APPENDIX G: WETLANDS/WATERS OF THE US

G1: Wetland Delineation

G2: Wetland Value Assessment Methodology and Assumptions

G1: Wetland Delineation

USACE Delineation Concurrence

William Nethery

Digitally signed by William Nethery
Date: 2022.09.08 09:04:35 -05'00'

INTERNAL TRACKING SHEET FROM RG-J

(to be used for applications where no JD has been requested by applicant)

Account #: 2012-02806 Account Name: MBSD

DATE: 8/29/2022 SUBJECT: Delineation Only/Delineation Concurrence

MEMORANDUM FOR CEMVN-RG-E, ATTN: Brad Laborde

MEMORANDUM FROM CEMVN-RG-J, Jurisdiction & Enforcement Branch

==

PARISH: Plaquemines SECTION 25 TWP 16S RANGE 25E

PROPERTY/PROJECT DESCRIPTION: Mid Barataria Sediment Diversion

OWNER/COMPANY NAME: Numerous

==

1. After careful review, the Jurisdiction & Enforcement Branch has:

   ☐ Provided a delineation.

   ☒ Concurred with the submitted delineation.

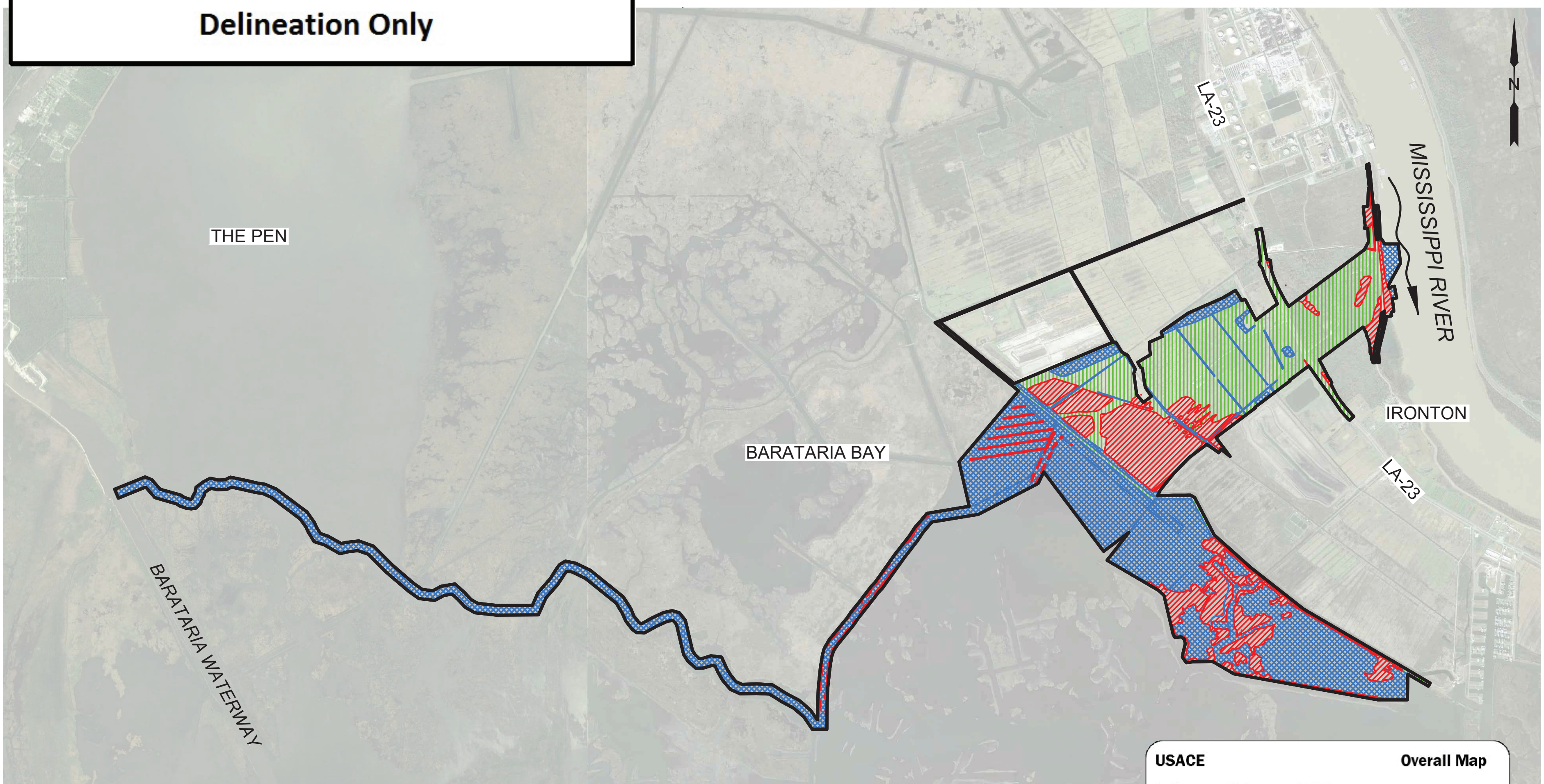
   OTHER: _____

2. Additional comments: Confirmed via desktop resources

3. P.O.C. for this: Jon Barmore, x 1704

US Army Corps of Engineers

Delineation Only



MBSD WETLAND DELINEATION KEY PLAN

SCALE: 1" = 1 MILE

1 MILE 0 1 MILE 2 MILES

SCALE: 1" = 1 MILE

WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.
2. HDR, 2014. Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands. Mid-Barataria Sediment Diversion (BA-153). Plaquemines Parish, LA. Prepared CPRA, July 2014 Amendment.
3. Basin wetland delineation by Jacobs Engineering based on 11/28/2019 Maxar, Google Earth, 0.5 m resolution.

USACE **Overall Map**

In House, 29 August 2022

BOTANIST Mr. Jon Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

Wetlands

Non–wetland waters

Uplands

JD Review Area

LEGEND:

OPEN WATER

NON-WETLAND WETLANDS

COASTAL PROTECTION AND RESTORATION AUTHORITY CPRA

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY

ENGINEERING DIVISION

150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

DRAWN BY: PB	DESIGNED BY: GH	APPROVED BY: LD	
MID-BARATARIA SEDIMENT DIVERSION		WETLAND DELINEATION KEYPLAN	
CPRA PROJECT NUMBER: BA-0153			
PROJECT NUMBER:	DATE: APRIL 2022		
DRAWING FIGURE 1	SHEET 1 OF 7		

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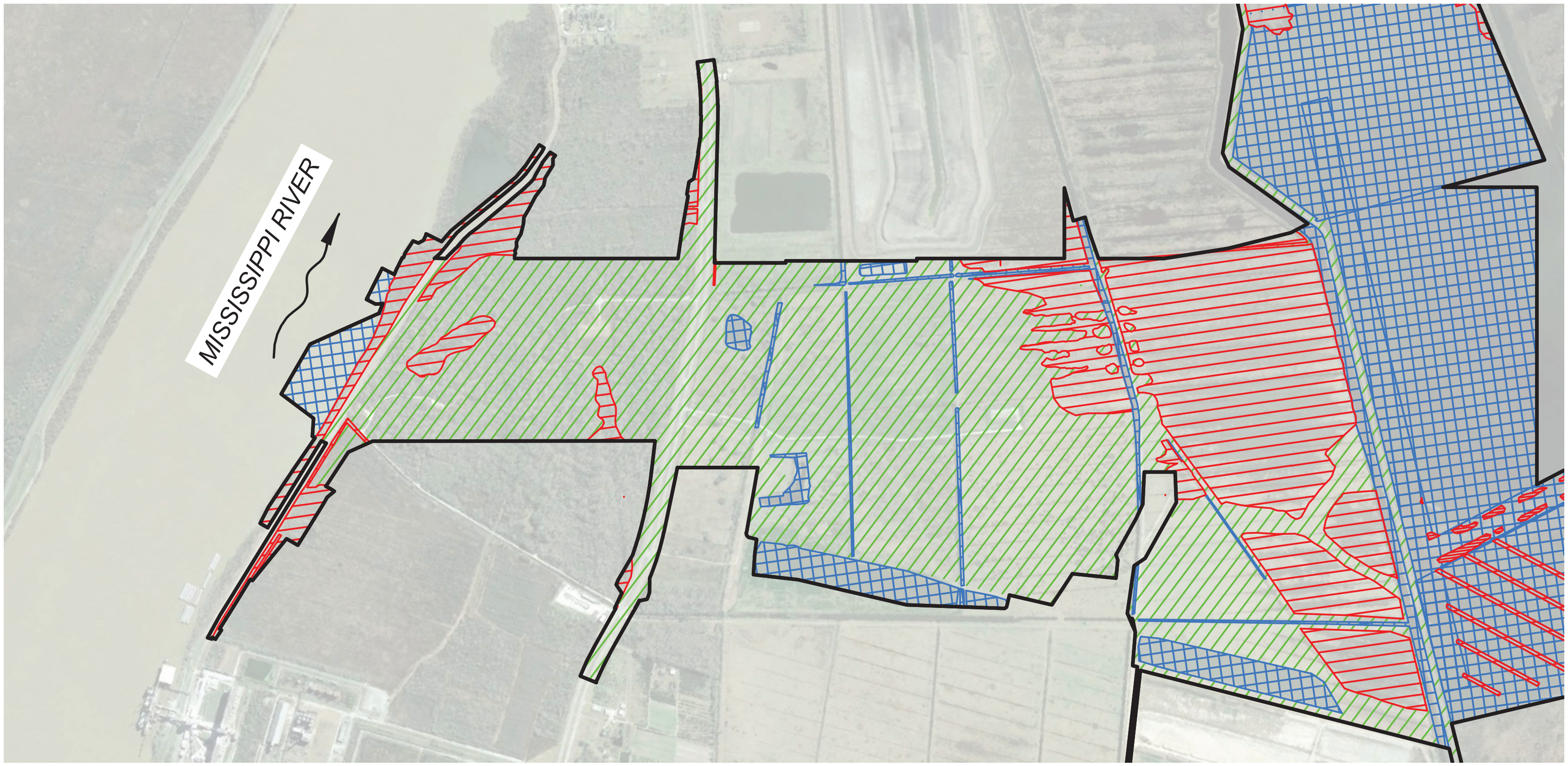
US Army Corps of Engineers
Delineation Only



MBSD WETLAND DELINEATION SITE PLAN
SCALE: 1" = 2000'

WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.
2. HDR, 2014. Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands. Mid-Barataria Sediment Diversion (BA-153). Plaquemines Parish, LA. Prepared CPRA, July 2014 Amendment.
3. Basin wetland delineation by Jacobs Engineering based on 11/28/2019 Maxar, Google Earth, 0.5 m resolution.

2000' 0 2000' 4000'
SCALE: 1" = 2000'

USACE Map 1 of 6

In House, 29 August 2022

BOTANIST Mr. Jon Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

Wetlands

Non-wetland waters

Uplands

JD Review Area

COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
ENGINEERING DIVISION
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

DRAWN BY: PB	DESIGNED BY: GH	APPROVED BY: LD

MID-BARATARIA SEDIMENT DIVERSION

CPRA PROJECT NUMBER: BA-0153

PROJECT NUMBER:

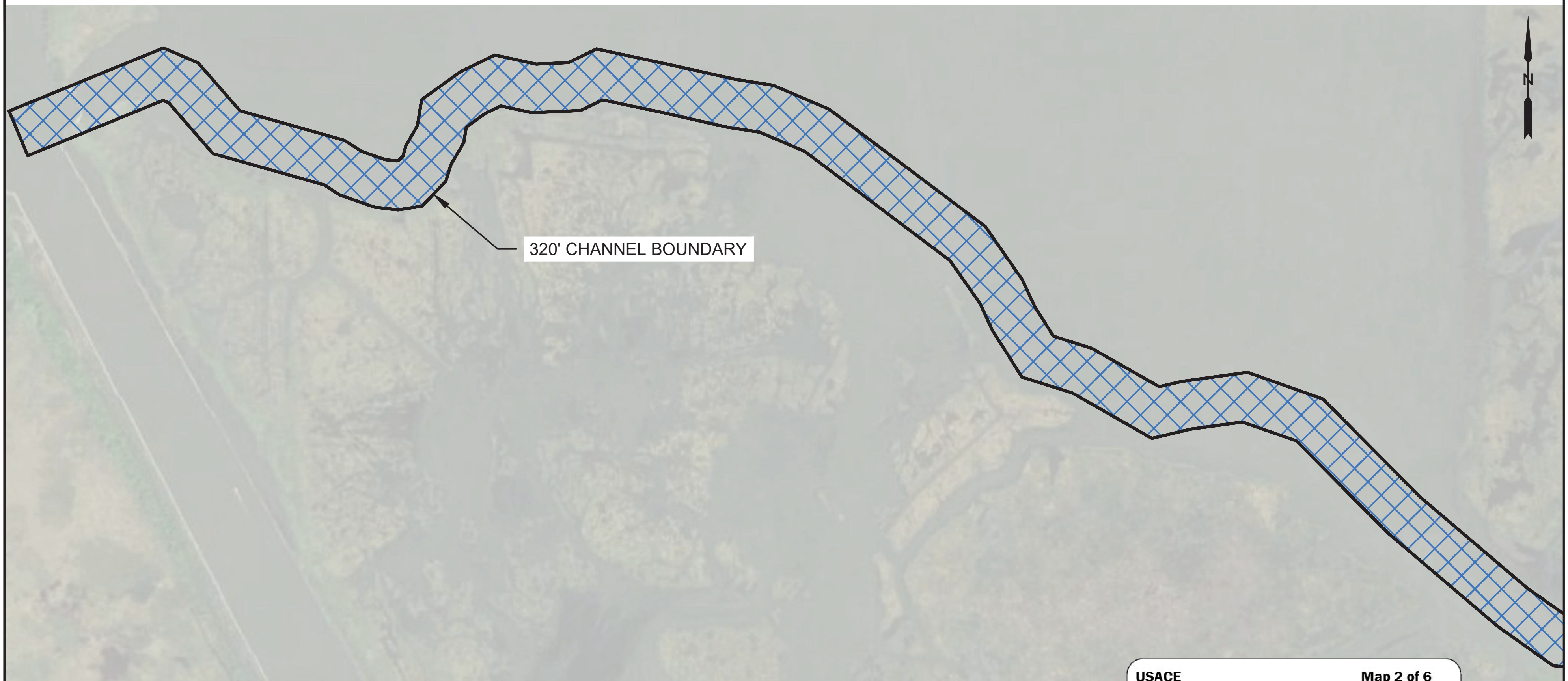
WETLAND DELINEATION SITE PLAN

DATE: APRIL 2022

DRAWING FIGURE 1 SHEET 2 OF 7

US Army Corps of Engineers

Delineation Only



MBSD WETLAND DELINEATION SITE PLAN
SCALE: 1" = 1000'

1000' 0 1000' 2000'
SCALE: 1" = 1000'

USACE **Map 2 of 6**

In House, 29 August 2022

BOTANI Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

Wetlands

Non–wetland waters

Uplands

JD Review Area

COASTAL PROTECTION AND RESTORATION AUTHORITY
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LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
ENGINEERING DIVISION
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

MID-BARA

LAND
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PLAN

CPRA PROJE

PROJECT NU

2022

DRAWN BY: PB | DESIGNED BY: GH | APPROVED BY:

1 | SHEET 3 OF 7

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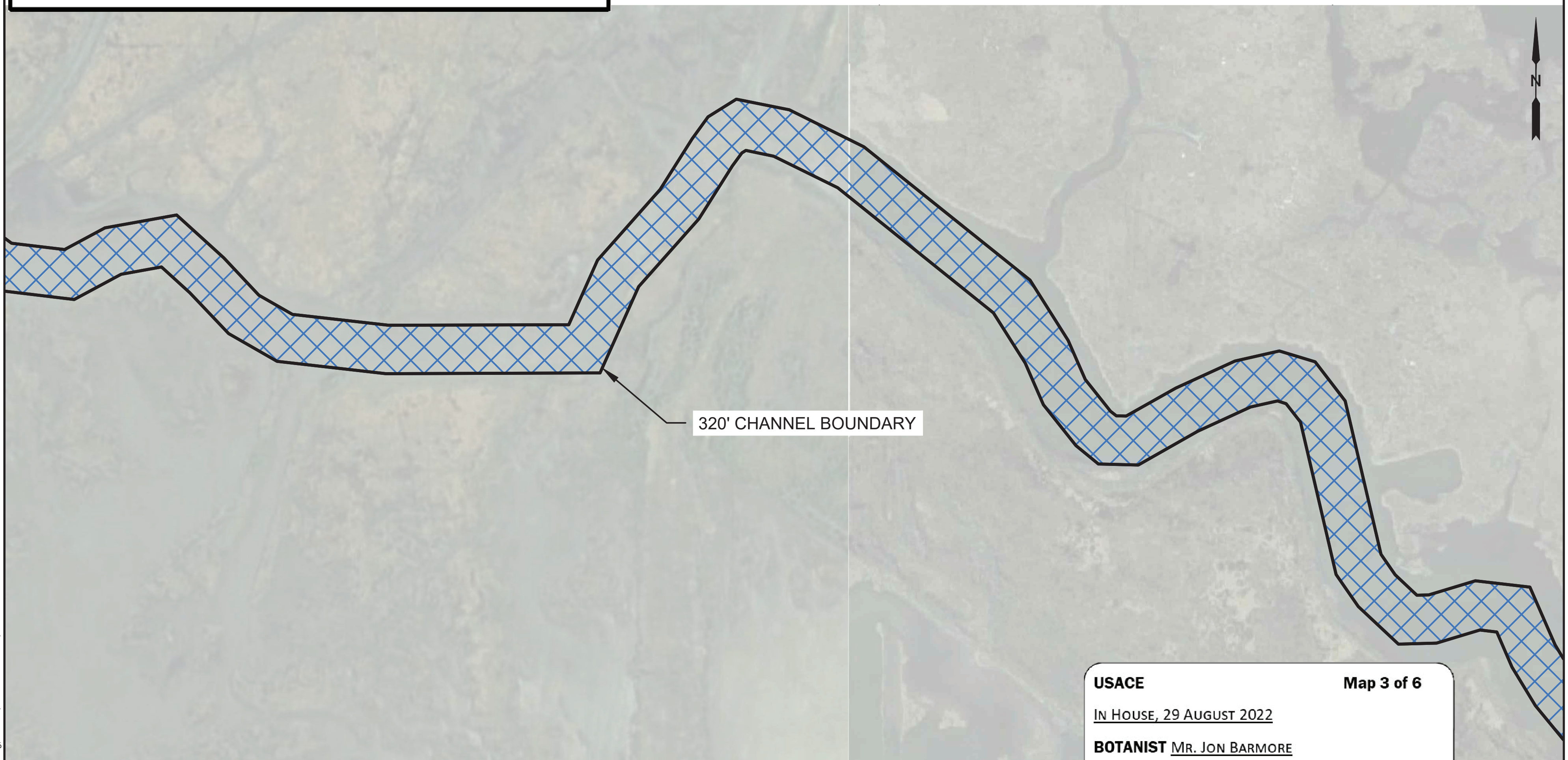
US Army Corps of Engineers

Delineation Only



USACE **Map 3 of 6**

In House, 29 August 2022

BOTANIST Mr. Jon Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

LEGEND:

OPEN WATER

Wetlands

Non–wetland waters

Uplands

JD Review Area

WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.

2. HDR, 2014. Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands. Mid-Barataria Sediment Diversion (BA-153). Plaquemines Parish, LA. Prepared CPRA, July 2014 Amendment.

3. Basin wetland delineation based on 11/28/2019 Maxar, Google Earth, 0.5 m resolution.

MBSD WETLAND DELINEATION SITE PLAN

SCALE: 1" = 1000'

1000' 0 1000' 2000'

SCALE: 1" = 1000'

COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY

ENGINEERING DIVISION

150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

MID-BARATARIA SEDIMENT DIVERSION

WETLAND DELINEATION SITE PLAN

CPRA PROJECT NUMBER: BA-0153

PROJECT NUMBER:

DATE: MARCH 2022

DRAWN BY: PB | DESIGNED BY: GH | APPROVED BY: ID | DRAWING FIGURE: 1 | SHEET 4 OF 7

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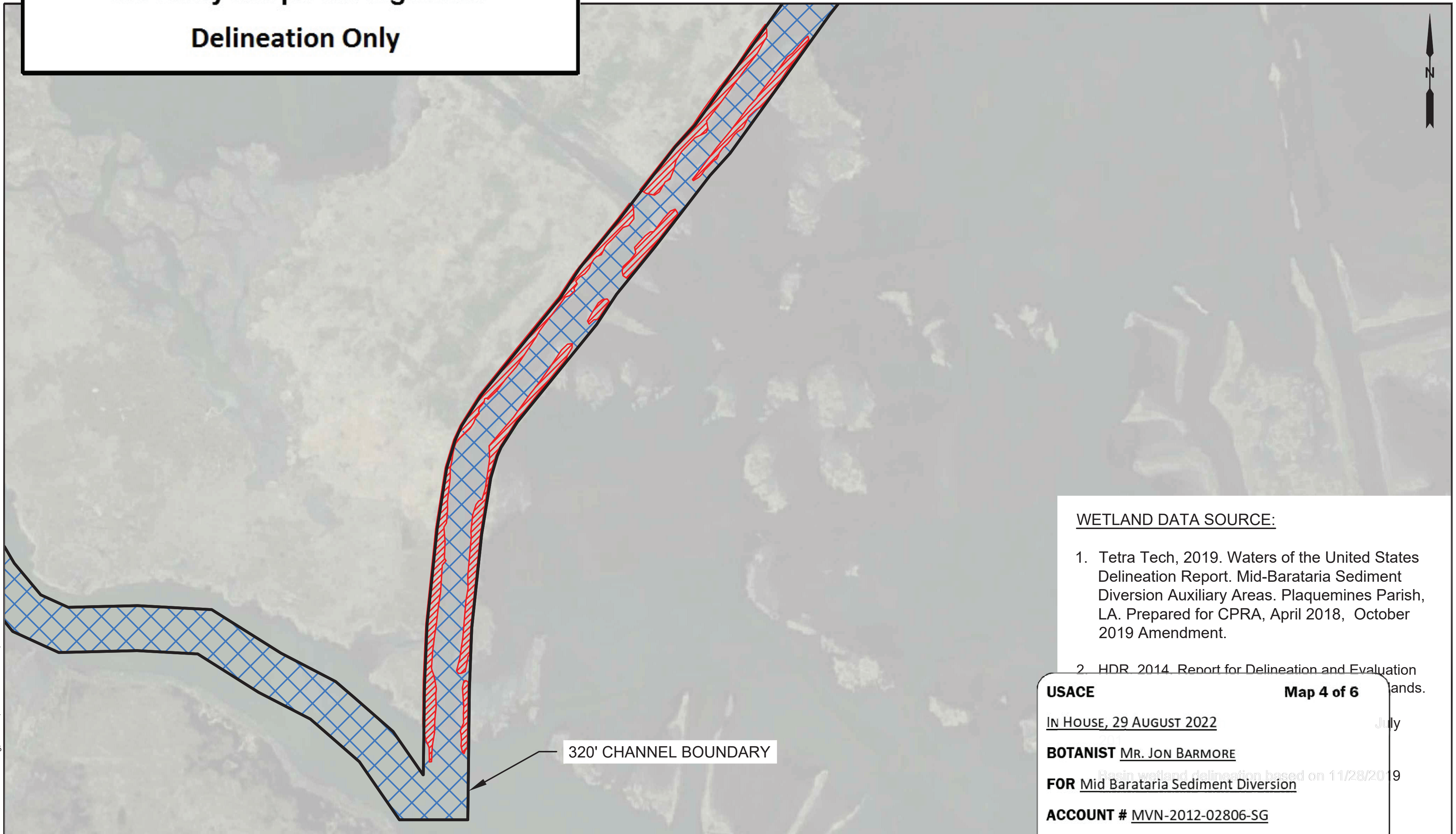
US Army Corps of Engineers
Delineation Only



WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.
2. HDR, 2014. Report for Delineation and Evaluation ... ands. ... July ... based on 11/28/2019

USACE	**Map 4 of 6**

IN HOUSE, 29 AUGUST 2022

BOTANIST MR. JON BARMORE

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

- Wetlands
- Non–wetland waters
- Uplands
- JD Review Area

MBSD WETLAND DELINEATION SITE PLAN
SCALE: 1" = 1000'

1000' 0 1000' 2000'
SCALE: 1" = 1000'

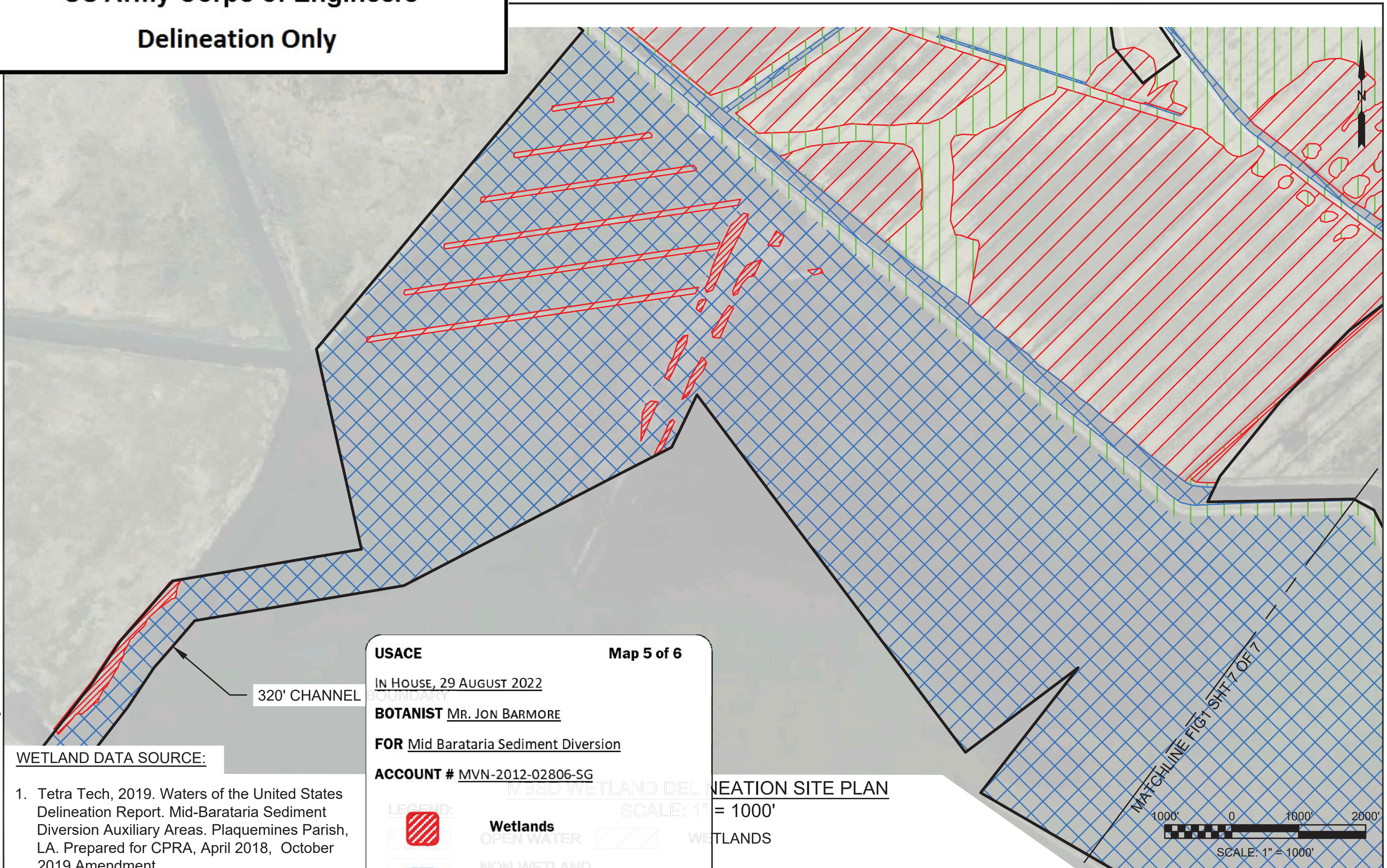
LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
ENGINEERING DIVISION
150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

MID-BA... | CPRA PROJ... | PROJECT N... | ...N

DRAWN BY: PB | DESIGNED BY: GH | APPROVED BY... | ...EET 5 OF 7

US Army Corps of Engineers

Delineation Only



USACE **Map 5 of 6**

In House, 29 August 2022

BOTANIST Mr. Jon Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

Legend:

- **Wetlands**
- **Non-wetland waters**
- **Uplands**
- **JD Review Area**

MBSD WETLAND DELINEATION SITE PLAN

SCALE: 1" = 1000'

LEGEND: OPEN WATER, NON-WETLAND, WETLANDS

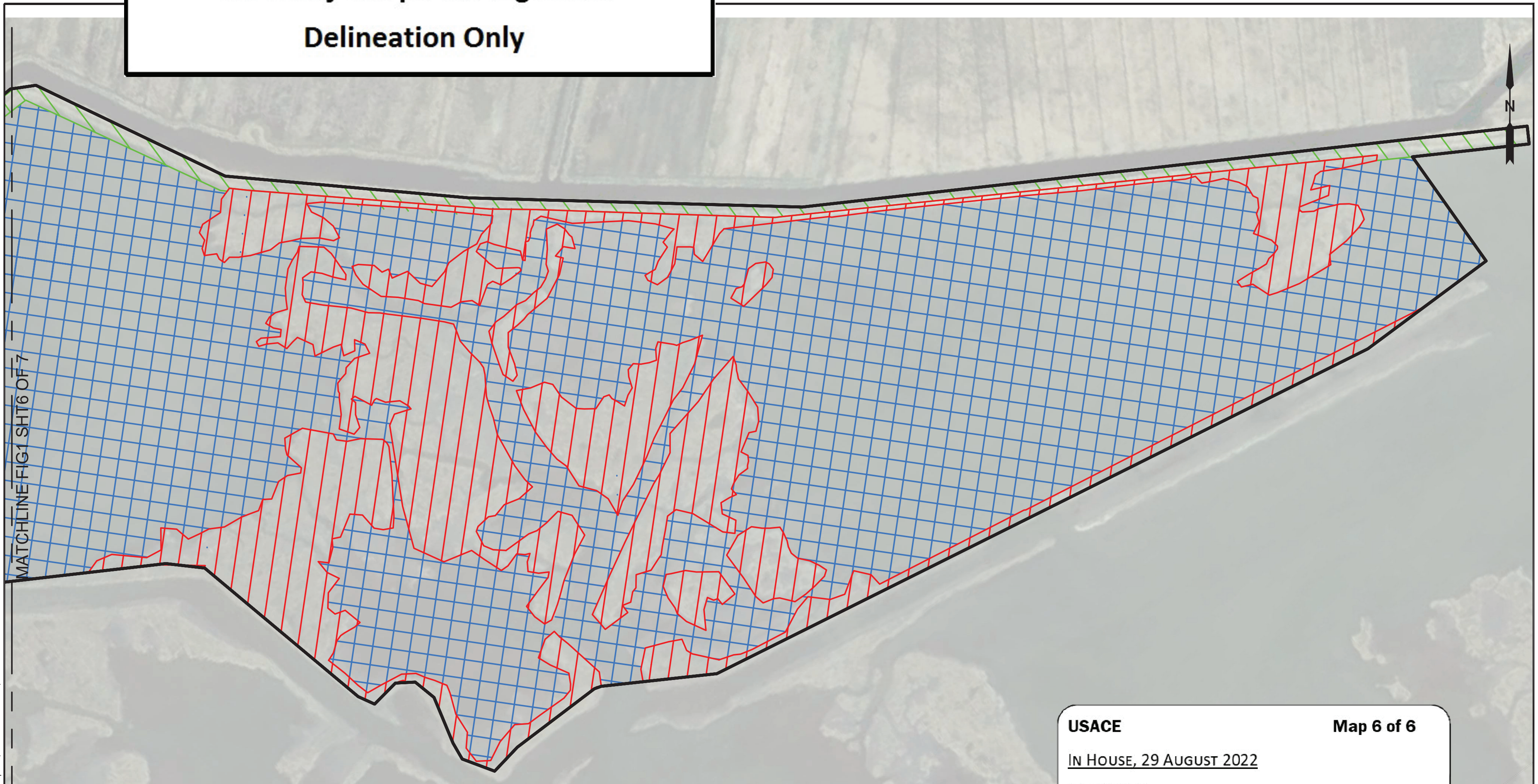
WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.
2. HDR, 2014. Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands. Mid-Barataria Sediment Diversion (BA-153). Plaquemines Parish, LA. Prepared CPRA, July 2014 Amendment.
3. Basin wetland delineation based on 11/28/2019 Maxar, Google Earth, 0.5 m resolution.

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY ENGINEERING DIVISION 150 TERRACE AVENUE BATON ROUGE, LOUISIANA 70802	MID-BARATARIA SEDIMENT DIVERSION	WETLAND DELINEATION SITE PLAN	
	CPRA PROJECT NUMBER: BA-0153		
	PROJECT NUMBER:	DATE: MARCH 2022	
DRAWN BY: PB / DESIGNED BY: GH	APPROVED BY: LD	DRAWING FIGURE 1	SHEET 6 OF 7

US Army Corps of Engineers

Delineation Only



MBSD BENEFICIAL USE AREA PLAN
SCALE: 1" = 1000'

1000' 0 1000' 2000'

SCALE: 1" = 1000'

WETLAND DATA SOURCE:

1. Tetra Tech, 2019. Waters of the United States Delineation Report. Mid-Barataria Sediment Diversion Auxiliary Areas. Plaquemines Parish, LA. Prepared for CPRA, April 2018, October 2019 Amendment.
2. HDR, 2014. Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands. Mid-Barataria Sediment Diversion (BA-153). Plaquemines Parish, LA. Prepared CPRA, July 2014 Amendment.
3. Basin wetland delineation by Jacobs Engineering based on 11/28/2019 Maxar, Google Earth, 0.5 m resolution.

COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY

ENGINEERING DIVISION

150 TERRACE AVENUE
BATON ROUGE, LOUISIANA 70802

DRAWN BY: PB | DESIGNED BY: GH

MID-BARATARIA SEDIMENT DIVERSION

CPRA PROJECT NUMBER:

PROJECT NUMBER:

APPROVED BY:

MBSD BENEFICIAL USE AREA PLAN

DATE: APRIL 2022

DRAWING FIGURE 1 SHEET 6 OF 7

USACE **Map 6 of 6**

In House, 29 August 2022

BOTANIST Mr. Jon Barmore

FOR Mid Barataria Sediment Diversion

ACCOUNT # MVN-2012-02806-SG

LEGEND:

Wetlands

WETLANDS

NON-WETLAND

Non–wetland waters

Uplands

JD Review Area

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Auxiliary Areas

WATERS OF THE UNITED STATES DELINEATION REPORT

Mid Barataria Sediment Diversion Auxiliary Areas
Plaquemines Parish, LA

Prepared for

The Coastal Protection and Restoration Authority (CPRA)

April 2018
Updated October 2019

Prepared by

Tetra Tech
748 Main Street, Suite B
Baton Rouge, LA 70802

CONTENTS

1.0 Introduction 1
2.0 Methods 2
 2.1 Overview 2
 2.2 Vegetation 2
 2.3 Soils 3
 2.4 Hydrology 3
3.0 Delineation Results 4
 3.1 Site Description 4
 3.2 Vegetation 4
 3.3 Soils 5
 3.4 Hydrology 6
4.0 Conclusion 8
5.0 References 9

FIGURES

Figure 1 General Vicinity Map
Figure 2 Site Location Map
Figure 3 Wetlands/Waters of the US Determination Overview Map
Figure 4-12 Wetlands/Waters of the US Determination Map
Figure 13-19 Soil Map

APPENDICES

Appendix A Field Data Sheets
Appendix B Photographic Documentation

1.0 Introduction

The following report summarizes the waters of the United States (U.S.) determination and delineation conducted on the approximately 606-acre Mid Barataria Sediment Diversion Auxiliary Area wetland delineation project located in Plaquemines Parish, Louisiana. The overall project site is bordered to the east by the Mississippi River; to the west by a protection levee, open water, and marsh; and bordered to the north and south by undeveloped property (Figure 1). The project area encompasses the 8 units and corresponding acreage listed below (Figure 2):

1. Pump station 70 acres
2. Siphon north 116 acres
3. Siphon south 100 acres
4. Hwy 23 north 43 acres
5. Hwy 23 south 65 acres
6. Rail north 37 acres
7. Rail south 24 acres
8. Supplemental (2019) 151 acres

"Jurisdictional waters" shall mean wetlands, ponds, streams, and other waterways that are regulated by federal, state, or regional agencies. Wetlands with "jurisdictional status" are waters of the U.S. as defined by Section 404 of the Clean Water Act (CWA). These types of wetlands are regulated by the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (EPA). Several classes of water bodies are subject to federal jurisdiction under the CWA, including traditional navigable waters (TNWs); non-navigable tributaries of TNWs that are relatively permanent waters (RPWs); and wetlands that directly abut RPWs (USACE 2007).

The regulations specify that tributaries to waters of the U.S. should be considered waters of the U.S. In the absence of adjacent wetlands, lateral jurisdiction over non-tidal waters extends to the ordinary high water mark. The definition of the ordinary high water mark is "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." (Federal Register 2000)

In Louisiana, there is no state or regional agency that interprets jurisdictional waters differently from the federal agency for the types of activities contemplated herein; therefore, for purposes of this investigation, jurisdictional waters are those regulated by the USACE pursuant to Section 404 of the Clean Water Act.

2.0 Methods

2.1 Overview

The waters of the U.S. determination and delineation followed the on-site routine field procedures as outlined in the *1987 Corps of Engineers Wetlands Delineation Manual and subsequent Regulatory Guidance Letters (RGL)* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Version 2.0* (USACE 2010). The *Wetlands Delineation Manual* outlines three criteria for delineating a feature as a wetland: hydrology, hydric soils, and hydrophytic vegetation. A feature must satisfy all three criteria to be classified as a wetland. This investigation involved collection and review of pertinent background information, followed by an on-site survey and delineation to meet the objectives of the study.

This on-site field investigation was conducted to determine the presence of jurisdictional waters of the U.S. that occur within the project area. Tetra Tech wetland scientists reviewed the U.S. Geological Survey (USGS) DOQQ maps (USGS 2015) and the Plaquemines Parish Soil Survey (NRCS 2017) prior to the initiation of fieldwork to identify the potential extent of jurisdictional waters of the U.S. located within the project area. USACE jurisdiction was evaluated using the methodologies prescribed in the USACE *Jurisdictional Determination Form Instruction Guidebook*, including the December 2, 2008, Corps/EPA revised Rapanos guidance (USACE and USEPA 2008).

A field investigation was conducted by Tetra Tech wetland scientists between February 27, 2018 to March 8, 2018, and September 20, 2019 to verify the extent of jurisdictional waters of the U.S. located within the project area. A total of 27 Wetland Delineation Data Forms – Atlantic and Gulf Coastal Plain Region Version 2.0, as approved by Headquarters, USACE 11/10, were completed within the project area (Appendix A). These data forms contain information regarding the presence, or absence, of hydric soils, hydrophytic vegetation, and wetland hydrology. Photographs were taken throughout the site to document dominant vegetative communities and general site conditions. Wetland boundaries were recorded utilizing a handheld global positioning system. A georeferenced wetland delineation boundary suitable for overlay onto project maps and aerial photographs was created using ArcMap 10.4 (Environmental Systems Research Institute, Inc., Redlands, CA) mapping software (Figures 3-12). Photographs taken within the project area during the field efforts are presented in Appendix B. Specific methods for characterizing and evaluating the soils, vegetation, and hydrologic indicators within the plant communities, are described below.

2.2 Vegetation

The USACE defines hydrophytic vegetation as the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present (USACE 2014). Vegetation strata within a plot are sampled separately when evaluating indicators of hydrophytic vegetation. Plant species in the Atlantic and Gulf Coastal Plain Region Version 2.0 are recorded as one of the four following strata:

1. Tree Stratum – Woody plants, excluding woody vines, 3 in (7.6 cm) or larger diameter at breast height (DBH), regardless of height.

2. Sapling/Shrub Stratum – Woody plants, excluding woody vines, less than 3 in (7.6 cm) DBH and greater than 3.28 ft. (1 meter) tall.

3. Herb Stratum - All herbaceous (non-woody) plants, regardless of size, and woody species less than approximately 3.28 ft. (1 meter) tall.

4. Woody Vines – All woody vines greater than 3.28 ft. (1 meter) tall. (USACE 2010).

Dominant vegetation was sampled by visual estimation or percent cover of vegetation layers to determine the presence of hydrophytic vegetation at each sample location. The dominance test is the basic hydrophytic vegetation indicator to be applied to wetlands in the coastal plain. Plant communities meet hydrophytic vegetation criteria if greater than 50 percent of the dominant species from all strata are Obligate Wetland, Facultative Wetland, or Facultative as designated in USACE National Wetland Plant List – 2014 State Lists (USACE 2014). Wetland indicator status is assigned to plant species as follows:

- OBL: Occur almost always in wetlands (estimated probability >99%).
- FACW: Usually occur in wetlands (estimated probability 67% - 99%).
- FAC: Equally likely to occur in wetlands or non-wetlands (estimated probability 34% - 66%).
- FACU: Usually occur in uplands (estimated probability 67% - 99%).
- UPL: Occur almost always in uplands (estimated probability >99%).

2.3 Soils

Hydric soils are formed from being saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation as defined by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS 1998). Soils data are gathered from digging a hole to a depth of approximately 16-inches, or depth to refusal at each sample location, and then examining the extracted soil profile to determine if positive hydric soils indicators were present. Information recorded on the wetland delineation data forms included soil colors (hue, value, and chroma as per the 2000 revised edition of the Munsell Color Chart), size, abundance, and depth of mottles, as well as the soil texture. Hydric soil criteria were determined when soil samples indicated a matrix chroma of two or less in mottled soils or a matrix chroma of one or less in unmottled soils. Soil texture was determined using the "texture by feel" analysis.

2.4 Hydrology

Wetland hydrology is determined by the sum total of wetness characteristics in the area that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation (USACE 1987). Each sample plot was examined for wetland hydrology indicators, and indicators were recorded if present in the sample plot. A sample plot will meet wetland hydrology criteria if one primary indicator is present, or if the plot shows the presence of two or more secondary hydrology indicators. Primary wetland hydrology indicators include but are not limited to: surface water, high water table, saturation, water marks, sediment deposits, and drift deposits. Examples of secondary indicators include but are not limited to: surface soil cracks, sparsely vegetated concave surfaces, drainage patterns, FAC-Neutral Test.

3.0 Delineation Results

The approximately 606-acre Mid Barataria Sediment Diversion Auxiliary Area wetland delineation project located in Plaquemines Parish, Louisiana is described in the following sections in terms of soil, vegetation, and hydrologic characteristics.

3.1 Site Description

The project area is comprised of approximately 606 acres of undeveloped property. The portions of the project site located west of LA Highway 23 primarily consist of pasture/grazing land. The remaining project area located east of LA Highway 23 is comprised of dense wooded areas with intermittent clearings from local outdoor activities. The majority of the surveyed area is located within fast lands of the USACE – New Orleans Division Polder Oakville to St. Jude, which is bounded by the New Orleans to Venice/Non-Federal Levee and the Mississippi River Levee. The polder is drained by the Wilkinson Pump station, which has a receiving canal that borders the back levee. The overall project site is bordered to the east by the Mississippi River; to the west by a protection levee, open water, and marsh; and bordered to the north and south by undeveloped property (Figure 1). The project area encompasses the 8 units and corresponding acreage listed below (Figure 2):

1. Pump station 70 acres
2. Siphon north 116 acres
3. Siphon south 100 acres
4. Hwy 23 north 43 acres
5. Hwy 23 south 65 acres
6. Rail north 37 acres
7. Rail south 24 acres
8. Supplemental (2019) 151 acres

3.2 Vegetation

The vegetation found in the project area consists mainly of various tree, shrub, and vine species located east of Highway 23 and primarily various herbaceous species located west of Highway 23. Dominant and common species found in the project area includes:

Quercus virginiana, *Quercus nigra, Acer negundo, Triadica sebifera, Liquidambar styraciflua, Sabal minor, Morella cerifera, Carya aquatica, Acer rubrum, Smilax laurifolia*, *Vitis rotundifolia, Toxicodendron radicans, Toxicodendron pubescens, Ampelopsis arborea, Baccharis halimifolia, Rubus trivialis, Rubus* sp.*, Lonicera japonica, Salix nigra, Celtis laevigata, Callicarpa americana, Ligustrum sinense, Juncus effusus, Eleocharis palustris, Eleocharis montevidensis*, *Eleocharis sp., Spartina patens, Trifolium repens, Cynodon dactylon, Polygonum pensylvanicum, Solidago sempervirens, Ambrosia trifida, Helenium autumnale, Vigna luteola, Hydrocotyle prolifera, Andropogon glomeratus, Allium vineale, Dryopteris ludoviciana*, *Carex* sp., *Cirsium vulgare, and Ampelopsis arborea.*

3.3 Soils

According to the NRCS Web Soil Survey (NRCS 2018a, 2019) and Plaquemines Parish Soil Survey (NRCS 2018a), soil occurring within the project area include: Cancienne silt loam, 0 to 1 percent slopes; Cancienne silty clay loam, 0 to 1 percent slopes; Carville, Cancienne, and Schriever soils, frequently flooded; Clovelly muck, 0 to 0.2 percent slopes, very frequently flooded; Harahan clay, 0 to 1 percent slopes; Lafitte-Clovelly association, 0 to 0.2 percent slopes, very frequently flooded; Lafitte muck, 0 to 0.2 percent slopes, very frequently flooded; Westwego clay, 0 to 0.5 percent slopes (Figures 13-19). All soils occurring within the project area are listed as hydric soils (NRCS 2018b). The hydric soil indicators found during the investigation were depleted matrix. A brief description of each series is below:

Cancienne series

The Cancienne series consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries. Slopes range from 0 to 3 percent. Cancienne soils are on natural levee positions on the alluvial plain of the lower Mississippi River and its distributaries.

Carville

The Carville series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in recent loamy alluvium. These soils are on nearly level to very gently sloping natural levee positions on flood plains, mainly along the Mississippi River and its distributaries. Slopes range from 0 to 2 percent.

Clovelly series

The Clovelly series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in moderately thick accumulations of herbaceous organic material overlying very fluid clayey alluvial sediments. These soils are on broad coastal marshes that are nearly continuously flooded with brackish water. Slope ranges from 0 to 0.2 percent. Clovelly soils are on intermediate or brackish marshes that border saline bays, saline marshes, or open Gulf waters. They flood frequently or very frequently with intermediate or brackish water during high tides.

Harahan series

The Harahan series consist of very deep, poorly drained, very slowly permeable soils. They formed in moderately thick firm clayey alluvium overlying fluid clayey sediments. These soils are on broad backswamp positions on the lower Mississippi River flood plain. Slopes range from 0 to 1 percent. These soils are protected from flooding by levees, and are artificially drained by pumps. Harahan soils are in artificially drained backswamp positions on the flood plain of the lower Mississippi River and its distributaries. They formed from fluid, alluvial clays that were artificially altered by man to become firm and form a solum in the upper 20 to 40 inches. Elevations are about sea level to 1 or 2 feet below sea level.

Lafitte series

The Lafitte series consists of very deep, very poorly drained, moderately rapidly permeable organic soils in the Gulf Coast Marsh (MLRA 151) and the Eastern Gulf Coast Flatwoods (MLRA 152A)

Major Land Resource Areas. They formed in herbaceous plant remains over mineral sediments in intermediate and brackish marshes in the extreme lower Mississippi River Delta and coastal areas. Lafitte soils are in large areas of intermediate to brackish marshes in the extreme lower Mississippi River delta and coastal areas. They commonly adjoin large brackish water lakes. Elevation is typically one foot above mean sea level to about 3 feet below. Lafitte soils formed in herbaceous plant remains that overlie mineral sediments.

Schriever series

The Schriever series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain. Slope is dominantly less than 1 percent but ranges up to 3 percent.

Westwego series

The Westwego series consist of deep, poorly drained, very slowly permeable soils. They formed in semifluid clayey alluvium and organic material that dried and shrank irreversibly in the upper part as the result of artificial drainage. These soils are on broad, drained former swamps along the lower Mississippi River and its distributaries. Slopes range from 0 to 0.5 percent. These soils are protected from flooding by a system of levees and are artificially drained by pumps. Westwego soils are on drained areas between the natural levees and marsh. The landscape was semifluid clayey swamps and swamp-marsh transition prior to reclamation. Elevations are generally 2 or 3 feet below sea level.

3.4 Hydrology

The majority of the project site has localized drainage to the ditches located throughout all the project areas. A brief description of the local hydrology for each site is listed below. The hydrology indicators observed during the field investigation, located at the data points, included; surface water, high water table, saturation, iron deposits, water-stained leaves, oxidized rhizospheres on living roots, presence of reduced iron, surface soil cracks, FAC-neutral test, sparsely vegetated concave surface, and drainage patterns.

Pump station

The hydrology of the pump station site is dissected by a levee/road and canal located to the east of the levee. All areas east of the levee drain west toward the canal through local man-made drainage ditches, with minimal localized drainage to isolated wetlands. The area located west of the levee has localized drainage to the surrounding marsh in the vicinity of Chenier Traverse Bayou. This area partially includes lands that were re-created by river sediments as part of the BA-39, Bayou Dupont project (indicated by point DP 13, Figure 4).

Siphon north

The hydrology of the siphon north site has localized drainage to man-made ditches located throughout the site, primarily flowing westward to the levee canal located along the western boundary of the site.

Siphon south

The hydrology of the siphon south site has localized drainage to man-made ditches located throughout the site, primarily flowing westward to the levee canal located along the western boundary of the site. The site is also dissected by 2 larger canals which appear to be used to control water levels south and west of the canals. The majority of the site seems to be used as a waterfowl hunting area which water is held purposely.

Hwy 23 north and south

The primary hydrology of the Highway 23 sites has localized drainage to man-made ditches located throughout the site and along the highway, flowing to larger canals located in the northern and southern portions of the project sites with minimal localized drainage to isolated wetlands located within the site.

Rail north

The hydrology of the rail north site is dissected by a road and man-made ditch running primarily east to west. The area north of the ditch has localized drainage to man-made ditches throughout the area with additional localized drainage to wetlands located within the site. The area south of road flows primarily toward Highway 23 through man-made ditches with additional localized drainage to wetlands throughout the site.

Rail south

The hydrology of the rail south site has localized drainage to man-made ditches located along the levee on the eastern side of the project site with additional localized drainage to wetlands located within the site.

Supplemental (2019)

The hydrology of the supplemental site is dissected by Highway 23, levee roads and man-made ditches running primarily northwest to southeast. The area east and north of Highway 23 has localized drainage to man-made ditches throughout the area with additional localized drainage to wetlands located within the site. The area west and south of Highway 23 has localized drainage to man-made ditches located throughout the site, primarily flowing westward to the levee canal located along the western boundary of the site. The site is also dissected by 2 larger canals which appear to be used to control water levels south and west of the canals.

4.0 Conclusion

This waters of the United States (U.S.) determination and delineation for the approximately 606-acre Mid Barataria Sediment Diversion Auxiliary Area wetland delineation project located in Plaquemines Parish, Louisiana project area followed the on-site routine field procedures as outlined in the *1987 Corps of Engineers Wetlands Delineation Manual and subsequent Regulatory Guidance Letters (RGL)* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Version 2.0* (USACE 2010). Results of the field investigation indicate the presence of approximately 253 acres of wetlands within the project area. A Waters of the U.S. data map that includes the approximate location of data points and the delineated wetland areas of the property can be found in Figures 3-12. A table summarizing the wetland acreage is listed below:

Site Number	Site Name	Total Acreage (acres)	Wetland Acreage (acres)
1	Pump station	70	31.1
2	Siphon north	116	50.3
3	Siphon south	100	89.7
4	Hwy 23 north	43	4.3
5	Hwy 23 south	65	18.9
6	Rail north	37	14.4
7	Rail south	24	11
8	Supplemental (2019)	151	33.2

The USACE, under the Clean Water Act, Section 404 and the Rivers and Harbor Act, Section 10 is authorized to make the final determination of the location and extent of jurisdictional wetlands and jurisdictional waters on this property, respectively. Use of this report should recognize the subjectivity associated with studies of this type and the limitations of the methods required by the 1987 Corps of Engineers Wetlands Delineation Manual.

5.0 References

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U.S. Geological Survey (USGS). 2015 Color Aerial Photographs.

FIGURES

Figure 1: Vicinity Map: Proposed Mid-Baratatia Sediment Diversion Project, Plaquemines Parish, LA

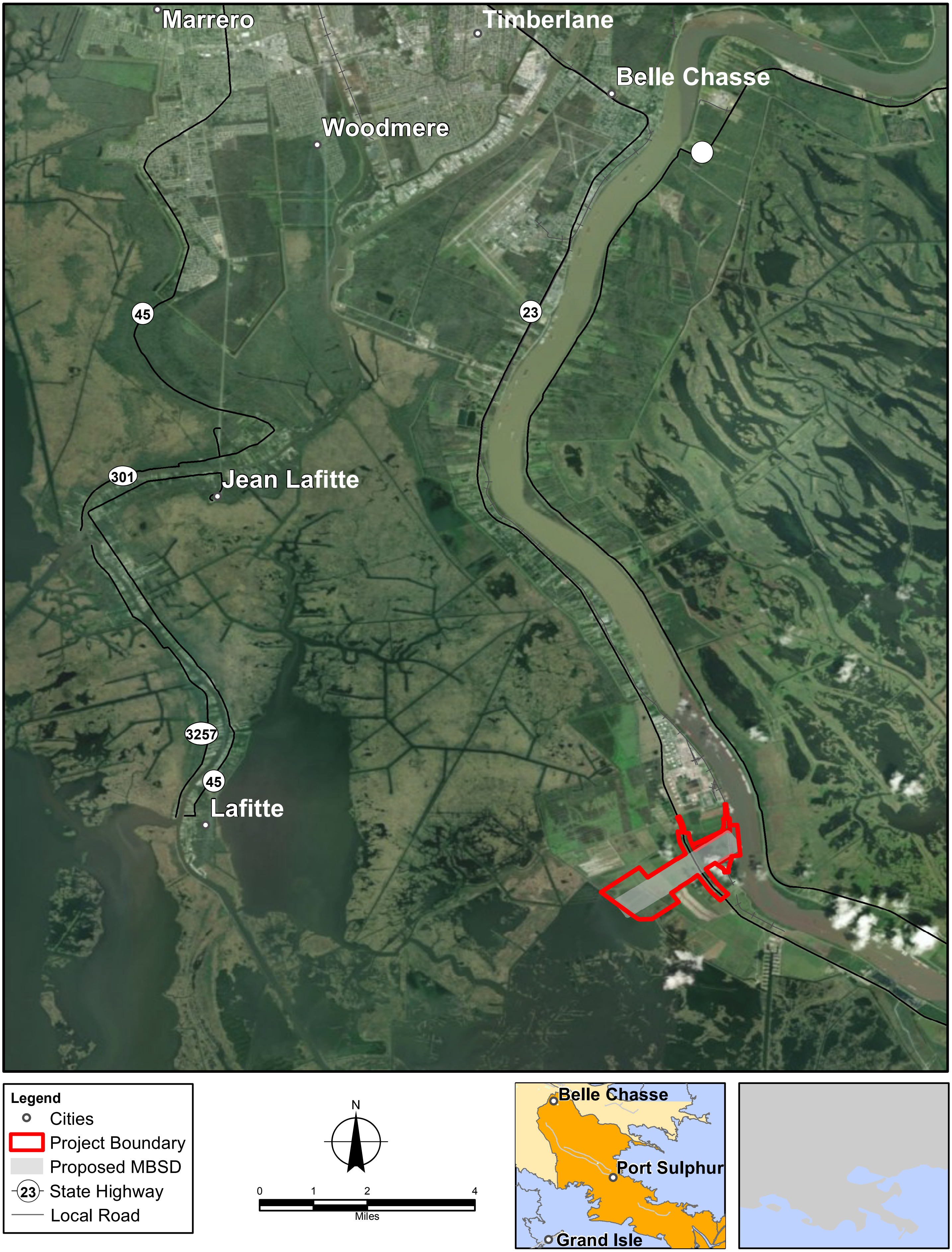


Figure 2: Site Location: Proposed Mid-Barataria Sediment Diversion Project, Plaquemines Parish, LA

Figure 3: Wetland Delineation: Proposed Mid-Baratatia Sediment Diversion Project, Plaquemines Parish, LA

Figure 4: Wetland Delineation: Site 1, Pump Station
Proposed MBSD Project, Plaquemines Parish, LA

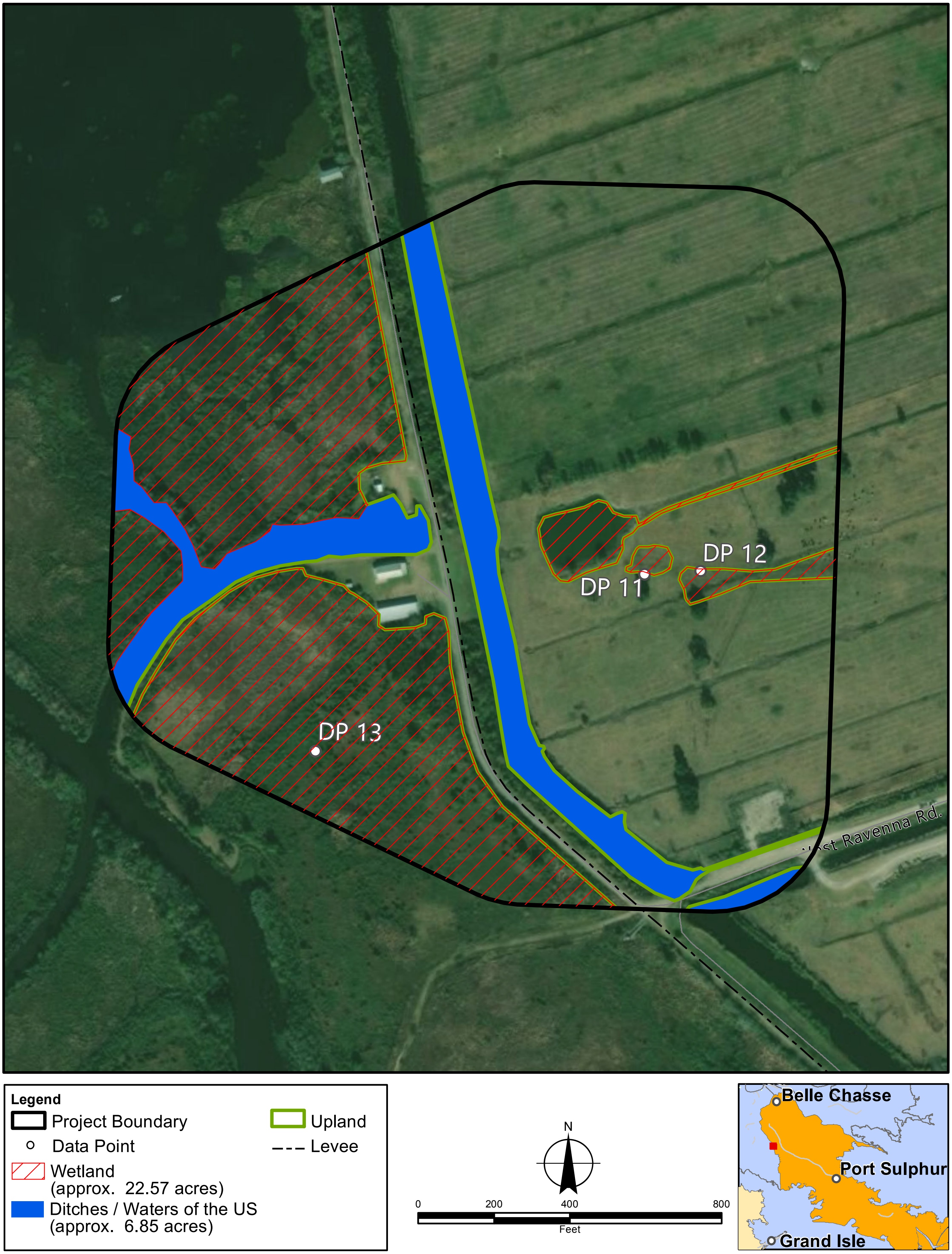
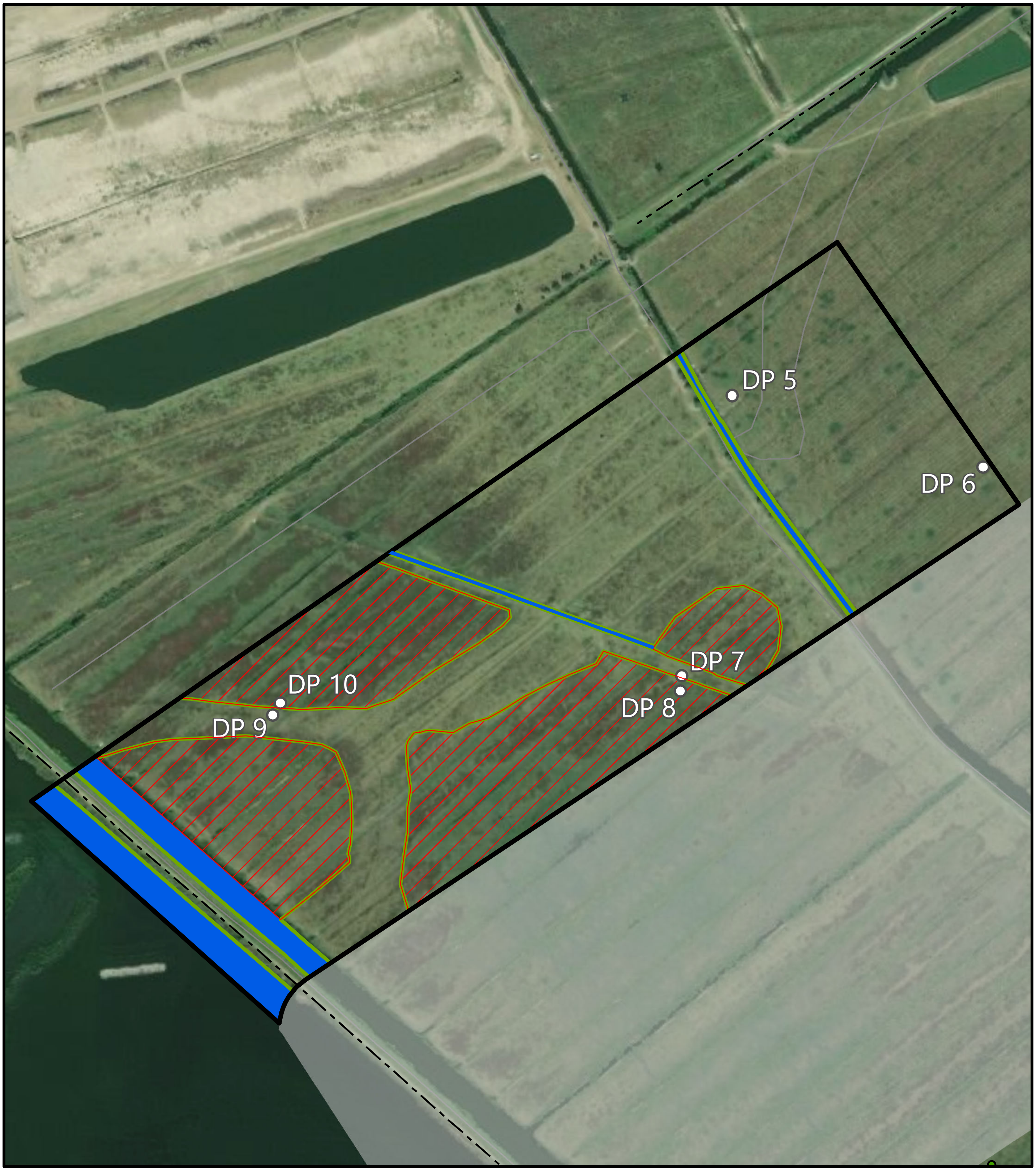
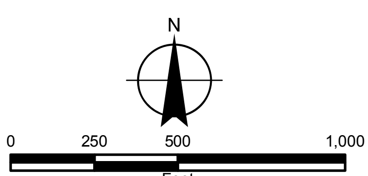


Figure 5: Wetland Delineation: Site 2, Siphon North
Proposed MBSD Project, Plaquemines Parish, LA



Legend
- Project Boundary
- Data Point
- Wetland (approx. 38.71 acres)
- Ditches / Waters of the US (approx. 8.3 acres)
- Upland
- Levee



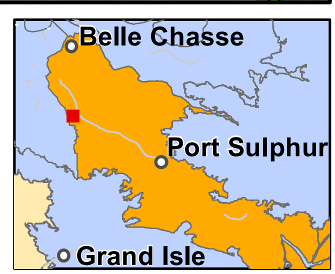


Figure 6: Wetland Delineation: Site 3, Siphon South Proposed MBSD Project, Plaquemines Parish, LA

Figure 7: Wetland Delineation: Site 4, Highway 23 North Proposed MBSD Project, Plaquemines Parish, LA

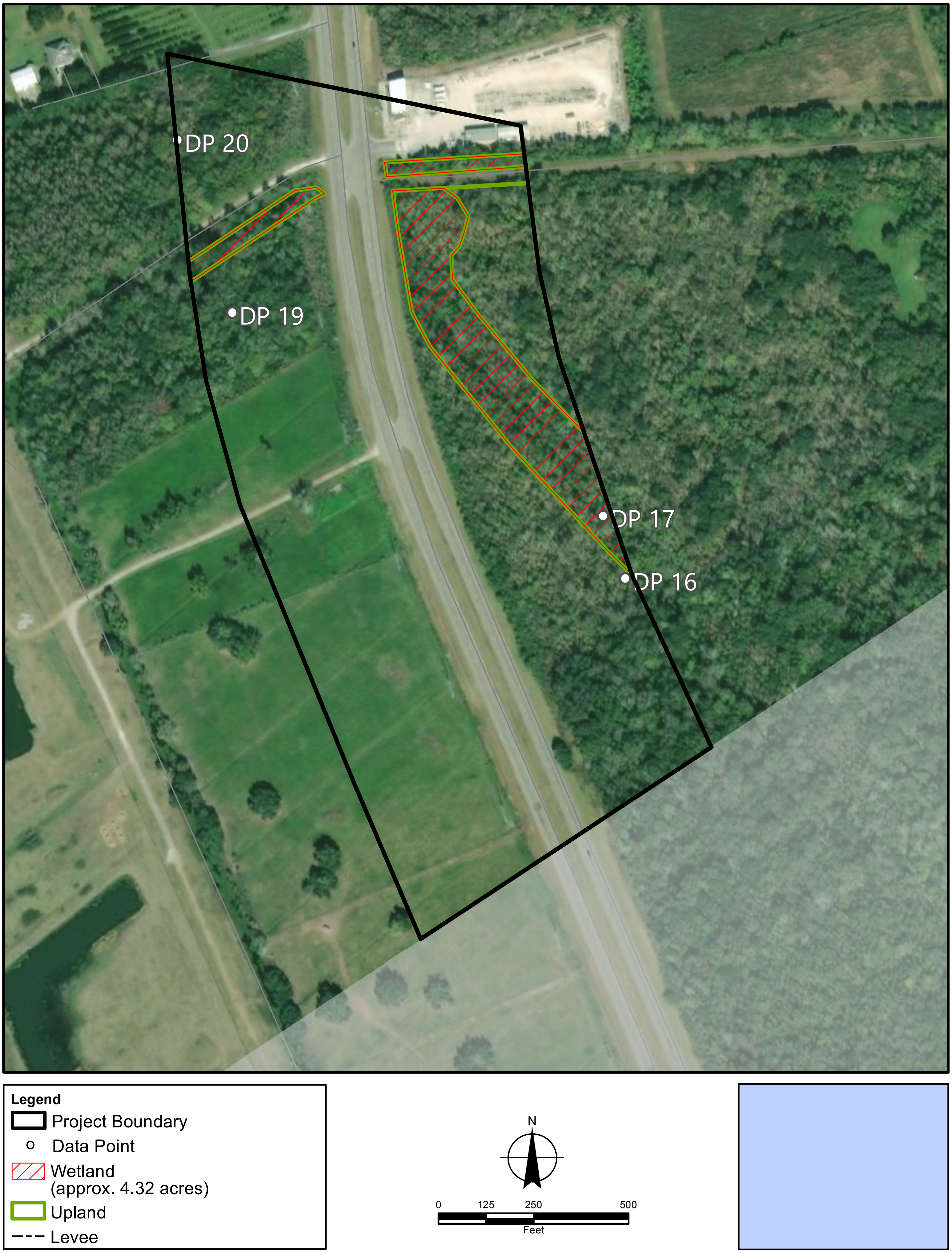


Figure 8: Wetland Delineation: Site 5, Highway 23 South Proposed MBSD Project, Plaquemines Parish, LA

Figure 9: Wetland Delineation: Site 6, Rail North
Proposed MBSD Project, Plaquemines Parish, LA

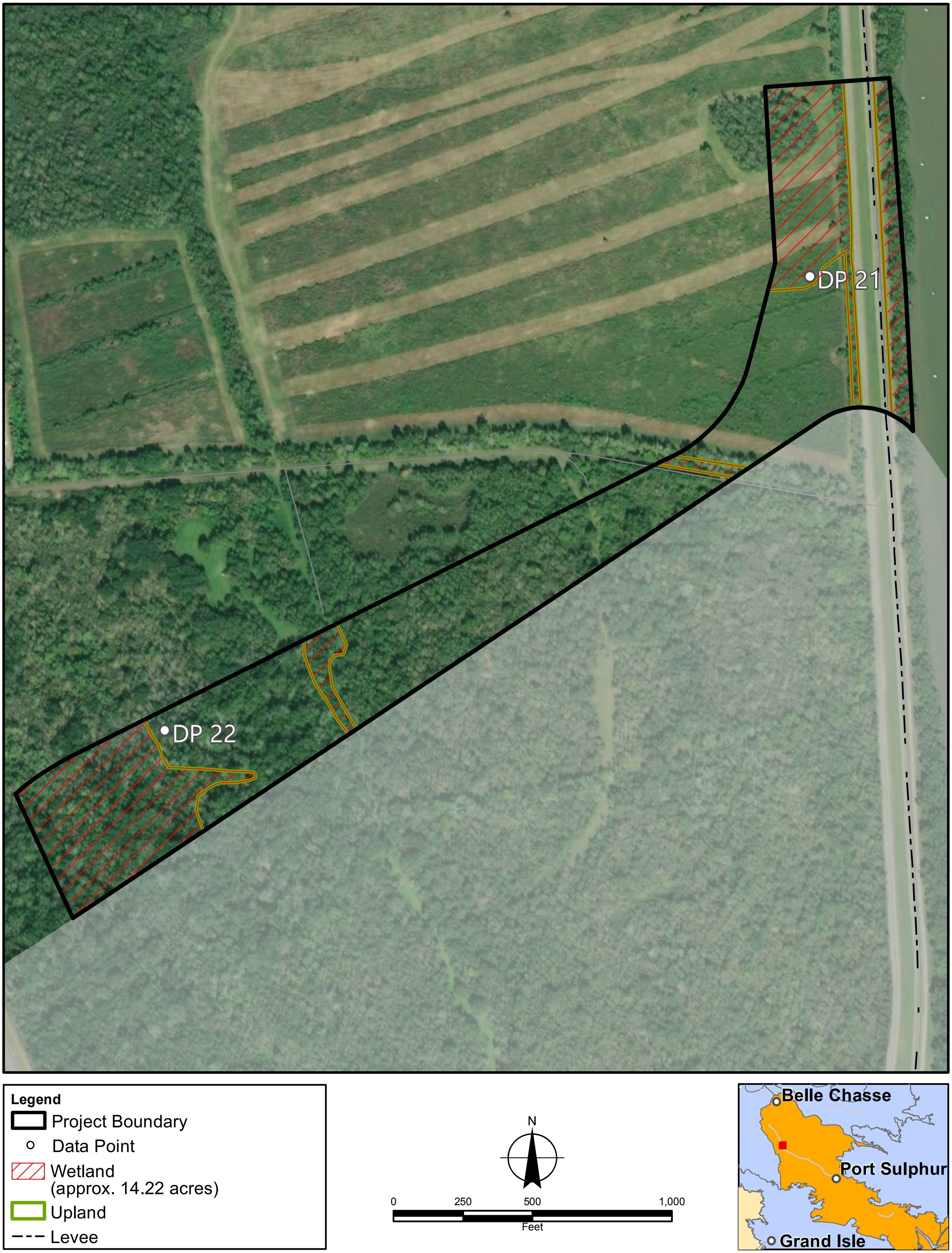


Figure 10: Wetland Delineation: Site 7, Rail South
Proposed MBSD Project, Plaquemines Parish, LA

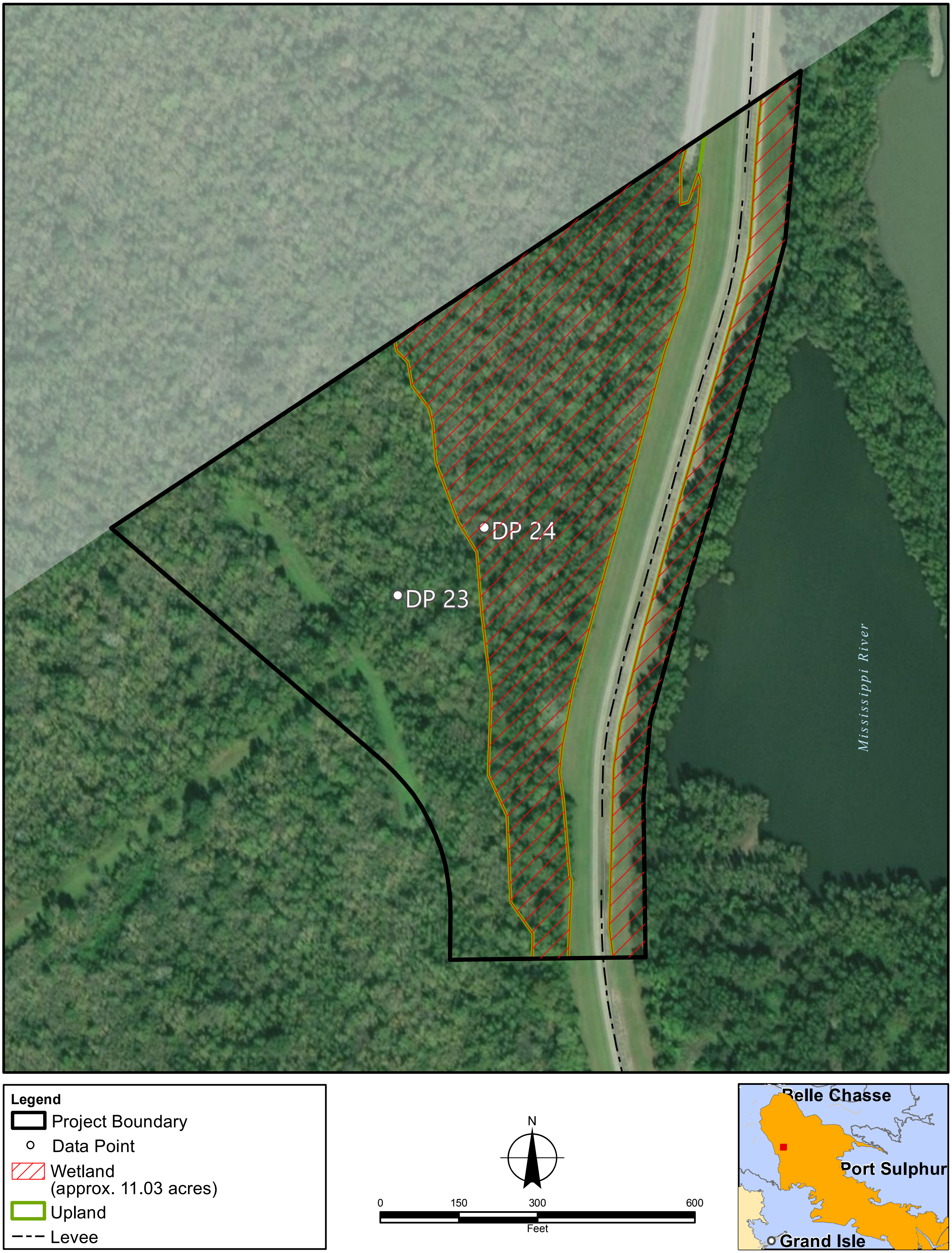


Figure 11: Wetland Delineation: Supplemental, Eastern Proposed MBSD Project, Plaquemines Parish, LA

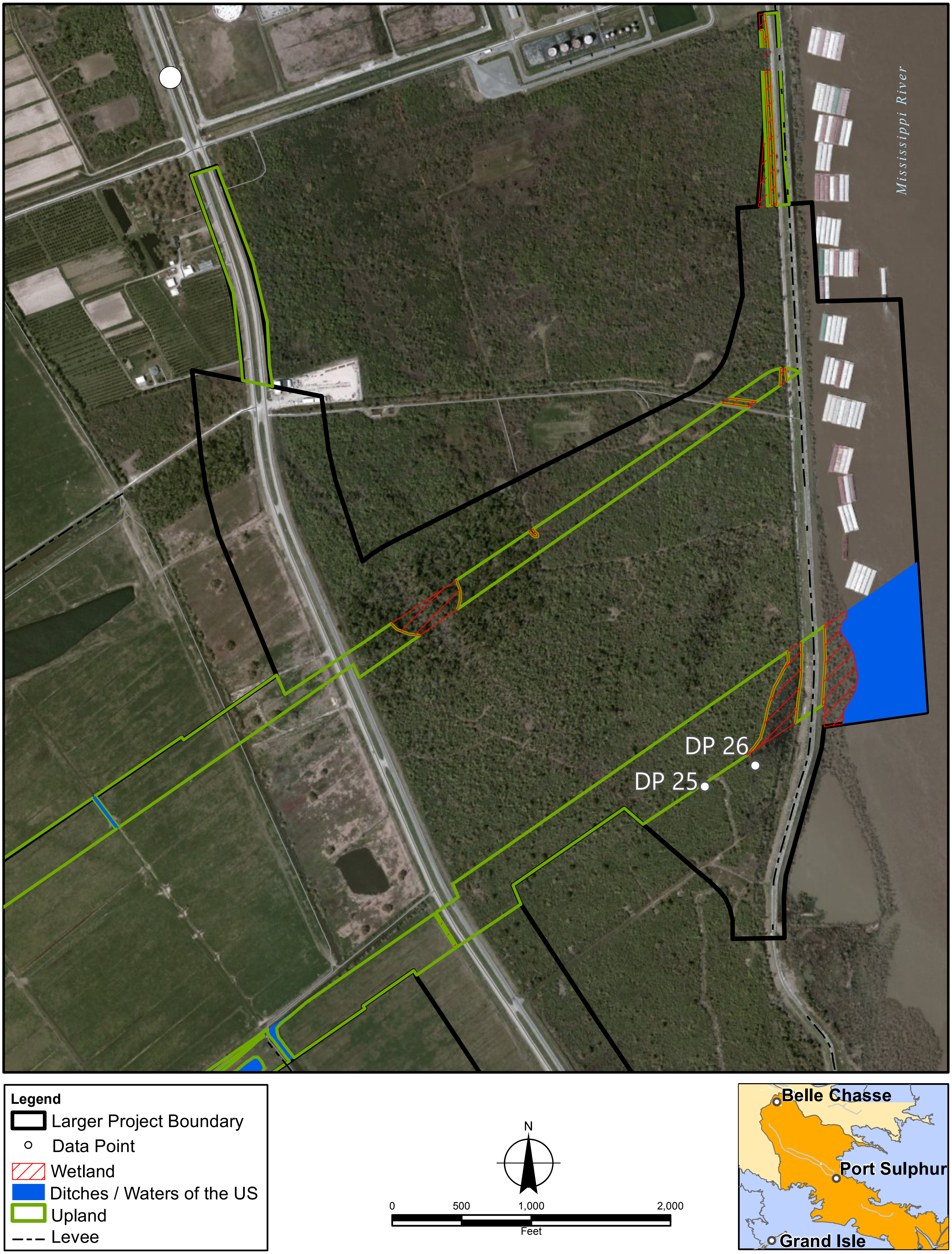


Figure 12: Wetland Delineation: Supplemental, Western Proposed MBSD Project, Plaquemines Parish, LA

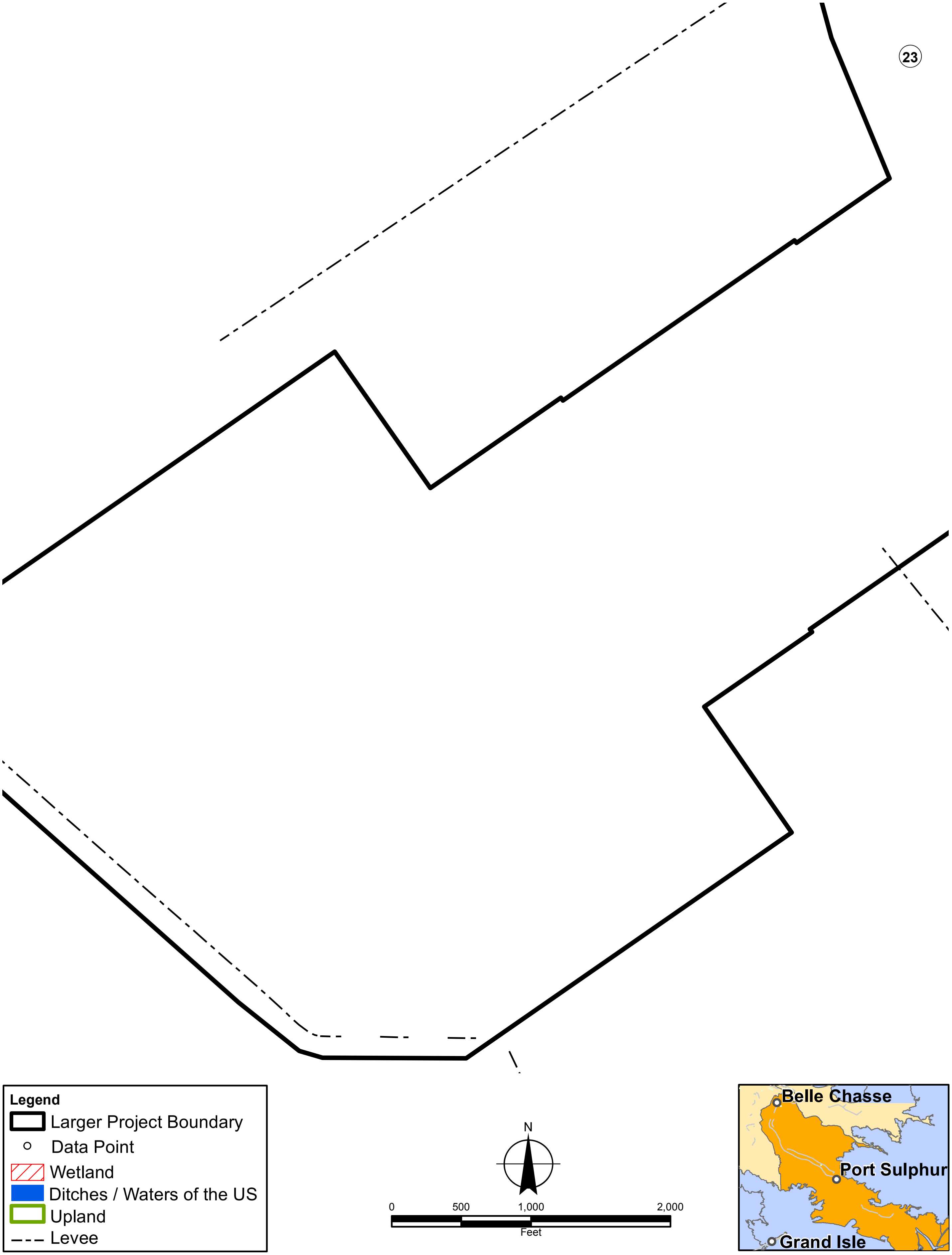


Figure 13: Soil Map: Site 1, Pump Station
Proposed MBSD Project, Jefferson and Plaquemines Parishes, LA

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

MAP LEGEND

MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CE	Clovelly muck, 0 to 0.2 percent slopes, very frequently flooded	12.2	15.6%
LA	Lafitte-Clovelly association, 0 to 0.2 percent slopes, very frequently flooded	17.5	22.3%
W	Water	8.7	11.1%
Subtotals for Soil Survey Area		**38.5**	**49.0%**
Totals for Area of Interest		**78.5**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CE	Clovelly muck, 0 to 0.2 percent slopes, very frequently flooded	3.1	3.9%
Co	Cancienne silty clay loam, 0 to 1 percent slopes	20.5	26.1%
Ha	Harahan clay, 0 to 1 percent slopes	12.1	15.4%
LF	Lafitte muck, 0 to 0.2 percent slopes, very frequently flooded	0.4	0.5%
W	Water	4.0	5.1%
Subtotals for Soil Survey Area		**40.0**	**51.0%**
Totals for Area of Interest		**78.5**	**100.0%**

Figure 14: Soil Map: Site 2, Siphon North
Proposed MBSD Project, Plaquemines Parish, LA

Map Scale: 1:8,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 400, 800, 1600, 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

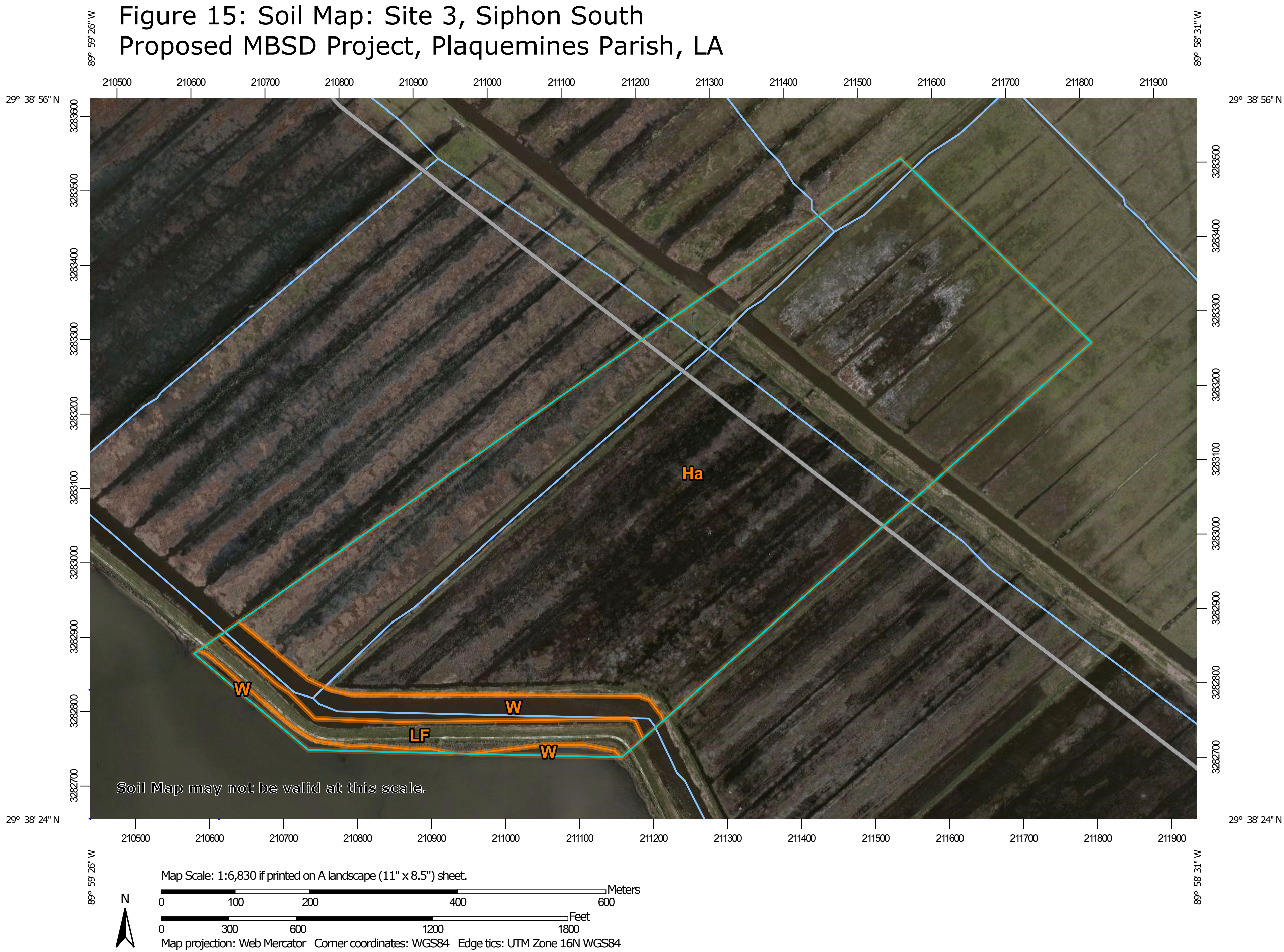
Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Cancienne silty clay loam, 0 to 1 percent slopes	63.6	49.4%
Ha	Harahan clay, 0 to 1 percent slopes	44.8	34.8%
W	Water	4.1	3.2%
Ww	Westwego clay, 0 to 0.5 percent slopes	16.1	12.6%
Totals for Area of Interest		**128.6**	**100.0%**

Figure 15: Soil Map: Site 3, Siphon South
Proposed MBSD Project, Plaquemines Parish, LA



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

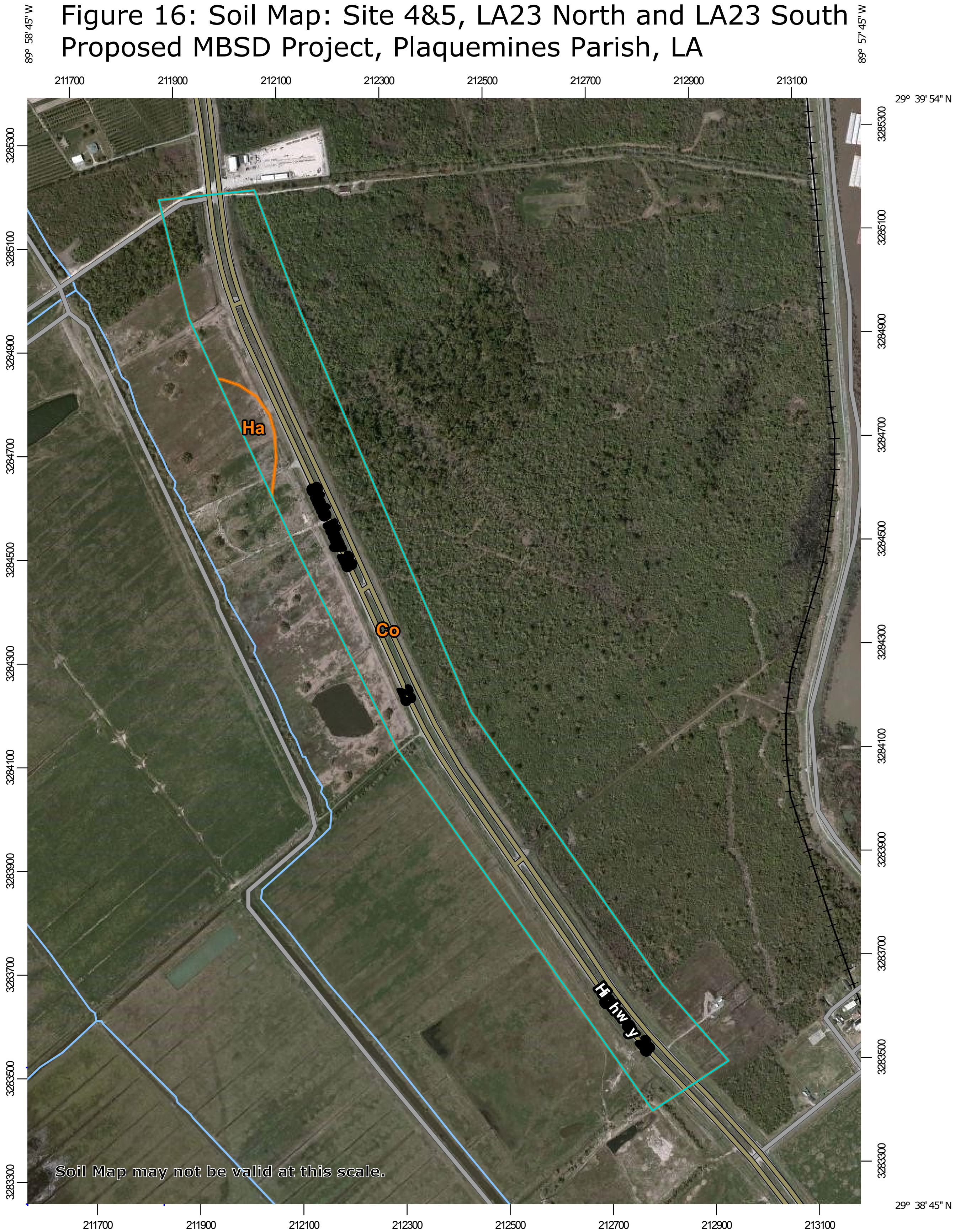
Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ha	Harahan clay, 0 to 1 percent slopes	96.1	88.9%
LF	Lafitte muck, 0 to 0.2 percent slopes, very frequently flooded	5.4	5.0%
W	Water	6.6	6.1%
Totals for Area of Interest		**108.1**	**100.0%**

Figure 16: Soil Map: Site 4&5, LA23 North and LA23 South Proposed MBSD Project, Plaquemines Parish, LA



Map Scale: 1:10,400 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Cancienne silty clay loam, 0 to 1 percent slopes	83.1	97.1%
Ha	Harahan clay, 0 to 1 percent slopes	2.5	2.9%
Totals for Area of Interest		**85.5**	**100.0%**

Figure 17: Soil Map: Site 6, Rail North
Proposed MBSD Project, Plaquemines Parish, LA

Map Scale: 1:6,380 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

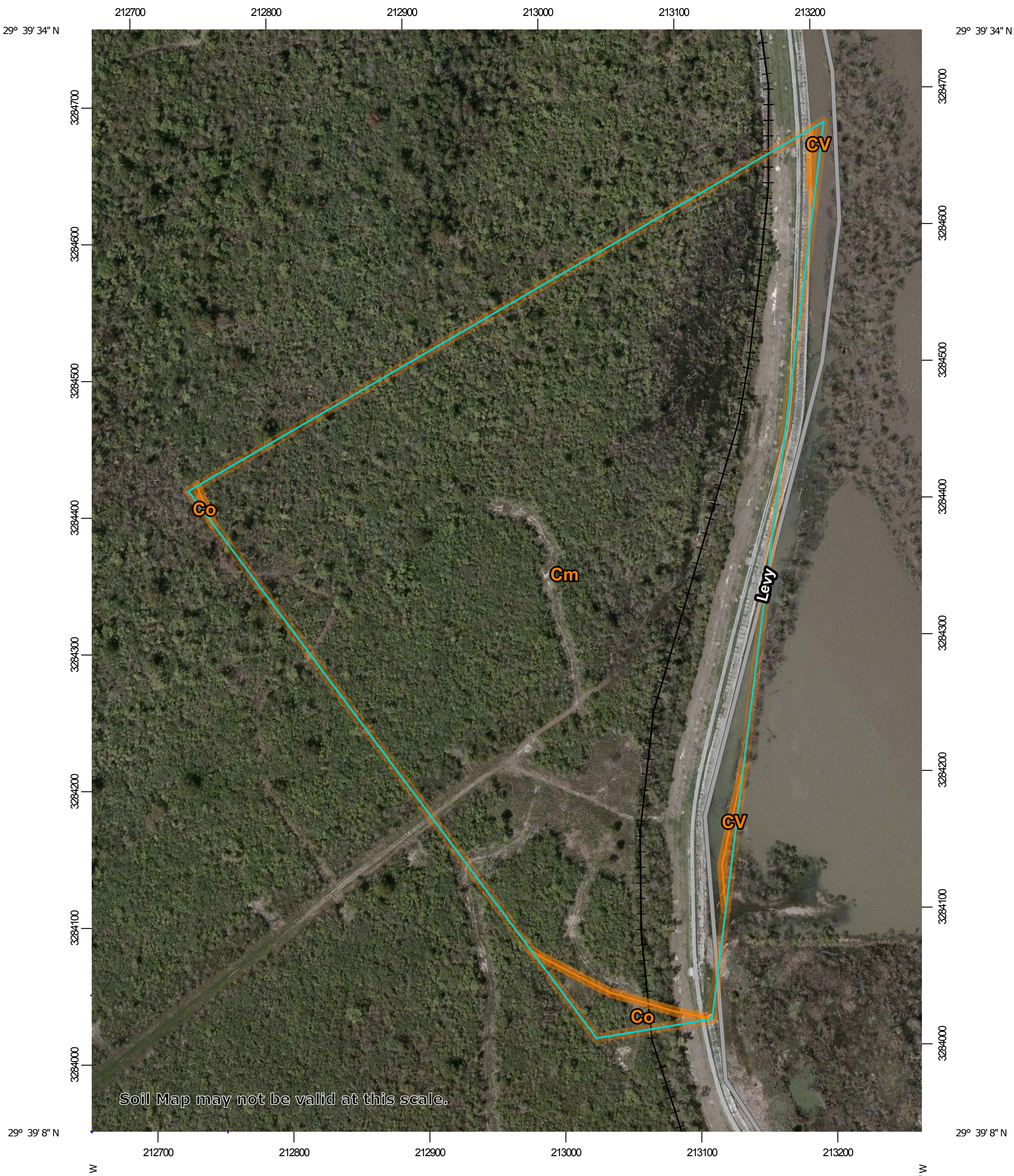
Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cm	Cancienne silt loam, 0 to 1 percent slopes	26.0	63.8%
Co	Cancienne silty clay loam, 0 to 1 percent slopes	14.7	36.2%
Totals for Area of Interest		**40.8**	**100.0%**

Figure 18: Soil Map: Site 7, Rail South
Proposed MBSD Project, Plaquemines Parish, LA



Map Scale: 1:3,930 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 150, 300, 600, 900

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

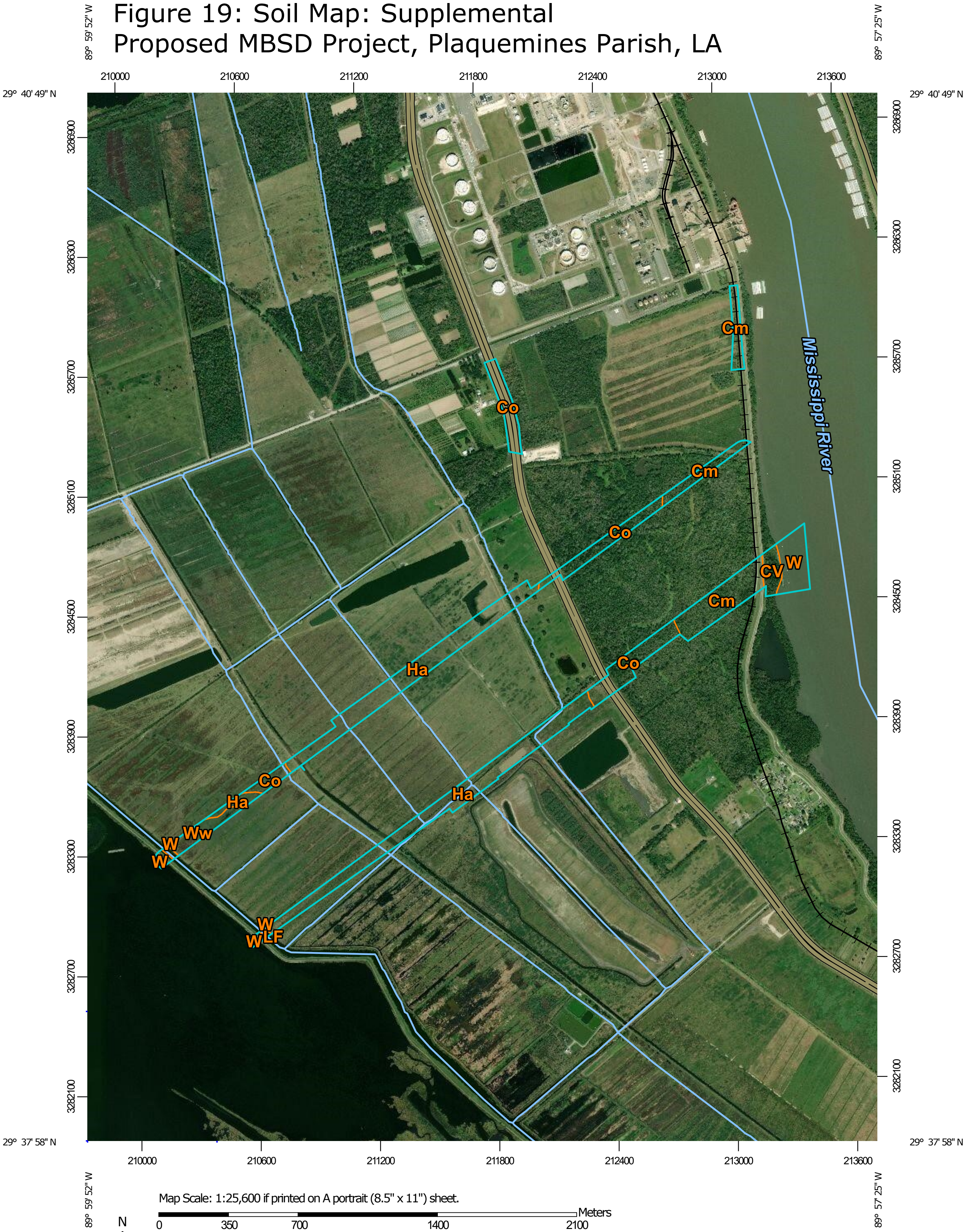
Date(s) aerial images were photographed: Mar 29, 2010—Mar 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cm	Cancienne silt loam, 0 to 1 percent slopes	39.2	98.0%
Co	Cancienne silty clay loam, 0 to 1 percent slopes	0.6	1.6%
CV	Carville, Cancienne, and Schriever soils, frequently flooded	0.2	0.4%
Totals for Area of Interest		**40.0**	**100.0%**

Figure 19: Soil Map: Supplemental
Proposed MBSD Project, Plaquemines Parish, LA



Map Scale: 1:25,600 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 350, 700, 1400, 2100

Feet: 0, 1000, 2000, 4000, 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Plaquemines Parish, Louisiana
Survey Area Data: Version 14, Sep 11, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Dec 10, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cm	Cancienne silt loam, 0 to 1 percent slopes	27.3	18.1%
Co	Cancienne silty clay loam, 0 to 1 percent slopes	32.3	21.3%
CV	Carville, Cancienne, and Schriever soils, frequently flooded	4.8	3.1%
Ha	Harahan clay, 0 to 1 percent slopes	67.4	44.6%
LF	Lafitte muck, 0 to 0.2 percent slopes, very frequently flooded	0.3	0.2%
W	Water	12.6	8.3%
Ww	Westwego clay, 0 to 0.5 percent slopes	6.5	4.3%
Totals for Area of Interest		**151.1**	**100.0%**

APPENDIX A
FIELD DATA SHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 3 - Siphon South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 27 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 1

Investigator(s): Benjamin Richard Section, Township, Range: S17 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.645107 Long: -89.983791 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland? Yes ✓ No ___**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 1

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	40	Y	FACU
2. Juncus effusus	20	Y	OBL
3. Andropogon glomeratus	30	Y	FACW
4. Ranunculus sardous	10	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2/3 = 66.67% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:
OBL species	1	x 1 = 1
FACW species	1	x 2 = 2
FAC species	1	x 3 = 3
FACU species	1	x 4 = 4
UPL species	0	x 5 = 0
Column Totals:	4 (A)	10 (B)

Prevalence Index = B/A = 10/4 = 2.5

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1		10YR 5/8	30	RM	M	clay	
10-12	10YR 2/1						organic	
12-18	10YR 2/1		10YR 4/6	25	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 3 - Siphon South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 27 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 2

Investigator(s): Benjamin Richard Section, Township, Range: S17 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.644153 Long: -89.985199 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 2

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	60	Y	FACU
2. Ranunculus sardous	30	Y	FAC
3. Alternanthera philoxeroides	30	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 = Total Cover		
50% of total cover: 60		20% of total cover: 24	

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2/3 = 66.67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1		7.5YR 3/4	30	RM	M	clay	
8-10	10YR 2/1						organic	
10-16	10YR 4/1		10YR 5/8	20	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 3 - Siphon South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 27 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 3

Investigator(s): Benjamin Richard Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.646764 Long: -89.979097 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes ✓ No ____**
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 3

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	60	Y	FACU
2. Hydrocotyle prolifera	25	Y	OBL
3. Alternanthera philoxeroides	30	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	115 = Total Cover		

50% of total cover: 57.5 20% of total cover: 23

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2/3 = 66.67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1		7.5YR 4/6	30	RM	M	clay	
8-11	10YR 5/1		7.5YR 4/6	35	RM	M	clay	
11-16	10YR 2/1		10YR 5/8	25	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 3 - Siphon South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 27 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 4

Investigator(s): Benjamin Richard Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.644835 Long: -89.978391 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___	
Water Table Present?	Yes ___	No ✓	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___	**Wetland Hydrology Present? Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 4

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	50	Y	FACU
2. Hydrocotyle prolifera	25	Y	OBL
3. Juncus effusus	25	Y	OBL
4. Vigna luteda	25	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	125 = Total Cover		
50% of total cover: 62.5		20% of total cover: 25	

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 3/4 = 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

wet pasture

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1		7.5YR 4/6	25	RM	M	clay	
6-8	10YR 2/1		7.5YR 4/6				organic	
8-16	10YR 5/1		7.5YR 4/6	35	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 5

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.652835 Long: -89.988841 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?	✓	
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✓

Remarks:

potentially spoil or fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		✓	
Water Table Present?		✓	
Saturation Present? (includes capillary fringe)		✓	

Wetland Hydrology Present? Yes ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 5

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Herb Stratum (Plot size: 5' radius)			
1. Cynodon dactylon	60	Y	FACU
2. Trifolium repens	50	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110 = Total Cover		

50% of total cover: 55 20% of total cover: 22

Woody Vine Stratum (Plot size: 15' radius)			
1. Rubus spp.	20	Y	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1/3 = 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	1	x 3 = 3
FACU species	2	x 4 = 8
UPL species	0	x 5 = 0
Column Totals:	3 (A)	11 (B)

Prevalence Index = B/A = 11/3 = 3.67

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2		7.5YR 4/6	10	RM	M	clay	
12-16	10YR 4/1		10YR 5/8	15	D	M	sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ______

Remarks:
potential spoil material

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 6

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.652094 Long: -89.985550 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✓
Hydric Soil Present?	Yes ✓	No ___	
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 6

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ______ 20% of total cover: ______

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	50	Y	FACU
2. Trifolium repens	50	Y	FACU
3. Lolium perenne	20	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 = Total Cover		

50% of total cover: 60 20% of total cover: 24

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0/2 = 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✓

Remarks: (If observed, list morphological adaptations below).

dead Ambrosia trifida

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2		10YR 6/8	15	RM	M	clay	
12-16	10YR 4/1		10YR 5/8	15	D	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

potential spoil material

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 7

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.649629 Long: -89.989404 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✓
Hydric Soil Present?	Yes ✓	No ___	
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 7

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	60	Y	FACU
2. Trifolium repens	50	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110 = Total Cover		

50% of total cover: 55 20% of total cover: 22

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0/2 = 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/1		10YR 5/8	10	RM	M	clay	
12-18	10YR 5/1		10YR 5/8	30	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 8

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.649458 Long: -89.989417 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 15

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 8

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 5' radius)

1. Juncus effusus	60	Y	OBL
2. Eleocharis palustris	20	Y	OBL
3. Solidago sempervirens	20	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 15' radius)

1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 3/3 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1		7.5YR 4/6	20	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 9

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.649064 Long: -89.994721 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?	✓	
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		✓	
Water Table Present?		✓	
Saturation Present? (includes capillary fringe)		✓	

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 9

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: 5' radius)			
1. Cynodon dactylon	80	Y	FACU
2. Trifolium repens	30	Y	FACU
3. Oxalis corniculata	20	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130 = Total Cover		
50% of total cover: 65	20% of total cover: 26		

Woody Vine Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0/2 = 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1						clay	
10-18	10YR 3/1		10YR 5/8	30	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 2 - Siphon North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 28 February 2018

Applicant/Owner: CPRA State: LA Sampling Point: 10

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.649201 Long: -89.994624 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 4

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 10

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus effusus	80	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 = Total Cover		

50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1/1 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1		10YR 5/8	25	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 1 - Pump Station (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 6 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 11

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.660020 Long: -90.010202 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ___	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** ✓
Hydric Soil Present?	Yes ✓ No ___		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___ No ✓	Depth (inches): ___	
Water Table Present?	Yes ___ No ✓	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___ No ✓	Depth (inches): ___	**Wetland Hydrology Present? Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 11

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus virginiana	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: 5' radius)			
1. Ranunculus sardous	30	N	FAC
2. Cynodon dactylon	50	Y	FACU
3. Trifolium repens	80	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	160 = Total Cover		
50% of total cover: 80	20% of total cover: 32		

Woody Vine Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0/3 = 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3						clay	
4-18	10YR 5/1		7.5YR 4/6	30	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 1 - Pump Station (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 6 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 12

Investigator(s): Benjamin Richard Section, Township, Range: S16 - T16S - R24E

Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.660051 Long: -90.009738 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 12

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: 5' radius)			
1. Ranunculus sardous	5	N	FAC
2. Eleocharis palustris	90	Y	OBL
3. Alternanthera philoxeroides	40	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	135 = Total Cover		
50% of total cover: 67.5	20% of total cover: 27		

Woody Vine Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2/2 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1						organic	
2-18	10YR 4/1		10YR 5/8	20	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 1 - Pump Station (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 6 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 13

Investigator(s): Benjamin Richard Section, Township, Range: S50 - T16S - R24E

Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.658678 Long: -90.012892 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Clovelly muck, 0-0.2% slopes, very frequently flooded NWI classification: E2EM1P5

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ✓, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

potentially spoil or fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 8

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 13

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Baccharis halimifolia	50	Y	FAC
2. Morella cerifera	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
50% of total cover: 40		20% of total cover: 16	
Herb Stratum (Plot size: 5' radius)			
1. Eleocharis montevidensis	90	Y	FACW
2. Solidago sempervirens	90	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	180 = Total Cover		
50% of total cover: 90		20% of total cover: 36	
Woody Vine Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 4/4 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	2.5Y 4/2		10YR 4/6	20	C	CS	sand	
10-18	2.5Y 4/1						sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:
potential spoil material

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 5 - Highway 23 South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 14

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.650928 Long: -89.967898 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?**	**Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______		
Wetland Hydrology Present?	Yes ✓ No ______		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______ No ✓	Depth (inches): ______	
Water Table Present?	Yes ✓ No ______	Depth (inches): 10	
Saturation Present? (includes capillary fringe)	Yes ✓ No ______	Depth (inches): 3	**Wetland Hydrology Present? Yes** ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 14

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	50	Y	FAC
2. Quercus virginiana	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		

50% of total cover: 30 20% of total cover: 12

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	40	Y	FAC
2. Acer negundo	20	Y	FAC
3. Acer rubrum	15	N	FAC
4. Morella cerifera	20	Y	FAC
5.			
6.			
7.			
8.			
	95 = Total Cover		

50% of total cover: 47.5 20% of total cover: 19

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex sp	5	Y	OBL
2. Triadica sebifera	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25 = Total Cover		

50% of total cover: 12.5 20% of total cover: 5

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2. Rubus trivialis	20	Y	FAC
3.			
4.			
5.			
	25 = Total Cover		

50% of total cover: 12.5 20% of total cover: 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 8/8 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 4/1		10YR 4/6	20	RM	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 5 - Highway 23 South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 15

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.652934 Long: -89.969522 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** ✓
Hydric Soil Present?	Yes ✓ No ____		
Wetland Hydrology Present?	Yes ____ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ______

Water Table Present? Yes ____ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 15

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus nigra	15	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Ligustrum sinense	40	Y	FAC
2. Acer negundo	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Herb Stratum (Plot size: 5' radius)			
1. Acer negundo	10	Y	FAC
2. Triadica sebifera	10	Y	FAC
3. Rubus trivialis	10	Y	FAC
4. Toxicodendron radicans	10	Y	FAC
5. Quercus nigra	10	Y	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Woody Vine Stratum (Plot size: 15' radius)			
1. Rubus trivialis	25	Y	FAC
2.			
3.			
4.			
5.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 9/9 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 4/2		10YR 5/6	20	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 4 - Highway 23 North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 16

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.660573 Long: -89.973292 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ______	No ✓
Wetland Hydrology Present?	Yes ______	No ✓

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 16

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	20	Y	FAC
2. Carya aquatica	5	N	OBL
3. Liquidambar styraciflua	15	Y	FAC
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Callicarpa americana	10	Y	FACU
2. Triadica sebifera	5	N	FAC
3. Liquidambar styraciflua	30	Y	FAC
4.			
5.			
6.			
7.			
8.			
	45 = Total Cover		

50% of total cover: 22.5 20% of total cover: 9

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Callicarpa americana	20	N	FACU
2. Toxicodendron radicans	20	N	FAC
3. Acer negundo	20	N	FAC
4. Ligustrum sinense	5	N	FAC
5. Allium vineale	15	N	FACU
6. Potentilla indica	80	Y	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	160 = Total Cover		

50% of total cover: 80 20% of total cover: 32

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	25	Y	FAC
2. Toxicodendron radicans	5	N	FAC
3. Smilax laurifolia	15	Y	FACW
4.			
5.			
	45 = Total Cover		

50% of total cover: 22.5 20% of total cover: 9

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 5/7 = 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/3						clay	
5-18	10YR 4/2		10YR 4/6	15	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 4 - Highway 23 North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 17

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.661023 Long: -89.973491 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ✓	No ______	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes ✓	No ______	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 17

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	35	Y	FAC
2. Quercus michauxii	10	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	45	= Total Cover	

50% of total cover: 22.5 20% of total cover: 9

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	30	Y	FAC
2. Baccharis halimifolia	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	45	= Total Cover	

50% of total cover: 22.5 20% of total cover: 9

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Limnobium spongia	30	Y	OBL
2. Helenium autumnale	20	Y	FACW
3. Carex sp	20	Y	OBL
4. Iris fulva	10	Y	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	

50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 8/8 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1		10YR 4/6	15	RM	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 5 - Highway 23 South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 18

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.652715 Long: -89.971046 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ____	No ✓

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: 18

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Trifolium repens	90	Y	FAC
2. Andropogon glomeratus	30	Y	FACW
3. Rubus trivialis	30	Y	FAC
4. Cirsium vulgare	30	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	150		

50% of total cover: 75 20% of total cover: 30

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 4/4 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3							
4-18	10YR 4/1		10YR 4/6	30	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 4 - Highway 23 North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 19

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.662423 Long: -89.976607 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 19

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	15	Y	FAC
2. Quercus nigra	30	Y	FAC
3. Liquidambar styraciflua	10	N	FAC
4. Celtis laevigata	20	Y	FACW
5.			
6.			
7.			
8.			
	75 = Total Cover		
50% of total cover: 37.5	20% of total cover: 15		

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	20	Y	FACW
2. Quercus nigra	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Sabal minor	10	N	FACW
2. Toxicodendron pubescens	20	Y	FACU
3. Allium vineale	20	Y	FACU
4. Dryopteris ludoviciana	20	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	20	Y	FAC
2. Toxicodendron pubescens	30	Y	FACU
3.			
4.			
5.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 7/10= 70% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2						clay	
6-18	10YR 4/3		10YR 5/8	10	D	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 4 - Highway 23 North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 7 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 20

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.663662 Long: -89.977101 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** ✓
Hydric Soil Present?	Yes ___ No ✓		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 20

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	50	Y	FAC
2. Quercus virginiana	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	30	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus spp.	40	Y	FAC
2. Cirsium vulgare	20	Y	FACU
3. Eleocharis montevidensis	20	Y	FACW
4. Triadica sebifera	20	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	30	Y	FAC
2. Toxicodendron pubescens	20	Y	FACU
3. Lonciera japonica	25	Y	FACU
4.			
5.			
	75 = Total Cover		
50% of total cover: 37.5	20% of total cover: 15		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 6/10= 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2						silty clay	
4-18	10YR 4/3		10YR 4/6	10	D	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ______ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 6 - Rail North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 9 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 21

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.665897 Long: -89.964403 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silt loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?**	**Yes ✓ No ______**
Hydric Soil Present?	Yes ✓ No ______		
Wetland Hydrology Present?	Yes ✓ No ______		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______	
Water Table Present?	Yes ______	No ✓	Depth (inches): ______	
Saturation Present? (includes capillary fringe)	Yes ✓	No ______	Depth (inches): 2	**Wetland Hydrology Present? Yes ✓ No ______**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 21

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	20	Y	OBL
2. Triadica sebifera	40	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	60		

50% of total cover: 30 20% of total cover: 12

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus spp.	30	N	FAC
2. Salix nigra	20	N	OBL
3. Ampelopsis arborea	30	N	FAC
4. Triadica sebifera	40	Y	FAC
5. Juncus effusus	30	N	OBL
6. Ambrosia trifida	30	N	FAC
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	180		

50% of total cover: 90 20% of total cover: 36

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	40	Y	FAC
2. Rubus spp.	30	Y	FAC
3.			
4.			
5.			
= Total Cover	70		

50% of total cover: 35 20% of total cover: 14

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 5/5 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 3/2		10YR 5/8	15	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 6 - Rail North (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 8 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 22

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S5 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.661255 Long: -89.971565 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silty clay loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ✓	No ______
Wetland Hydrology Present?	Yes ______	No ✓

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 22

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	15	N	FAC
2. Quercus nigra	30	Y	FAC
3. Liquidambar styraciflua	30	Y	FAC
4. Acer rubrum	10	N	FAC
5. Quercus virginiana	30	Y	FACU
6.			
7.			
8.			
	115 = Total Cover		
50% of total cover: 57.5	20% of total cover: 23		

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	20	Y	FAC
2. Acer negundo	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Allium vineale	40	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	20	Y	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 5/7 = 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3						clay	
3-16	10YR 3/2		10YR 5/8	5	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 7 - Rail South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 8 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 23

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.655233 Long: -89.965022 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silt loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** ✓
Hydric Soil Present?	Yes ✓ No ___		
Wetland Hydrology Present?	Yes ___ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 23

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	40	Y	FAC
2. Quercus nigra	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		

50% of total cover: 30 20% of total cover: 12

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	40	Y	FAC
2. Triadica sebifera	25	Y	FAC
3. Celtis laevigata	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		

50% of total cover: 35 20% of total cover: 14

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus spp.	10	N	FAC
2. Toxicodendron radicans	20	Y	FAC
3. Acer negundo	20	Y	FAC
4. Ambrosia trifida	20	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 = Total Cover		

50% of total cover: 35 20% of total cover: 14

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	30	Y	FAC
2. Toxicodendron radicans	10	Y	FAC
3.			
4.			
5.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 9/9 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/3						silty clay	
8-18	10YR 4/3		10YR 5/8	20	RM	M	sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 7 - Rail South (MBSD) City/County: Belle Chasse, Plaquemines Sampling Date: 8 March 2018

Applicant/Owner: CPRA State: LA Sampling Point: 24

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.655601 Long: -89.964514 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silt loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☑ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ✓	No ______	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ______	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 24

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	50	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
50% of total cover: 25		20% of total cover: 10	

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	30	Y	FAC
2. Triadica sebifera	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
50% of total cover: 25		20% of total cover: 10	

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Hydrocotyle prolifera	80	Y	OBL
2. Saururus cernuus	10	N	OBL
3. Solidago sempervirens	5	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
50% of total cover: 47.5		20% of total cover: 19	

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus spp.	20	Y	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		
50% of total cover: 10		20% of total cover: 4	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 5/5 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1						silty clay	
3-18	10YR 4/2		7.5YR 4/6	20	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 8 - Supplemental City/County: Belle Chasse, Plaquemines Sampling Date: 20 September 2019

Applicant/Owner: CPRA State: LA Sampling Point: 25

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.656317 Long: -89.965363 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silt loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 25

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	50	Y	FAC
2. Acer negundo	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer negundo	20	Y	FAC
2. Triadica sebifera	30	Y	FAC
3. Ligustrum sinense	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Herb Stratum (Plot size: 5' radius)			
1. Rubus spp.	20	Y	FAC
2. Toxicodendron radicans	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Woody Vine Stratum (Plot size: 15' radius)			
1. Toxicodendron radicans	20	Y	FAC
2. Ampelopsis arborea	20	Y	FAC
3. Parthenocissus quinquefolia	20	Y	FACU
4.			
5.			
	60 = Total Cover		
50% of total cover: 30	20% of total cover: 12		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 9/10 = 90% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☑ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3						loam	
6-12	10YR 4/2						clay	
12-15	2.5Y 4/3						sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 8 - Supplemental City/County: Belle Chasse, Plaquemines Sampling Date: 20 September 2019

Applicant/Owner: CPRA State: LA Sampling Point: 26

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.656760 Long: -89.964232 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Cancienne silt loam, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?**	**Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______		
Wetland Hydrology Present?	Yes ✓ No ______		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☑ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ______ No ✓	Depth (inches): ______	
Water Table Present?	Yes ______ No ✓	Depth (inches): ______	
Saturation Present? (includes capillary fringe)	Yes ✓ No ______	Depth (inches): 15	**Wetland Hydrology Present? Yes** ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 26

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	50	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	50		

50% of total cover: 25 20% of total cover: 10

Sapling/Shrub Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Morella cerifera	20	Y	FAC
2. Triadica sebifera	40	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	70		

50% of total cover: 35 20% of total cover: 14

Herb Stratum (Plot size: 5' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Alternanthera philoxeroides	80	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	80		

50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: 15' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 4/4 = 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [x] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-18	10YR 4/3		10YR 4/8	20	RM	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Site 8 - Supplemental City/County: Belle Chasse, Plaquemines Sampling Date: 20 September 2019

Applicant/Owner: CPRA State: LA Sampling Point: 27

Investigator(s): Benjamin Richard and Joe Cancienne Section, Township, Range: S6 - T16S - R25E

Landform (hillslope, terrace, etc.): leveed pasture Local relief (concave, convex, none): none Slope (%): 0-1%

Subregion (LRR or MLRA): MLRA 151 Lat: 29.648458 Long: -89.9790532 Datum: NAD 83 UTM 16N

Soil Map Unit Name: Harahan clay, 0-1% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☑ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: 27

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Baccharis halimifolia	25	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	25	= Total Cover	
50% of total cover: 12.5		20% of total cover: 5	

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	90	Y	FACU
2. Juncus effusus	20	Y	OBL
3. Alternanthera philoxeroides	50	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	160	= Total Cover	
50% of total cover: 80		20% of total cover: 32	

Woody Vine Stratum (Plot size: 15' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Vigna luteola	20	Y	FACW
2.			
3.			
4.			
5.			
	20	= Total Cover	
50% of total cover: 10		20% of total cover: 4	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 4/5 = 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [x] 1 - Rapid Test for Hydrophytic Vegetation
- [x] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1		7.5YR 4/6	20	RM	M	clay	
8-12	10YR 2/1		10YRYR 5/8	30	RM	M	clay	
12-16	10YR 4/2		10YR 5/8	25	RM	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

APPENDIX B
PHOTOGRAPHS

Photo: 1

Description:
Data Point 1 Soil Profile

Photo: 2

Description:
Data Point 1 Typical Vegetation

Photo: 3

Description:
Data Point 2 Soil Profile

Photo: 4

Description:
Data Point 2 Typical Vegetation

Photo: 5 **Description:** Data Point 3 Soil Profile	

Photo: 6 **Description:** Data Point 3 Typical Vegetation	

Photo: 7

Description:
Data Point 4 Soil Profile

Photo: 8

Description:
Data Point 4 Typical Vegetation

Photo: 9

Description:
Data Point 5 Soil Profile

Photo: 10

Description:
Data Point 5 Typical Vegetation

Photo: 11

Description:
Data Point 6 Soil Profile

Photo: 12

Description:
Data Point 6 Typical Vegetation

Photo: 13

Description:
Data Point 7 Soil Profile

Photo: 14

Description:
Data Point 7 Typical Vegetation

Photo: 15 **Description:** Data Point 8 Soil Profile	

Photo: 16 **Description:** Data Point 8 Typical Vegetation	

Photo: 17

Description:
Data Point 9 Soil Profile

Photo: 18

Description:
Data Point 9 Typical Vegetation

Photo: 19

Description:
Data Point 10 Soil Profile

Photo: 20

Description:
Data Point 10 Typical Vegetation

Photo: 21 **Description:** Data Point 11 Soil Profile	

Photo: 22 **Description:** Data Point 11 Typical Vegetation	

Photo: 23

Description:
Data Point 12 Soil Profile

Photo: 24

Description:
Data Point 12 Typical Vegetation

Photo: 25 **Description:** Data Point 13 Soil Profile	
Photo: 26 **Description:** Data Point 13 Typical Vegetation	

Photo: 27

Description:
Data Point 14 Soil Profile

Photo: 28

Description:
Data Point 14 Typical Vegetation

Photo: 29 **Description:** Data Point 15 Soil Profile	

Photo: 30 **Description:** Data Point 15 Typical Vegetation	

Photo: 31

Description:
Data Point 16 Soil Profile

Photo: 32

Description:
Data Point 16 Typical Vegetation

Photo: 33 **Description:** Data Point 17 Soil Profile	

Photo: 34 **Description:** Data Point 17 Typical Vegetation	

Photo: 35

Description:
Data Point 18 Soil Profile

Photo: 36

Description:
Data Point 18 Typical Vegetation

Photo: 37 **Description:** Data Point 19 Soil Profile	

Photo: 38 **Description:** Data Point 19 Typical Vegetation	

Photo: 39 **Description:** Data Point 20 Soil Profile	
Photo: 40 **Description:** Data Point 20 Typical Vegetation	

Photo: 41

Description:
Data Point 21 Soil Profile

Photo: 42

Description:
Data Point 21 Typical Vegetation

Photo: 43

Description:
Data Point 22 Soil Profile

Photo: 44

Description:
Data Point 22 Typical Vegetation

Photo: 45

Description:
Data Point 23 Soil Profile

Photo: 46

Description:
Data Point 23 Typical Vegetation

Photo: 47

Description:
Data Point 24 Soil Profile

Photo: 48

Description:
Data Point 24 Typical Vegetation

Photo: 49

Description:
Typical Site Characteristics

Duck Pond located in south west portion of project site.

Photo: 50

Description:
Typical Drainage Ditch

Photo: 51 **Description:** Typical Drainage Ditch (Pump Station)	
Photo: 52 **Description:** Typical Site Characteristics Marsh behind duck camp.	

Photo: 53

Description:

Data Point 25 - Soil profile.

Photo: 54

Description:

Data Point 25 - Typical Site Characteristics

Photo: 55 **Description:** Data Point 26 - Soil profile.	

Photo: 56 **Description:** Data Point 26 - Typical Site Characteristics	

Photo: 57

Description:

Data Point 27 - Soil profile.

Photo: 58

Description:

Data Point 27 - Typical Site Characteristics

Photo: 59

Description:

Typical Site Characteristics.

Photo: 60

Description:

Typical Site Characteristics.

2016 Jurisdictional Determination

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INTERNAL TRACKING SHEET FOR JURISDICTIONAL DETERMINATIONS

(to be used for accounts where no letter is being sent)

Account #: 2012-02806-1 Account Name: Davoli, Elizabeth

DETERMINATION DATE: 8/11/16 SUBJECT: Jurisdictional Determination

MEMORANDUM FOR CEMVN-OD-SE, ATTN: Brad Laborde

MEMORANDUM FROM CEMVN-OD-SS, Surveillance & Enforcement Section

==

PARISH: Plaquemines SECTION 5,16,47,48,4 TWP 16S RANGE 25E

PROPERTY/PROJECT DESCRIPTION: Mid-Barataria Sediment Diversion (BA-153)

OWNER/COMPANY NAME: CPRA of LA

==

1. After careful review, the Surveillance & Enforcement Section has determined that this property/project is:

NONWETLAND ☐ NO PERMIT REQUIRED ☐

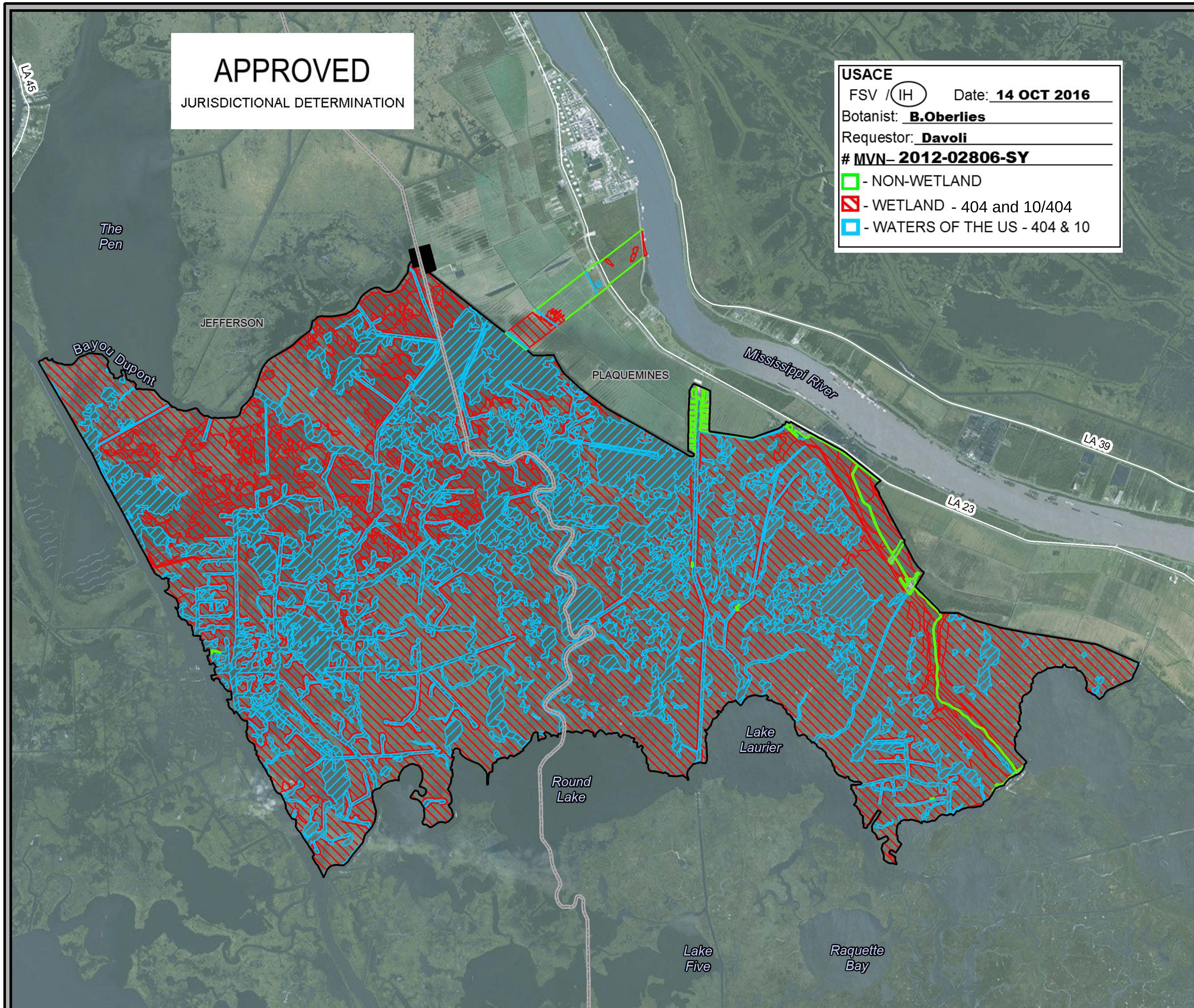
MIXED ☒ AND/OR SECTION 10 ☒

WETLAND ☐ OTHER: _____

☒ A map is enclosed that outlines the wetland or nonwetland area that has been delineated.

2. Additional comments: _____

3. P.O.C. for this determination: Brian Oberlies, x 2275



Mid-Barataria Sediment Diversion
Site Map - Wetlands
Permitting
October 2016

Jefferson and Plaquemines Parishes, La

Project Features

MBSD Pump Station

Habitat Types

Open Water

Uplands

Wetlands

Reference Features

Parish Boundary

Road

All project features are graphical representations only, are subject to change, and may not reflect true location or dimension

N

1:80,000

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

Source:
Coastal Protection and Restoration Authority of Louisiana
Imagery: ESRI World Imagery
Map Date: October 13, 2016
//2016040375

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: New Orleans District | File/ORM #: MVN-2012-02086-1-SY | PJD Date: Aug 11, 2016

State: LA | City/County: Plaquemines Parish

Nearest Waterbody: Mississippi River

Location: TRS, LatLong or UTM: Sec. 5,16,47,48,49, T16S, R25E
29.661806 N -89.9635 W

Name/ Address of Person Requesting PJD:
Ms. Elizabeth Davoli
Coastal Protection & Restoration Authority of LA
P. O. Box 44027 Capitol Station
Baton Rouge, LA 70804

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: ___ linear ft ___ width ___ acres | Stream Flow: Perennial

Wetlands: ~38 acre(s) | Cowardin Class: Estuarine

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: Mississippi River | Non-Tidal:

☑ Office (Desk) Determination
☐ Field Determination: Date of Field Trip:

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: 1:24k Phoenix
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: NRCS web soil survey
- ☐ National wetlands inventory map(s). Cite name:
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☑ Aerial (Name & Date): 98, 04, 05,06, 08, 10,13
  - ☐ Other (Name & Date):
- ☑ Previous determination(s). File no. and date of response letter: 2009-00898-SY, 5/5/09;
- ☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

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Signature and Date of Regulatory Project Manager
(REQUIRED)

Requested by applicant 6/30/16

Signature and Date of Person Requesting Preliminary JD
(REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.
2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

Potential Waters of the U.S., Including Wetlands Memorandum

To	Micaela Coner, Liz Davoli Coastal Protection and Restoration Authority of Louisiana		
From	Brooke Savant, James Thomas, HDR		
CC	Neil McLellan, Betty Dehoney, HDR		
Date	July 30, 2014	Job No.	BA 153-01

RE: Mid-Barataria Sediment Diversion (BA-153), Plaquemines Parish, Louisiana, Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands, July 2014 Amendment

Introduction

The Coastal Protection and Restoration Authority of Louisiana (CPRA) authorized HDR to perform a delineation and evaluation of waters of the U.S., including wetlands, for the proposed Mid-Barataria Sediment Diversion (MBSD, or proposed project). The intent of this memorandum is to disclose the findings of HDR's:

- on-site evaluation and delineation of waters of the U.S. as defined by the Clean Water Act, including wetlands, for the preliminary proposed channel footprint
- expanded desktop delineation of a portion of the proposed project's immediate outfall

The information included in this memorandum is considered a complete evaluation of existing wetland conditions and delineation report for waters of the U.S., including wetlands, and will be used by the U.S. Army Corps of Engineers (USACE) New Orleans District to support its jurisdictional determination, evaluation of fill impacts, and permit decision for the proposed project.

The proposed project would divert Mississippi River sediment-laden water through a new diversion structure installed in the Mississippi River and Tributary (MR&T) levee north of Ironton, Louisiana, into degraded marshes in the Barataria Basin to the west. The MBSD would provide sediment and nutrients to restore, build, and maintain wetlands. HDR completed a wetland delineation, proposed jurisdictional determination, and habitat classification of waters of the U.S., including wetlands, to assess potential impacts of dredged and fill placement activities necessary to construct the proposed project.

Methods

The evaluation included both the preliminary diversion channel footprint and an area of the immediate outfall using a combination of on-site and remote sensing methods, consistent with the flexibility allowed for conducting routine determinations in the USACE 1987 *Wetland Delineation Manual* (USACE 1987) and regional supplements. The delineation of waters of the U.S. was originally completed within the proposed project construction area limits or channel footprint (including a 200-foot construction servitude) in November 2012 for submittal to USACE as part of the Joint Application pursuant to Programmatic General Permits and Coastal Use Permits for the geotechnical investigations and as a required attachment in the Joint Application for an Individual Permit submitted on July 23, 2013.

The on-site field delineation included examination of habitats within the preliminary boundary of the proposed project's footprint (that is, an approximately 1,400-foot-wide corridor, 12,000 feet in length).

Data collected during the field visit included photographs as well as information on vegetation, soils, and hydrology as specified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (Version 2.0) (USACE 2010) and recorded on wetland determination data forms. These data forms and corresponding site photos are included in Attachment B. Additionally, 35,000 acres of the proposed diversion outfall area (U.S. Geological Survey [USGS] Hydrologic Unit Code [HUC] #80903010408) were evaluated through a desktop evaluation or Level 1 routine determination (USACE 1987) of existing wetland and habitat conditions for inclusion in the project's proposed jurisdictional determination.

The methods employed for the delineation and proposed jurisdictional determination of waters of the U.S. varied between the proposed diversion channel footprint—lying primarily between the MR&T levee and the Non-Federal Levee (that is, the back levee)—and the outfall area, consisting primarily of intertidal and subtidal estuarine wetlands and open water habitats, including natural sloughs, bayous, and ponds, as well as excavated channels and collapsed marsh. The following subsections describe the methods and objectives for each evaluation.

Diversion Channel Footprint

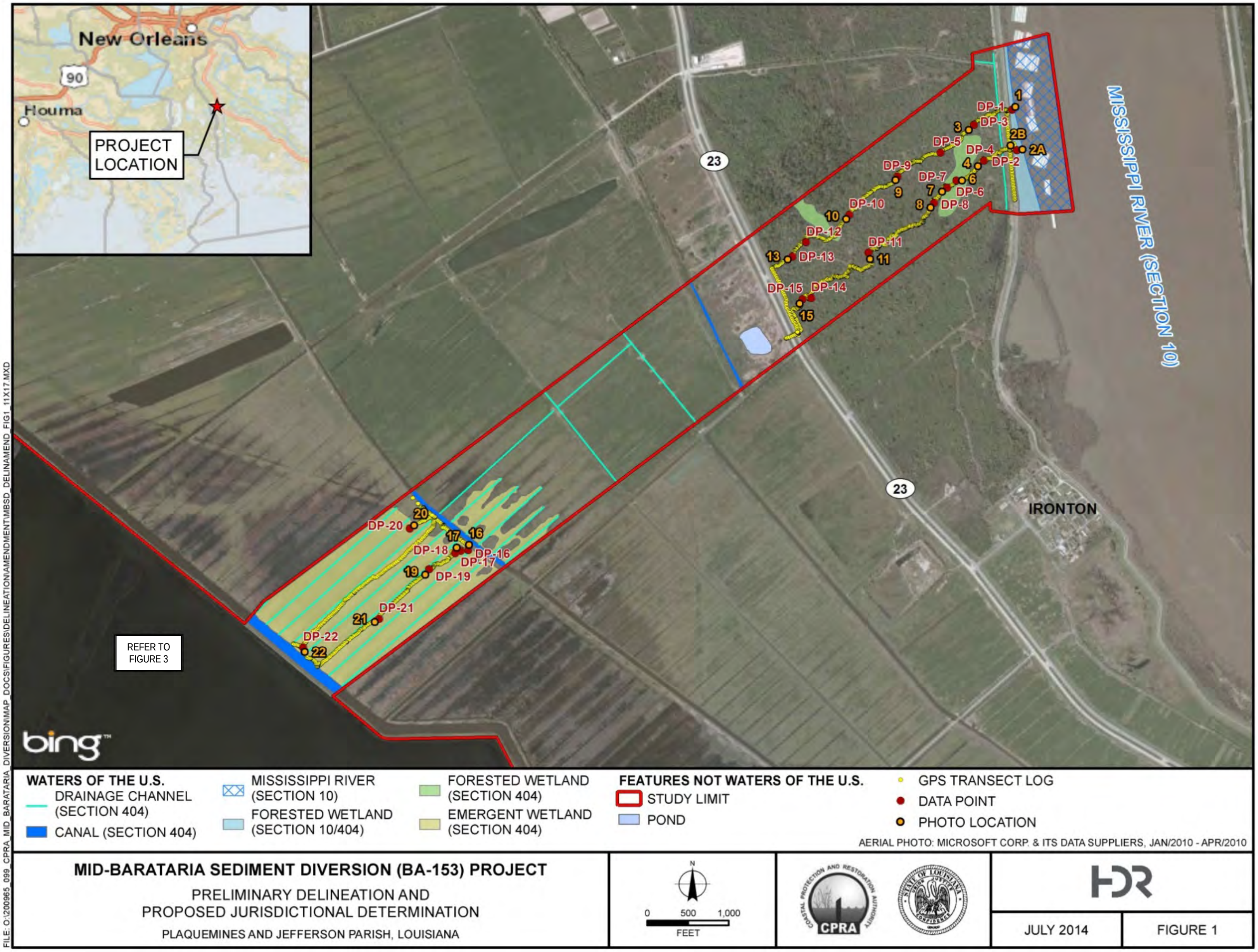
The on-site delineation and habitat evaluation of waters of the U.S., including wetlands for the proposed channel footprint (preliminary study limit) was conducted on November 12 and 13, 2012, by HDR wetland scientists and experienced delineators Joe Moake, Christine Magers, and Richard Wilson. During the field visit, HDR scientists generally walked transects (Figure 1) both north and south of the proposed project centerline to collect data on the wetland habitats present within the proposed diversion channel footprint limits. Data were collected (Attachment B) as described above for various soil, vegetation, and hydrologic conditions along these transects to evaluate habitat quality and the approximate percentage of wetland conditions. In addition, HDR noted the presence of other aquatic and excavated drainage features.

Spatial data for the evaluation of waters of the U.S., including wetlands, within the proposed channel footprint limits were collected using a 2010 Trimble GeoXT handheld Global Positioning System (GPS) unit and were post-processed using Trimble GPS Analyst for ArcGIS 10 to ensure sub-meter accuracy. Following the collection of spatial data, the preliminary extent of waters of the U.S. was mapped in ArcGIS 10 based on the field data collection and recent aerial photography.

The latest spatial soil map units for the diversion channel footprint were obtained from the Natural Resources Conservation Service (NRCS) soil survey website. Additionally, the NRCS database information for each soil map unit was evaluated to determine which soil types are listed as hydric and under what conditions. Finally, during on-site routine delineation and jurisdictional determination surveys, soil conditions were assessed at each data point (see data sheets in Attachment B) taken within wetland vegetation communities, with the exception of those exhibiting signs of sufficient hydrology indicators or prolonged inundation. For flooded or ponded areas, an aquic moisture regime and hydric soils can be inferred due to the length of inundation or saturation leading to anaerobic conditions.

The field delineation was conducted within 3 months of Hurricane Isaac, which caused substantial flooding throughout the area resulting in atypical hydrologic and vegetation indicators (rack and debris lines, water marks, vegetation modification, etc.). These indicators are typically most reliable where the soils have been heavily modified (agriculture, drainage improvements, etc.) and can present false positive indicators of wetland conditions in a major flooding event.

Figure 1. Preliminary delineation and proposed jurisdictional determination – waters of the U.S. in MBSD footprint



Consistent with the recommended methodology for atypical situations, additional data and information on the normal conditions were collected from other recent aerial photography and previous delineation and jurisdictional determination documentation. Subsequently, this delineation was updated based on information from USACE. Rob Heffner of the USACE New Orleans District, Regulatory Branch, provided information on recent, valid jurisdictional determinations (Attachment C) for the majority of the area within the limits of the diversion channel footprint (personal and electronic communications on January 18, 2013). This information was used in conjunction with recent aerial photography, including Pictometry® oblique photography taken before Hurricane Isaac, to refine the delineation boundary.

In March 2013, the proposed diversion site was revisited for the purpose of conducting geotechnical investigations. Normal site conditions observed during this field visit were consistent with the refined results of the HDR delineation report. Typical hydrologic and vegetation conditions have reestablished on the site and are consistent with the delineation and preliminary jurisdictional determination provided herein and in the Joint Permit Application submitted to the USACE and Office of Coastal Management in July 2013.

Diversion Outfall Area

Given the anticipated size of the deltaic land building restoration area for the MBSD project and the well-documented tidal marsh and elevation conditions in the Barataria Basin (U.S. Fish and Wildlife Service 2011; USGS 2011a, 2011b; U.S. Department of Agriculture 2010), HDR employed remote sensing for the evaluation of the proposed diversion outfall area using a variety of publicly available datasets and aerial photographs. The primary objective of the evaluation was to determine the spatial extent, quantity, and configuration of waters of the U.S., including wetlands, other special aquatic sites, deep water habitats (>6.6 feet deep), and uplands (not waters of the U.S.) for consideration during alternatives analysis, evaluation of project effects, and the USACE's use in the Section 404(b)(1) water dependency determination. Since a key objective of the project is to restore coastal wetlands in the Barataria Basin, and given the dynamic nature of the estuarine ecosystem, remote sensing methods were determined to be adequate for project planning and permitting activities in lieu of on-site delineations of the expansive outfall study area.

Given that delineation is needed to assess existing wetland conditions in areas where potential fill would be placed, either directly or indirectly, and because no Area of Potential Effects has been defined from sediment modeling thus far, USGS HUC #080903010408, which includes 35,000 acres of the immediate outfall area, was assumed to be a sufficient study area for delineation efforts within the Barataria Basin. HDR wetland specialists and geographic information system (GIS) analysts developed delineation maps for the outfall delineation study. This area is bounded by the Non-Federal Levee (that is, the back levee) on the east, Barataria Waterway on the west, Cheniere Traverse Bayou to the north, and Lake Judge Perez, Lake Laurier, and Round Lake to the south. The outfall limits were selected based on preliminary modeling information regarding the anticipated extent of sediment deposition in the Barataria Basin as a result of the MBSD project. At a future date, if modeling identifies a larger extent of delta/land building, the outfall area limits can be expanded for delineations of waters of the U.S., including wetlands, and the report can be amended at that time. The proposed outfall area is a portion of the Mid-Barataria Basin consisting of a complex mosaic of marshes, bayous, subtidal ponds, shallow open water areas, vegetated shallows, excavated channels, spoil banks, and a few developed upland areas featuring residential and industrial sites. For the purposes of the delineation and evaluation of the outfall area, HDR analyzed publicly available spatial datasets (Table 1) to develop an accurate depiction of the following:

- spatial location of waters of the U.S., including special aquatic sites such as wetlands, vegetated shallows, and mudflats

- differentiation of wetland types/classifications (estuarine emergent marsh, palustrine wetlands, scrub/shrub habitats, forested wetlands, etc.), to the extent practicable
- location of uplands
- differentiation of natural open water habitats, shallow subtidal areas, and excavated canals

The following matrix in Table 1 provides an overview of the key characteristics of each dataset evaluated for use in this analysis and an assessment of the applicability to achieve the objectives defined above.

Table 1. Dataset overview

Dataset	Year of imagery/ publication	Data	Constraints
Sasser et al. (2014) - USGS Marsh Vegetation Classification	2014	Includes an estimate of the extent of marsh types (that is, intermediate, brackish, saline) across the Louisiana Coastal Zone	Overestimates marsh by not accurately differentiating open water areas
USDA National Agriculture Imagery Program Satellite Imagery	2010	Most recent and detailed view of existing Basin land uses and vegetation community extents and conditions	Mosaic images create discrepancies in pixel values for similar cover types; difficult to distinguish submerged vegetation and shallows from areas of turbidity given the limitations of aerials (for example, cloud cover, signature inconsistencies)
NWI Mapping	Aerial: 1988, 1989 Publication: 2011	Comprehensive, detailed mapping of wetland and open water types (habitat classifications); provides historical context	Developed from 25-year-old image sources; not reflective of recent marsh loss or marsh creation projects; classification polygons misaligned from aerial base in some areas
USGS Land/Water Classification	2010	Most recent depiction of open water areas	30-meter resolution proved insufficient to identify localized conditions for MBSD project scale; overestimates water area by not capturing vegetated shallows and other marsh areas as land when compared with recent aerial imagery; no differentiation of wetland and open water types
USGS Land Area Change	2011	Assists with identification of marsh loss on a regional basis from 1973 to 2009	30-meter resolution proved insufficient to identify localized conditions for MBSD project scale; no differentiation of wetland types
USGS National Land Cover Database	2011	Recent land cover, including differentiation of wetland extents and types	30-meter resolution provided insufficient level of detail for MBSD project evaluation area; no differentiation of wetland types; overestimated marsh area

Notes: MBSD = Mid-Barataria Sediment Diversion, USDA = U.S. Department of Agriculture, USFWS = U.S. Fish and Wildlife Service, NWI - USFWS National Wetland Inventory , USGS = U.S. Geological Survey

For the purposes of this analysis, multiple datasets were used to support the desktop analysis to delineate jurisdictional waters and wetlands in the outfall study area. This analysis supported the differentiation between wetland and open water, as well as differentiating between different types of wetland habitats (that is, estuarine emergent marsh, palustrine wetlands, scrub/shrub habitats, forested wetlands, etc.) at a scale appropriate for the outfall study area. Although it is the most recent of datasets, the 2013 USGS marsh classification dataset does not provide the local level of mapping or differentiation detail required for the analysis. The USGS marsh classification data were collected through aerial transect surveys and photographic interpretation for the entire Louisiana coast. Although these data provide an overview of recent regional conditions, they showed inconsistencies in open water areas when compared with regional USGS 2010 land/water classification data and recent aerial photographs. For example, smaller areas in the MBSD outfall study area that have undergone marsh collapse during the past several decades are currently subtidal open water areas, but were classified in the USGS 2013 classification as brackish marsh. As a result, the USGS vegetation dataset overestimates marsh acreage in the outfall study area (HUC #080903010408) and underestimates open water areas by more than 17,000 acres. Because of these inconsistencies, the USGS marsh classification dataset was not used for the delineation and classification of marsh in the MBSD outfall study area.

Other datasets were reviewed and were not incorporated because of various constraints in the adequacy or applicability of the data. The U.S. Department of Agriculture (USDA) National Agriculture Imagery Program's (NAIP's) aerial imagery provides a relatively recent and detailed view of Barataria Basin conditions, but would require a substantial amount of time to develop into a classified land cover dataset given inconsistencies between photographs across the large study area. Other available datasets such as the USGS land/water classification, land area change, and land cover datasets were developed for the entire Louisiana coast at a resolution scale of 30 meters, which, as described above, proved too coarse to provide enough detail for delineation and classification. Additionally, a comparison of these spatial datasets with recent aerial photography identified substantial discrepancies in either the classification of marsh or submerged, open water habitats (Figures A-1 to A-3 in Attachment A). So while these datasets can be beneficial to estimate land to water ratios for large areas along the coast, they are too coarse to classify habitat areas and, when overlaid on top of the 2010 imagery, showed an overestimation of areas of water, which the NWI mapping accurately depicted as wetlands.

The process of overlaying the more recent datasets such as the 2010 USGS land/water classification dataset with the NWI mapping to perform spatial updates was evaluated but ultimately ruled out because of the discrepancies in mapping resolution. In other words, overlaying the USGS data that was created at a 30-meter resolution and does not adequately depict smaller areas of wetlands and marsh with the more detailed NWI mapping would have introduced a substantial amount of error.

Selected Approach for Diversion Outfall Area

Based on the evaluation of existing spatial data (USGS mapping, NWI mapping, NRCS mapping, aerial photos, Coastwide Reference Monitoring System [CRMS] data, tidal gauge data, etc.), the predominance of wetlands plant communities, and the consistency of mapping and conditions observed during a site visit to the proposed diversion outfall area in July 2012, it was determined a Level 1 (Onsite Inspection Unnecessary) Routine Determination was suitable for the outfall area. In accordance with the 1987 Wetlands Delineation Manual, a Level 1 determination is appropriate when available spatial information and supporting documentation is available to determine the presence of wetlands and upland conditions over the entire study area. This guidance was primarily written to ensure wetland areas (waters of the U.S.) were not inadvertently determined to be uplands (that is, false negatives) that would result in unpermitted fill activities. The 1987 Delineation Manual provides flexibility for the use of professional judgment for applying Level 1 methods for expansive study areas with data to support a determination that wetland conditions are highly likely to occur. Due to the high-quality aerial photography, the prevalence of open water and marsh habitats, and the detailed hydrologic and soils mapping for the area, a Level 1 determination as described in Section D, Subsection 1 of the 1987 Manual is appropriate.

Wetland Vegetation Community Analysis

The approach selected as the best method to achieve the stated objectives for the outfall area was to utilize the USFWS NWI dataset with minor modifications to include recently constructed uplands (dredge placement) and marsh creation areas not included in the NWI base mapping. The USFWS NWI dataset delineates the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). Certain wetland habitats are excluded from the national mapping program because of the limitations of aerial imagery as the primary data source used to detect submerged wetlands types (sea grasses, submerged aquatic vegetation found in the intertidal and subtidal zones, etc.). The mapping was produced as topical overlays using USGS topographic maps as the base and stereoscopic aerial photo interpretation to determine wetland habitat types and uplands. The hard-copy product is a composite map showing topographic and planimetric features from the USGS map base and wetlands and deepwater habitats from USFWS's topical overlay. The maps were then converted to digital files. The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of collateral data, and the amount of ground verification work conducted.

Although the base imagery used for the NWI mapping is approximately 25 years old, based on a comparison with other collected publicly available datasets and recent high resolution aerial photography, it is the best available representation of the location, type, extent, and spatial configuration of wetlands and other special aquatic habitats. While more recent datasets do provide high resolution mapping to differentiate between vegetated and non-vegetated water habitats, they do not provide the differentiation needed between wetland types. These datasets were generated from imagery classification of aerial photographs at 30-meter resolution, resulting in a substantial underestimation of vegetated areas (Figures A-1 to A-3 in Attachment A). The modified NWI dataset provides the best classification of wetlands, other special aquatic sites (vegetated shallows, tidal mudflats, etc.), non-vegetated deep water habitats (natural and excavated), and uplands. To classify various types of NWI features into the groupings mentioned above for the diversion outfall limits area, HDR wetland scientists overlaid the NWI data with the more recent 2010 satellite imagery. This aided in the process of assigning both the HDR Type classification (that is, open water, wetlands and uplands) as well as the HDR subtypes (that is, forested, scrub/shrub and emergent for wetlands and vegetated shallows, natural and excavated for open water) to specific NWI classifications.

Several modifications were made to the original NWI mapping to improve its accuracy and currentness. First, gaps in the source data were reviewed on the 2010 aerials and were determined to largely be spoil banks of excavated canals that are predominantly scrub/shrub wetlands, with the possibility of minor upland inclusions. Next, minor modifications of the NWI dataset were made to account for recent human-induced land changes not captured in the base imagery, including the addition of a developed/upland map unit category for improved areas such as the Myrtle Grove Marina, which includes constructed uplands, as well as oil and gas development areas in the marsh consisting of dredged material and infrastructure. Overall, this category accounts for a very small percentage of the study area. Additionally, the data were edited to include the 2009 development of the BA-39, a marsh restoration project occurring in the northeastern portion of the proposed MBSD diversion outfall. BA-39 involves piping renewable river sediment into the area of degraded marsh to encourage sediment accretion and the establishment of marsh vegetation. Due to the operations of BA-39, this area in the upper northeastern corner of the outfall delineation area changed from a predominately subtidal, open water, degraded habitat type to emergent marsh surrounded by a low ring levee. Finally, while the majority of the NWI mapping was well-aligned to the 2010 satellite imagery, small sections of the NWI data were slightly shifted in a certain direction. These areas were adjusted to better align with the imagery.

While the modified NWI classification does overestimate the amount of emergent marsh due to the basin-wide loss of marsh through various hydrogeologic processes (e.g., tidal erosion, relative sea level rise, lack of sediment, and tropical storm surge erosion) leading to marsh collapse, it is still the most accurate representation of the spatial extent of special aquatic sites in the study area.

Upon completion of all spatial and tabular modifications to the source NWI data, acreages were calculated for all wetland types and subtypes. These acreages are summarized by both by habitat types as well as individual wetland classifications in Tables 4 and 5 in the following results section. Based on an overall spatial and visual comparison of the older NWI classifications with the more recent 2010 satellite imagery and the USGS Land/Water Classification data, the primary change in the diversion outfall delineation area has been the conversion of intertidal estuarine emergent marsh to subtidal estuarine unconsolidated bottom (submerged) areas. HDR wetland scientists and GIS analysts estimated the loss of marsh (since the base mapping was completed in 1989) to be approximately 10 to 20 percent basin-wide, but such loss is highly variable depending on site-specific conditions and varies from approximately 5 to 50 percent. Based on a site visit to the proposed MBSD immediate outfall area of the Basin in July 2012, several of the subtidal vegetated shallow areas were observed to consist of rooted and floating submergent vegetation, dominated by Eurasian watermilfoil (*Myriophyllum spicatum*) and widgeon grass (*Ruppia maritima*). Delineation of vegetated shallows is likely underestimated given substantial changes that can occur seasonally and in response to tropical storm surges.

Hydrologic Conditions Analysis

A wetland water budget is the total inflows and outflows of water from a wetland. Coastal wetlands such as those in Barataria Basin, while also receiving direct runoff, precipitation, and groundwater inflow, are strongly influenced by surface water (permanent and seasonal) and tidal cycles, particularly in areas of subsidence or lower elevations (CPRA 2011). Sufficient hydrology for the support of wetlands in the diversion channel and outfall area include surface water and streamflow from natural and artificial bayous and canals, freshwater surface flows from the Naomi siphon, Davis Pond diversion, and the Intracoastal Waterway, groundwater discharge, and tides (CPRA 2011).

Using data from a hydrologic modeling effort completed in 2014 by HDR, an elevation analysis was performed for wetland habitat types within the diversion outfall area to perform a comparison with water level and tidal elevation ranges to observe the influence hydrology sources had on ponding, flooding, and soil saturation. Conclusions and data are presented in the results section discussed further in the document.

Continuous hydrologic water surface elevation data were also collected from the CRMS. However, only four CRMS locations were within the delineation boundary for the diversion outfall area (HUC #080903010408). Given the data from only four locations (CRMS 0225, 0276, 3601, 3617) within the 35,000-acre study area, no single water surface elevation or combination of these locations can serve as a representative value for such a dynamic landscape with fluctuating service elevations and subsidence rates. Therefore, average elevation data for the outfall study area and a comparison with tidal elevation trends was conducted to evaluate the hydrologic conditions in vegetated areas.

Soils Analysis

The predominant soils found in the NRCS soils map unit spatial files and documentation were evaluated for the diversion channel footprint and the outfall area. The NRCS National Hydric Soils List was referenced to determine which soils in the study limits were on the list and under which criteria. Site conditions were assessed based on field conditions and aerial photographs for non-forested habitats to determine whether the soils were similar to the map unit descriptions and if they included hydric conditions or smaller hydric components (that is, inclusions). Hydrology and elevation data were also used in the diversion outfall delineation area to infer that soil saturation likely occurs in the upper 12 inches of the soil profile for at least 3 weeks in the majority of the study area, with the exception of those areas built up with fill, due to tidal inundation and other sources of flow.

Results

Diversion Channel Footprint

Results of the delineation and habitat evaluation for waters of the U.S., including wetlands, are presented in Figure 1 and Table 2. Representative photographs of the proposed project site are presented later in this memorandum and following corresponding wetland determination data forms in Attachment B. The diversion channel footprint of approximately 362 acres contains forested wetlands, emergent wetlands, and open water habitats considered waters of the U.S., including canals that were excavated for agriculture, drainage, and potential access. Additionally, the study area contains numerous smaller ditches excavated for drainage associated with historical agricultural practices. Drainage channels within wetlands or that have relatively permanent water and are contiguous or adjacent to traditional navigable waters (TNWs) are generally considered jurisdictional waters of the U.S., whereas other excavated ditches and an excavated pond that are not connected to other tributaries or not adjacent to waters of the U.S. are typically considered non-jurisdictional. Both circumstances occur within different portions of the diversion channel footprint.

Table 2. Aquatic habitats considered waters of the U.S. in the diversion channel footprint

Type	Acres
Forested wetland	10.0
Emergent wetland	85.2
Open water (canal)	7.3
Total	**102.5**

At the northeastern portion of the diversion channel footprint, forested wetlands occur in the batture area between the MR&T levee and the Mississippi River. The entire area appears to be seasonally flooded but well-drained due to slopes. Primary hydrology indicators present are drift deposits and inundation that can be seen on aerial photography. Supportive dominant vegetation in the overstory is primarily obligate (OBL) and facultative-wet (FACW) species including black willow (*Salix nigra*), with Chinese tallow (*Triadica sebifera*), swamp privet (*Forestiera acuminata*), smartweeds (*Polygonum* spp.), coco-yam (*Colocasia esculenta*), and peppervine (*Ampelopsis arborea*). This habitat type appears to consist of early successional vegetation, including exotic and invasive species (Chinese tallow and coco-yam).

Within the proposed footprint from the MR&T levee to Belle Chasse Highway (LA 23), a mixture of uplands and forested wetlands occurs. Within this area, three forested wetland depressions occur that appear to be seasonally inundated within their entire extent. The remaining area surrounding the wetland depressions is slightly higher uplands. For forested wetland areas, primary hydrology indicators are water marks, water-stained leaves, and inundation seen on aerial photography. These forested wetlands areas are dominated by OBL species but consist of boxelder (*Acer negundo*), Chinese tallow (exotic), red maple (*Acer rubrum*), rough-leaf dogwood (*Cornus drummondii*), and peppervine. Other non-dominant woody species present include deciduous holly (*Ilex decidua*), water oak (*Quercus nigra*), and black willow. This vegetation composition is characteristic of regrowth colonizing and non-native species rather than true bottomland hardwood forest (see data forms in Attachment B for site-specific hydrology indicators and dominant vegetation). Between LA 23 and the back levee adjacent to marsh, the proposed footprint contains pasture and numerous drainage ditches excavated for and remaining from past agricultural practices. Near LA 23 a small pond also exists that was likely excavated for livestock watering and borrow material. Three excavated canals cross the area that carry drainage to pumps at the Wilkinson Canal near Myrtle Grove to the southeast. The current use of the pasture habitat in the proposed footprint appears to be cattle grazing. To the southwest, closest to the marsh, the pasture habitat transitions from uplands primarily vegetated with bermudagrass (*Cynodon dactylon*) to wetland increasingly dominated by smartweed and cattail (*Typha* sp.). This emergent wetland appears to be the result of inundation/saturation resulting from subsidence. In this wetland, given the problematic vegetation and hydrology indicators from the recent Hurricane Isaac (late August 2012), the wetland boundary was estimated using transects and reviewing recent aerial photography.

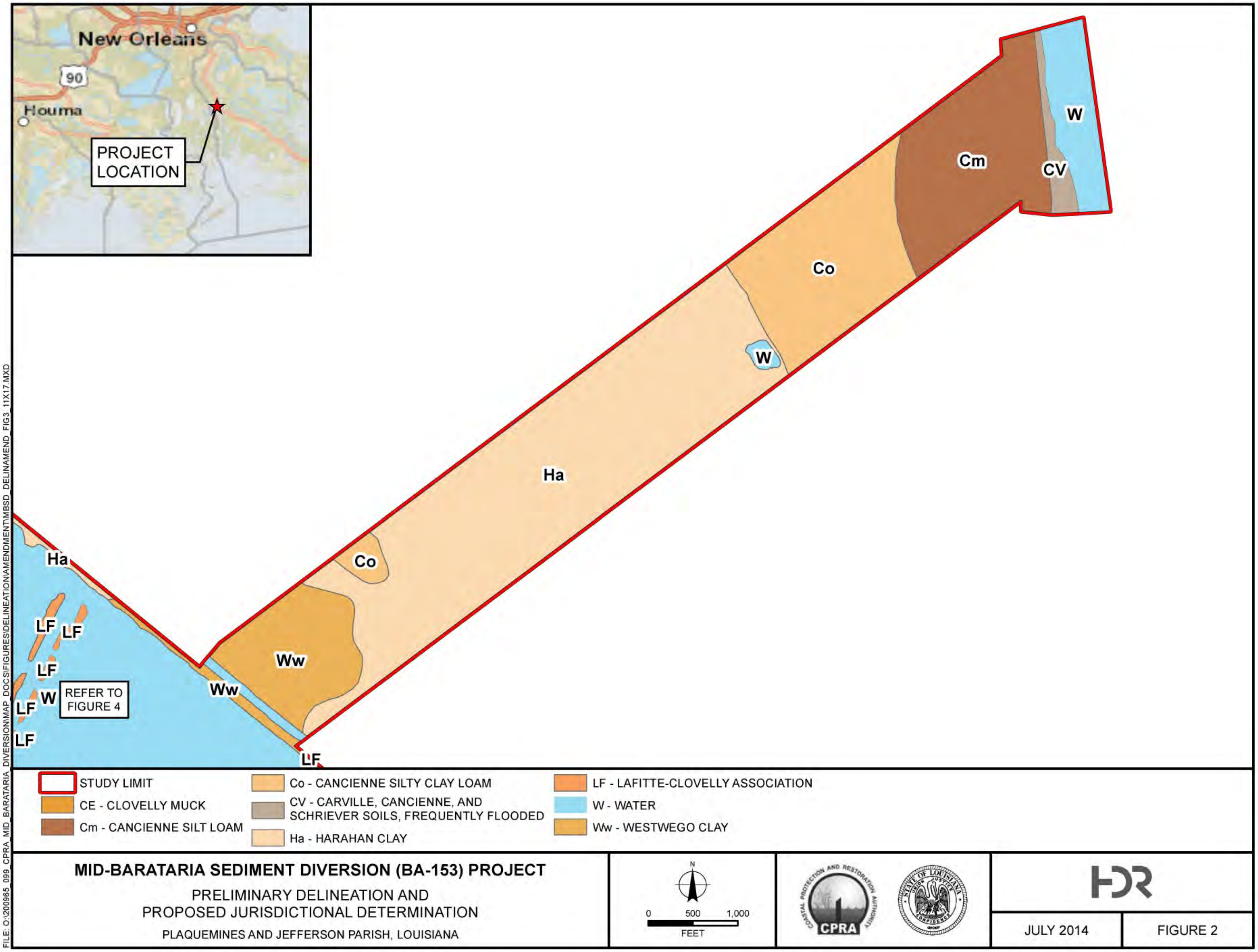
The soils within the diversion channel footprint limits are heavily modified by past agricultural, flood control, and transportation improvements. However, several of the soils within the delineation area exhibit frequently flooded characteristics or are positioned in depressional landscape areas due to the seasonal high water table and high annual precipitation and are listed on the current NRCS Hydric Soils List. The soil series and map units located within the diversion channel footprint include those listed in Table 3 with a description of each following below. Soil series descriptions and map units located within the MBSD footprint are displayed in Figure 2. Some soils, such as Cancienne Silty Clay Loam, include associated soil components or “inclusions” which occur within depressional areas and form hydric soil conditions when seasonal inundation or saturated conditions occur in the upper soil profile.

Table 3. Soil map units located within diversion channel footprint

Soil map unit	Landscape position	Hydric soil list/Component
Clovelly Muck	Marshes	Yes/Hydric
Cancienne Silt Loam	Natural levees	Yes/Hydric inclusions of Gramercy soils (10%)
Cancienne Silty Clay Loam	Natural levees	Yes/Hydric inclusions of Gramercy soils (10%)
Carville, Cancienne, & Schriever Soils, frequently flooded	Batture, natural levees, depressions and backswamps	Yes/Hydric
Harahan Clay	Backswamps	Yes/Hydric
Westwego Clay	Backswamps	Yes/Hydric

The Clovelly series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in moderately thick accumulations of herbaceous organic material overlying very fluid clayey alluvial sediments. These soils are on broad coastal marshes that are nearly continuously flooded with brackish water.

Figure 2. Preliminary delineation and proposed jurisdictional determination – soils in MBSD footprint



The Cancienne series consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries. Cancienne series can contain hydric inclusions of Gramercy soils which do occur in the eastern portion of the diversion channel footprint between LA 23 and the MR&T Levee. The Gramercy series consists of fine, very deep, poorly drained, very slowly permeable soils that formed in clayey over fine-silty alluvium. These soils are on alluvial flats and on the lower parts of natural levees on the alluvial plain of the Mississippi River and its distributaries.

The Carville series consists of coarse-silty, very deep, somewhat poorly drained, moderately permeable soils that formed in recent loamy alluvium. These soils are on nearly level to very gently sloping natural levee positions on flood plains, mainly along the Mississippi River and its distributaries.

The Harahan series consist of very deep, poorly drained, very slowly permeable soils. They formed in moderately thick firm clayey alluvium overlying fluid clayey sediments. These soils are on broad backswamp positions on the lower Mississippi River flood plain.

The Schriever series consists of very fine, deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain.

The Westwego series consist of very fine, deep, poorly drained, very slowly permeable soils. They formed in semifluid clayey alluvium and organic material that dried and shrank irreversibly in the upper part as the result of artificial drainage. These soils are on broad, drained former swamps along the lower Mississippi River and its distributaries.

Diversion Outfall Area

Based on the analysis of land cover and vegetation datasets and aerial imagery, the 35,000-acre diversion outfall area studied is a mosaic of coastal habitats including palustrine wetlands; estuarine/palustrine, subtidal, and intertidal wetlands; scrub/shrub wetlands, and forested wetlands. Upland areas are mainly found near developed industrial and residential areas along excavated canals, but there is the potential for a minor component (<1 percent) of upland inclusions not readily observable using the remote sensing (Level 1) methods. Results of the delineation and habitat evaluation for waters of the U.S., including wetlands, are presented in Figure 3 (Sheets 1 to 4) and Table 4. The classifications used in Table 4 are summary categories of habitats typically depicted in delineations of waters of the U.S.

As described above, the data presented below are primarily based on detailed NWI mapping with minor modifications and likely overestimate the current extent of emergent marsh habitat types while underestimating open water (natural) and vegetated shallows. Table 5 represents the NWI habitat classification codes used to sub-categorize existing marsh types in the area of the diversion outfall.

Table 4. Aquatic habitats considered waters of the U.S. in the proposed diversion outfall area (HUC #080903010408)

Type	Acres
Waters of the U.S.	
Open water – natural	8,173
Open water – artificial (excavated)	2,175
Wetlands – vegetated shallows	1,849
Wetlands – emergent marsh	20,489
Wetlands – scrub/shrub	1,669
Wetlands – forested	532
Subtotal – waters of the U.S.	**34,887**
Uplands/dredge disposal	**189**
Total	**35,076**

Figure 3. Preliminary delineation and proposed jurisdictional determination – waters of the U.S. in outfall area (Sheet 1)

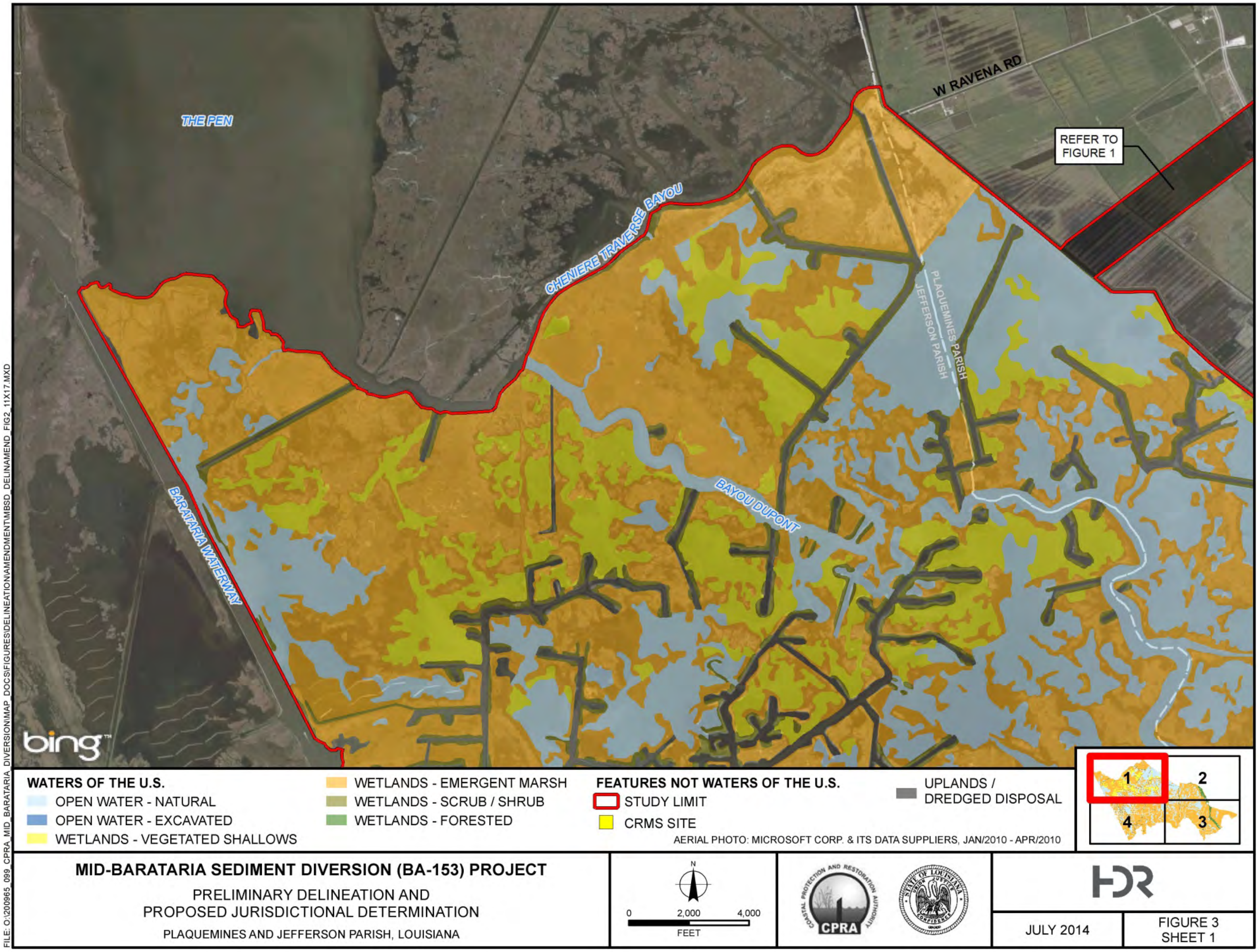


Figure 3. Preliminary delineation and proposed jurisdictional determination – waters of the U.S. in outfall area (Sheet 2)

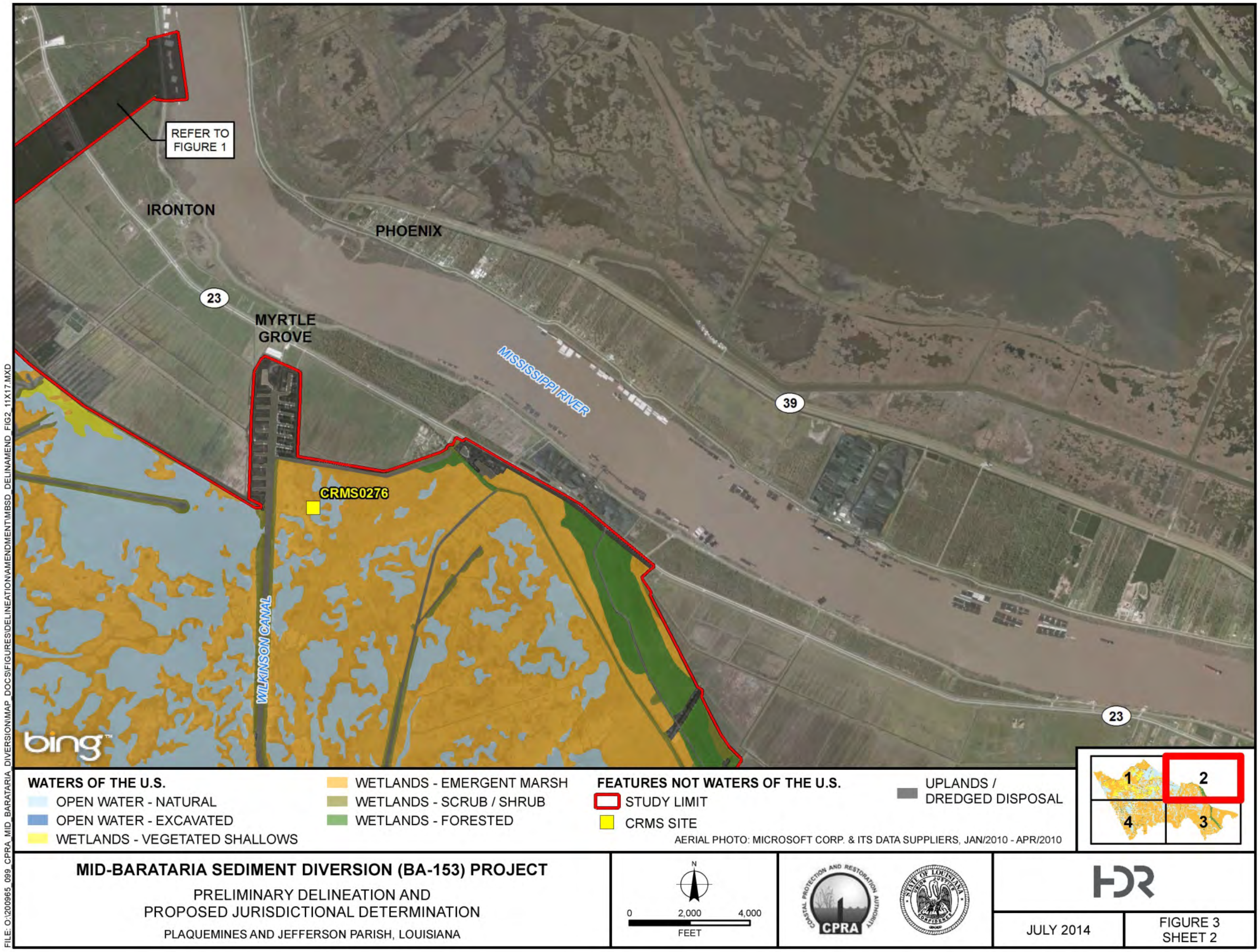


Figure 3. Preliminary delineation and proposed jurisdictional determination – waters of the U.S. in outfall area (Sheet 3)

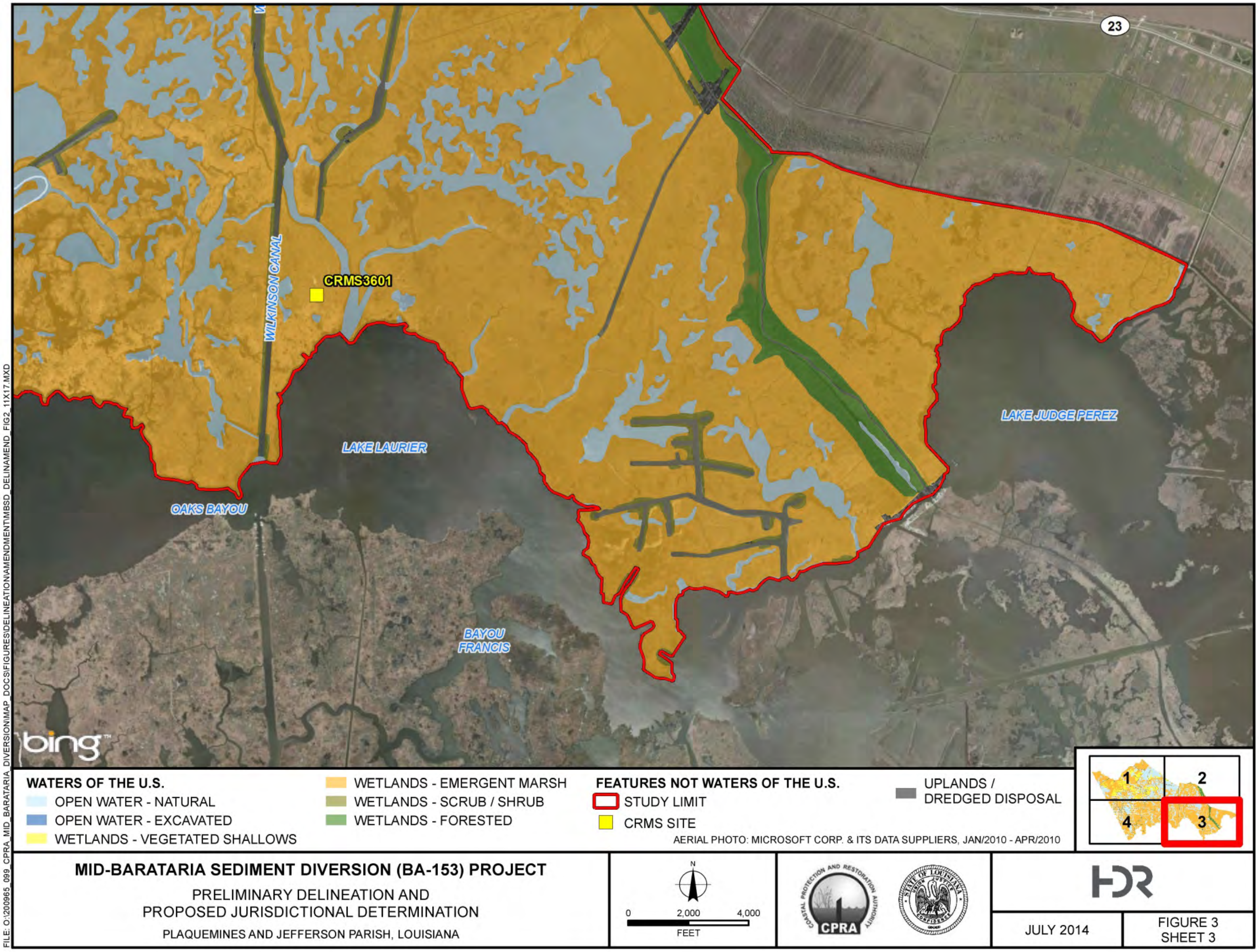


Figure 3. Preliminary delineation and proposed jurisdictional determination – waters of the U.S. in outfall area (Sheet 4)

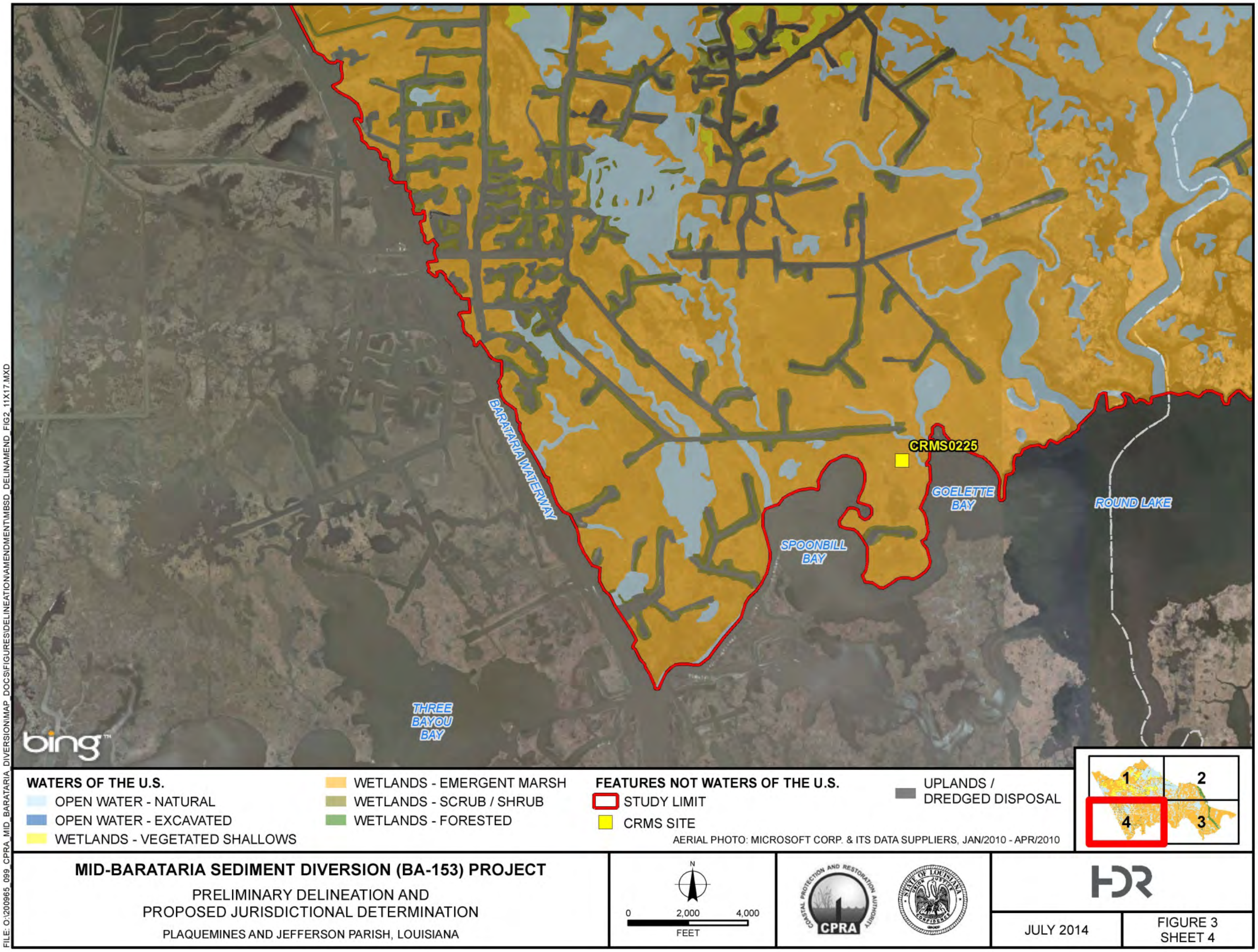


Table 5. National Wetland Inventory classifications and current habitat types in the diversion outfall study area (HUC #080903010408)

NWI code	NWI description	Updated habitat/ Land use types	Water of the U.S.
E1AB4L5	Estuarine, Subtidal, Aquatic Bed, Floating Vascular, Subtidal, Mesohaline	Emergent Marsh Wetland; Vegetated Shallows	Yes
E1AB5L5	Estuarine, Subtidal, Aquatic Bed, Unknown Submergent, Subtidal, Mesohaline	Vegetated Shallows	Yes
E1UBL	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal	Open Water (natural and excavated)	Yes
E1UBL5	Estuarine, Subtidal, Unconsolidated Bottom, Subtidal, Mesohaline	Open Water (natural)	Yes
E2ABL	Estuarine, Intertidal, Aquatic Bed, Subtidal	Vegetated Shallows	Yes
E2EM1N5	Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded, Mesohaline	Emergent Marsh Wetland	Yes
E2EM1P5	Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded, Mesohaline	Emergent Marsh Wetland	Yes
E2EM1Pd	Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded, Partially Drained/Ditched	Emergent Marsh Wetland	Yes
E2EM1Pd*	Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded, Partially Drained/Ditched	Uplands / Dredged Disposal	No
E2EMPh	Estuarine, Intertidal, Emergent, Irregularly Flooded, Diked/Impounded	Emergent Marsh Wetland	Yes
E2SS1P	Estuarine, Intertidal, Scrub-Shrub, Broad-Leaved Deciduous, Irregularly Flooded	Scrub/Shrub Wetland	Yes
E2SS1P5	Estuarine, Intertidal, Scrub-Shrub, Broad-Leaved Deciduous, Irregularly Flooded, Mesohaline	Scrub/Shrub Wetland	Yes
E2SSs	Scrub/Shrub	Scrub/Shrub Wetland	Yes
E2USN5	Estuarine, Intertidal, Unconsolidated Shore, Regularly Flooded, Mesohaline	Emergent Marsh Wetland; Vegetated Shallows	Yes
PEM1Cdh	Palustrine, Emergent, Persistent, Seasonally Flooded, Partially Drained/Ditched, Diked/Impounded	Emergent Marsh Wetland	Yes
PEM1Cdh*	Palustrine, Emergent, Persistent, Seasonally Flooded, Partially Drained/Ditched, Diked/Impounded	Uplands / Dredged Disposal	No
PEM1R	Palustrine, Emergent, Persistent, Seasonal-Tidal	Emergent Marsh Wetland	Yes
PEM1Rd	Palustrine, Emergent, Persistent, Seasonal-Tidal, Partially Drained/Ditched	Emergent Marsh Wetland	Yes
PEM1Rd*	Palustrine, Emergent, Persistent, Seasonal-Tidal, Partially Drained/Ditched	Uplands / Dredged Disposal	No
PEM1T	Palustrine, Emergent, Persistent, Semipermanent-Tidal	Emergent Marsh Wetland	Yes

Table 5. National Wetland Inventory classifications and current habitat types in the diversion outfall study area (HUC #080903010408)

NWI code	NWI description	Updated habitat/ Land use types	Water of the U.S.
PFO1/3R	Palustrine, Forested, Broad-Leaved Deciduous/Broad-Leaved Evergreen, Seasonal-Tidal	Forested Wetlands	Yes
PFO1Ad	Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded, Partially Drained/Ditched	Forested Wetlands	Yes
PFO1Ad*	Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded, Partially Drained/Ditched	Uplands / Dredged Disposal	No
PFO1Cd	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched	Forested Wetlands	Yes
PFO1R	Palustrine, Forested, Broad-Leaved Deciduous, Seasonal-Tidal	Forested Wetlands	Yes
PFO1S	Palustrine, Forested, Broad-Leaved Deciduous, Temporary-Tidal	Forested Wetlands	Yes
PSS1/3R	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/Broad-Leaved Evergreen, Seasonal-Tidal	Forested Wetlands	Yes
PSS1Cd	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched	Scrub/Shrub Wetland	Yes
PSS1Cd*	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched	Uplands / Dredged Disposal	No
PSS1Cdh	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched, Diked/Impounded	Scrub/Shrub Wetland	Yes
PSS1R	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonal-Tidal	Scrub/Shrub Wetland	Yes
PSS1T	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Semipermanent-Tidal	Scrub/Shrub Wetland	Yes
PUBH	Palustrine, Unconsolidated Bottom, Permanently Flooded	Open Water (excavated)	Yes
PUBHx	Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated	Open Water (excavated)	Yes
R1UBV	Riverine, Tidal, Unconsolidated Bottom, Permanent-Tidal	Open Water (natural)	Yes
n/a	Developed Land	Uplands / Dredged Disposal	No

Note: NWI categories classified as uplands/dredged disposal areas are based on recent (2010–2013) aerial photography or land use mapping comprising approximately 189 acres (0.5%) of the outfall study area.

Based on a site visit in July 2012 and available vegetation data in the CRMS for sites within the outfall study area, vegetative shallows are dominated by Eurasian watermoil and widgeon grass. Emergent marsh habitats are dominated by salt meadow cordgrass (*Spartina patens*), smooth cordgrass (*S. alterniflora*), and chairmaker's bulrush (*Schoenoplectus americanus*), with co-dominant species including needlegrass rush (*Juncus roemerianus*) and saltgrass (*Distichlis spicata*).

Dominant species occurring on the spoil banks parallel to the excavated channels include saltwater false willow (*Baccharis angustifolia*), and Chinese tallow, with understory herbaceous subdominants including saltgrass (*Distichlis spicata*) and saltmarsh morning glory (*Ipomoea sagittata*).

Hydrologic Conditions

In an effort to evaluate hydrologic influence to wetlands in the outfall area, baseline information was used to extract elevations for existing marsh types. Performing a GIS analysis, the latest surface elevation model from July 2014 was used to generate representative sampling locations at 20-foot increments across the delineation study area. Each data point was assigned an elevation value corresponding to that location from the model as well as corresponding marsh type information. Over 3 million individual sampling points were generated from this exercise and were subsequently summarized to obtain an average elevation (in feet) for each marsh type. The ranges derived from these values provide estimated elevations that can be used, in combination with tidal range information, to evaluate hydrologic conditions. Areas with wetland hydrology indicators in the project ecoregion would be inundated or saturated within the upper 12 inches of the soil surface for a duration of at least 3 weeks annually. Seasonally, tides tend to be highest in late summer through mid-fall (August to November) and lowest in the winter and early spring (December to March) (CPRA 2011). With typical tidal ranges of approximately 0.25 to 2.5 mean sea level (msl) within the outfall area, these habitats experience inundation or saturation for prolonged periods with a high probability of producing anaerobic soil conditions needed for hydric soil conditions to develop. The average elevations in the wetland and vegetated shallows range from -2 to 1.7 feet msl, while average depths in the open water and excavated areas are approximately -3 to -8 msl. Based on the evaluation of mean high tide in the project outfall area and the average elevations, there is evidence to indicate the majority of the outfall study limits meet the wetland hydrologic criteria. This is consistent with on-site conditions observed by the project team, NRCS soil mapping, USGS mapping, and NWI mapping.

Soils Conditions

The soils in the Louisiana Coastal Zone formed in either alluvial sediments or loess, and may have many accumulations of organic matter in the upper part. Deltaic processes have played a significant role in the types of soils present in the study area. The types of soils present today in this area are characterized by the depositional environments associated with the natural episodic deltaic cycle (CPRA 2011). Soils are a significant resource and a critical element of coastal habitat which supports vegetation growth and open water benthic productivity (CPRA 2011).

A desktop query was used to identify soils in the diversion outfall area. Several are listed as current NRCS Hydric Soils and are included in Table 6 with a description of each following below. Soil series descriptions and map units located within the MBSD outfall area are displayed in Figure 4 (Sheets 1 to 4).

Table 6. Soil map units located within study area delineation limits

Soil map unit	Landscape position	Hydric soil list/Component
Clovelly Muck	Marshes	Yes/Hydric
Cancienne Silty Clay Loam	Natural levees	Yes/Hydric inclusions of Gramercy soils (10%)
Gentilly Muck	Marshes	Yes/Hydric
Harahan Clay	Backswamps	Yes/Hydric
Lafitte – Clovelly Association	Marshes	Yes/Hydric
Lafitte Muck	Marshes	Yes/Hydric
Schriever Clay	Backswamps	Yes/Hydric
Westwego Clay	Backswamps	Yes/Hydric

The Clovelly series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in moderately thick accumulations of herbaceous organic material overlying very fluid clayey alluvial sediments. These soils are on broad coastal marshes that are nearly continuously flooded with brackish water.

The Cancienne series consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries

The Gentilly series consists of very deep, very poorly drained, very slowly permeable slightly to moderately saline soils. These soils formed in thin accumulations of herbaceous plant remains and semifluid clayey alluvium over consolidated clayey deposits.

The Harahan series consist of very deep, poorly drained, very slowly permeable soils. They formed in moderately thick firm clayey alluvium overlying fluid clayey sediments. These soils are on broad backswamp positions on the lower Mississippi River flood plain.

Lafitte-Clovelly soils are level, poorly drained soils that have a thick or moderately thick mucky surface layer and clayey underlying material in brackish marshes. The Lafitte series consists of very deep, very poorly drained, moderately rapidly permeable organic soils formed in herbaceous plant remains over mineral sediments in intermediate and brackish marshes in the extreme lower Mississippi River Delta and coastal areas.

The Schriever series consists of very fine, deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain.

The Westwego series consist of very fine, deep, poorly drained, very slowly permeable soils. They formed in semifluid clayey alluvium and organic material that dried and shrank irreversibly in the upper part as the result of artificial drainage. These soils are on broad, drained former swamps along the lower Mississippi River and its distributaries.

Figure 4. Preliminary delineation and proposed jurisdictional determination – soils in outfall area (Sheet 1)

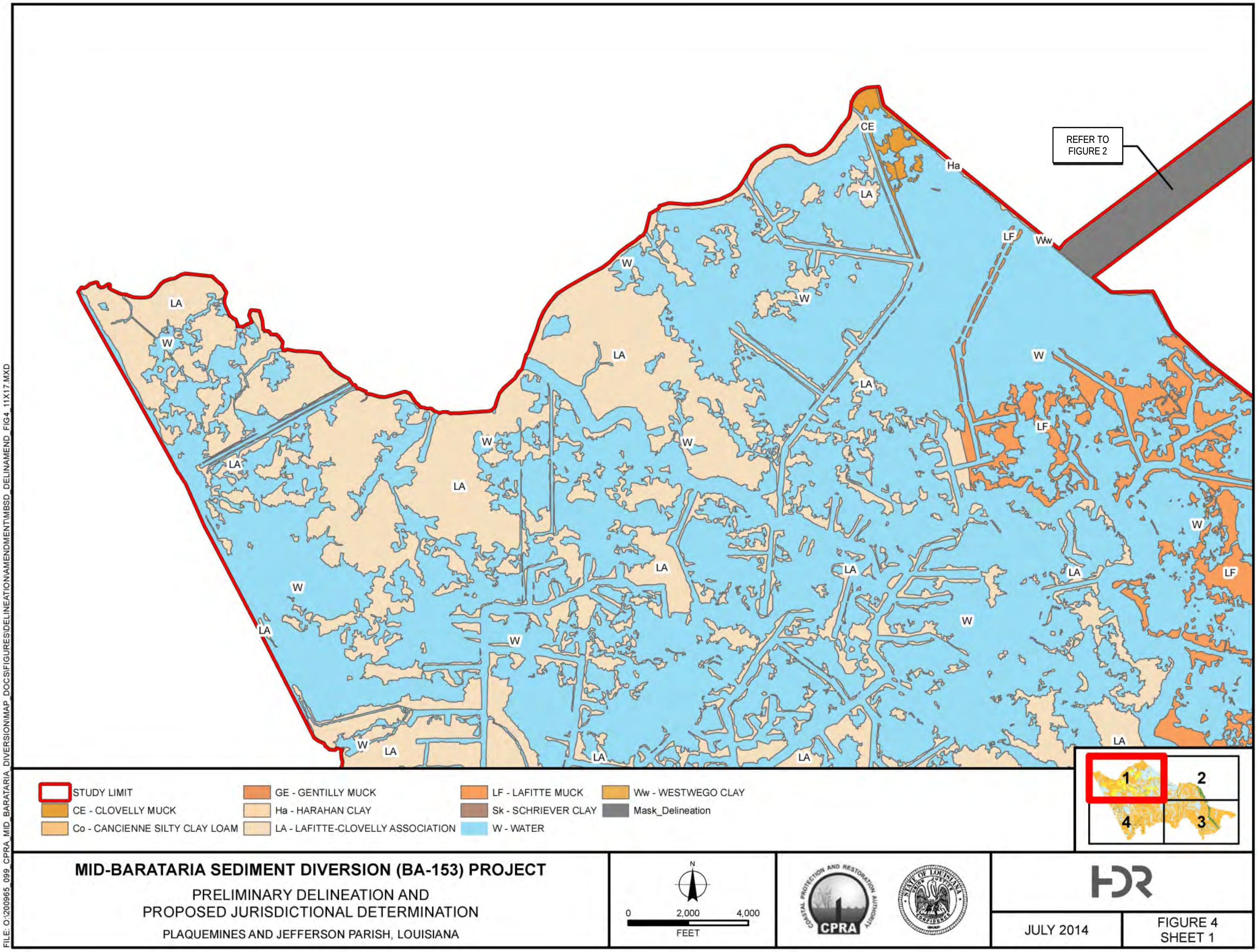


Figure 4. Preliminary delineation and proposed jurisdictional determination – soils in outfall area (Sheet 2)

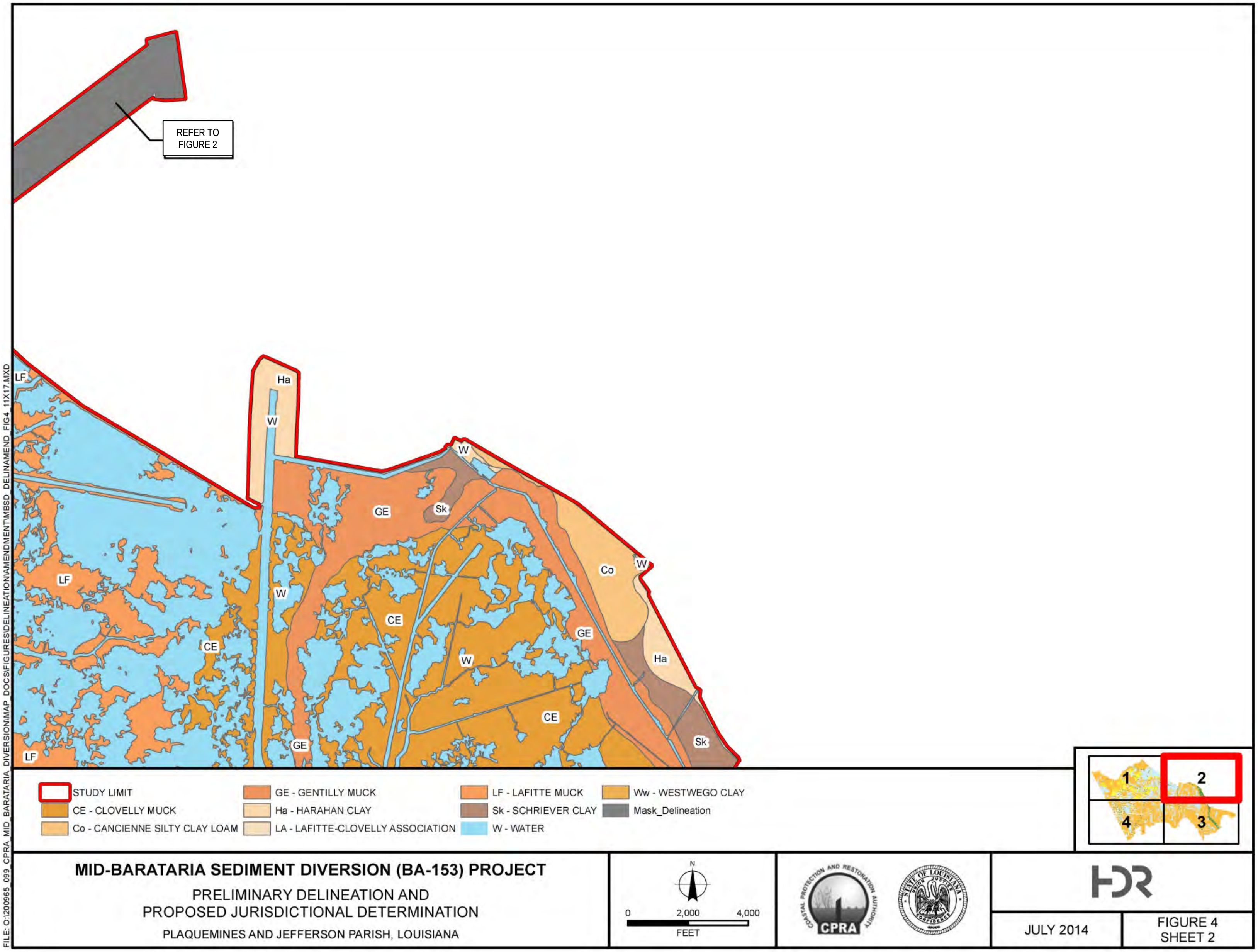


Figure 4. Preliminary delineation and proposed jurisdictional determination – soils in outfall area (Sheet 3)

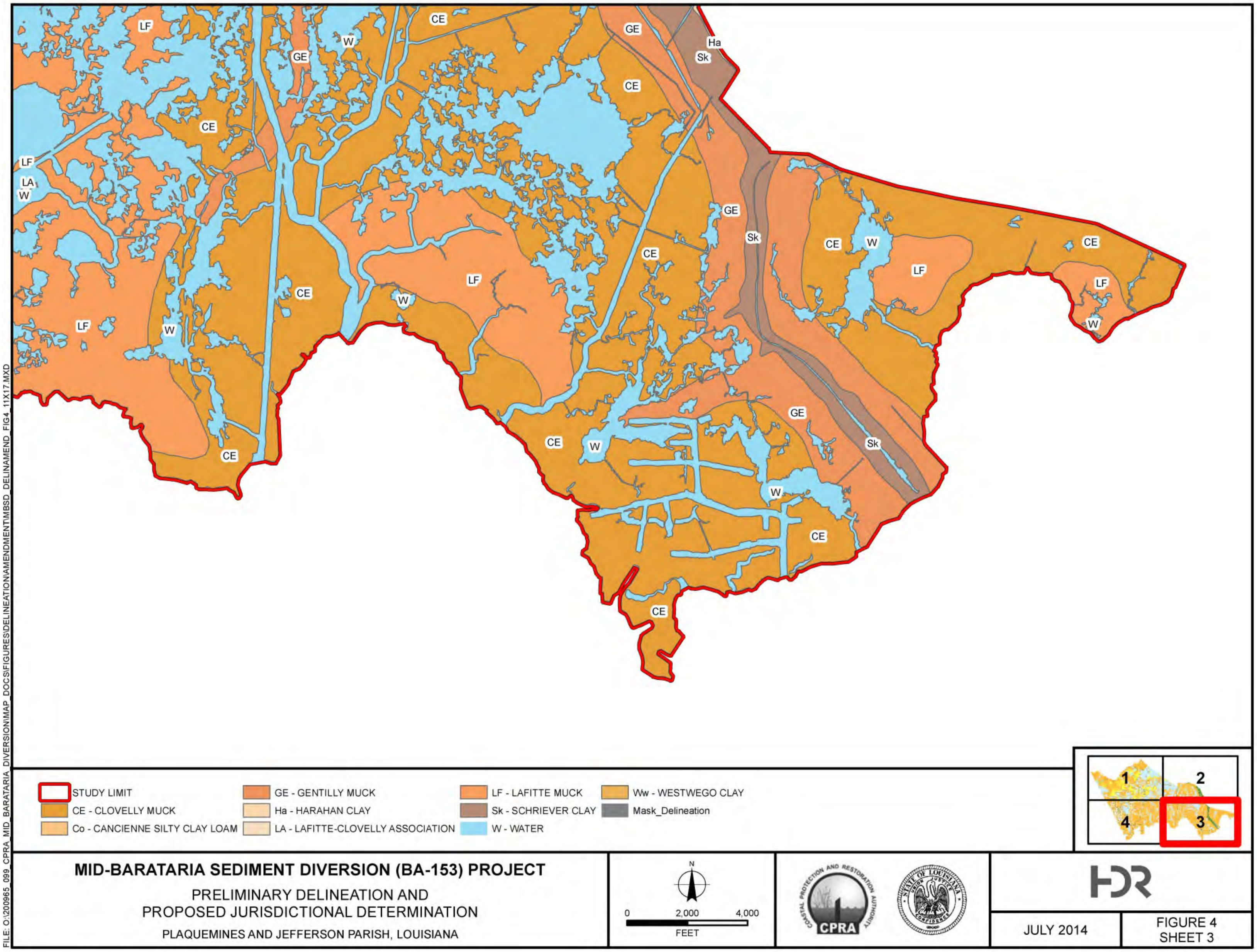
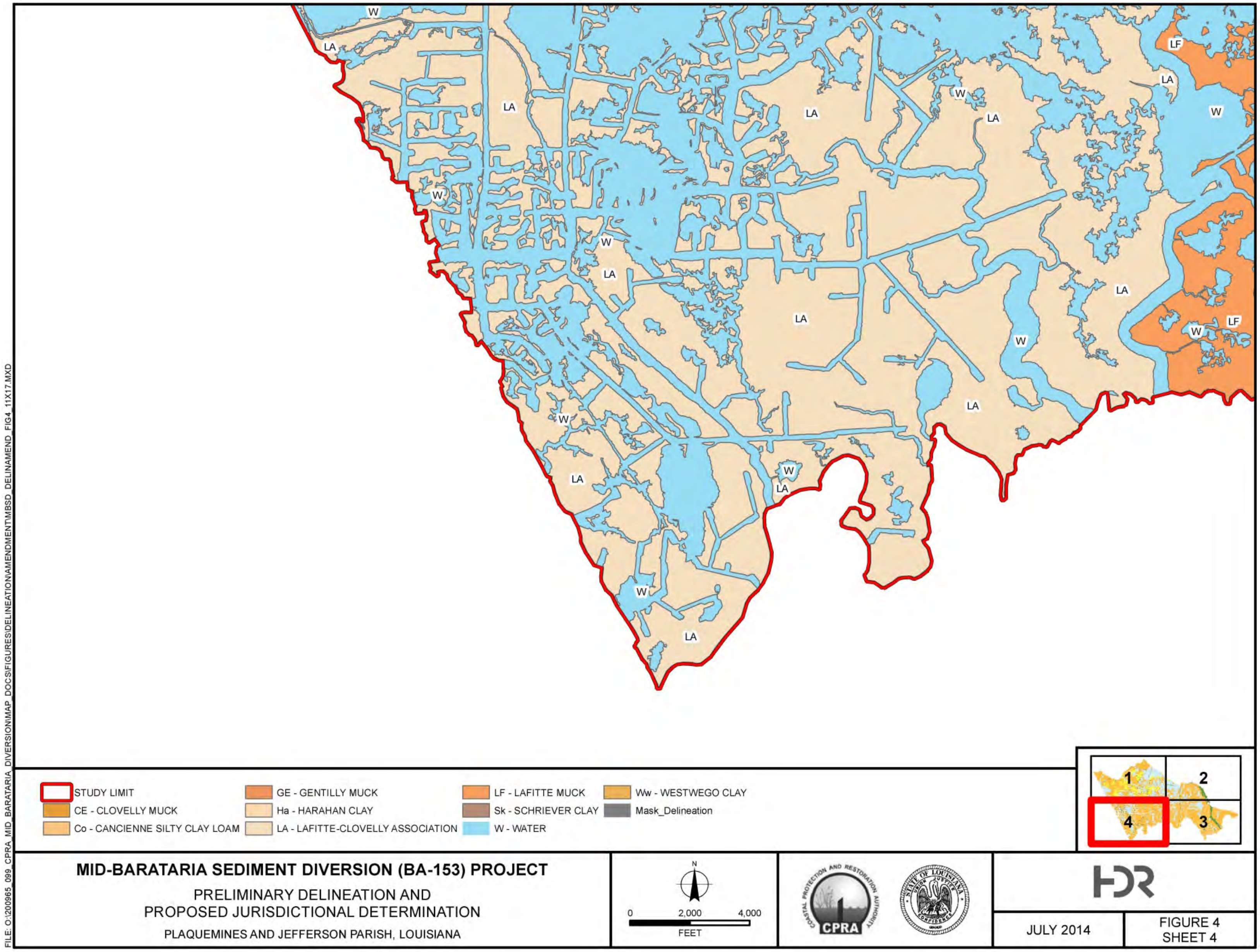


Figure 4. Preliminary delineation and proposed jurisdictional determination – soils in outfall area (Sheet 4)



Discussion

The proposed MBSD project footprint area should be monitored during the continued planning and design phases of the project to evaluate changes in infrastructure or existing drainage systems that could result in changes in the extent or type of wetlands present. Additionally, if the proposed footprint or location changes, additional delineation efforts may be required if the new right-of-way or construction servitude is not included in previously surveyed areas, or if more than 5 years have passed since the date of USACE verification.

With regard to the delineation of wetlands in the MBSD outfall area, careful evaluation of multiple spatial datasets and comparison with recent aerial photography indicate the USFWS NWI mapping provides the most accurate depiction of the types and spatial configuration of waters of the U.S. and special aquatic sites, including wetlands, in the outfall area. While other databases provide valuable information of trends (marsh loss, salinity trends, relative percentage of vegetated cover, etc.), none of the other datasets are useful for identifying the types and spatial extent of wetlands and special aquatic sites in the Barataria Basin necessary for the delineation and proposed jurisdictional determination. Also, trying to generate a combined GIS map to represent the current extent of submerged types while maintaining the NWI vegetated wetland classifications is not practicable due to the minor differences in resolution and spatial georectification between the datasets. However, as described above, given the age of the aerial imagery used as the base map for the NWI data and the continued degradation and dynamics of the system, it is likely that it overestimates the current extent of marsh habitats in the basin. Therefore, HDR recommends continued evaluation of new spatial data and mapping sources to further refine this evaluation. USGS is currently developing a 2013 land/water classification spatial database. When available, this dataset should be evaluated to determine whether the vegetated and submerged habitat areas are more accurately captured within the outfall area than under the existing mapping. If so, the 2013 data could be used to perform a GIS analysis of the previous marsh areas that have collapsed and converted to a submerged habitat type (vegetated shallows or open water).

Representative Site Photographs: Diversion Channel Footprint

1. Top of MR&T Levee. Batture area is presented on the left toe of levee and forested habitat on the right.

2. Forested wetland habitat dominated by black willow in the batture adjacent to the Mississippi River.

3. Forested wetland depression in the area between MR&T levee and LA 23.

4. Forested upland habitat in the area between MR&T levee and LA 23.

5. Upland pasture habitat with excavated pond in the background, facing southwest, from LA 23.

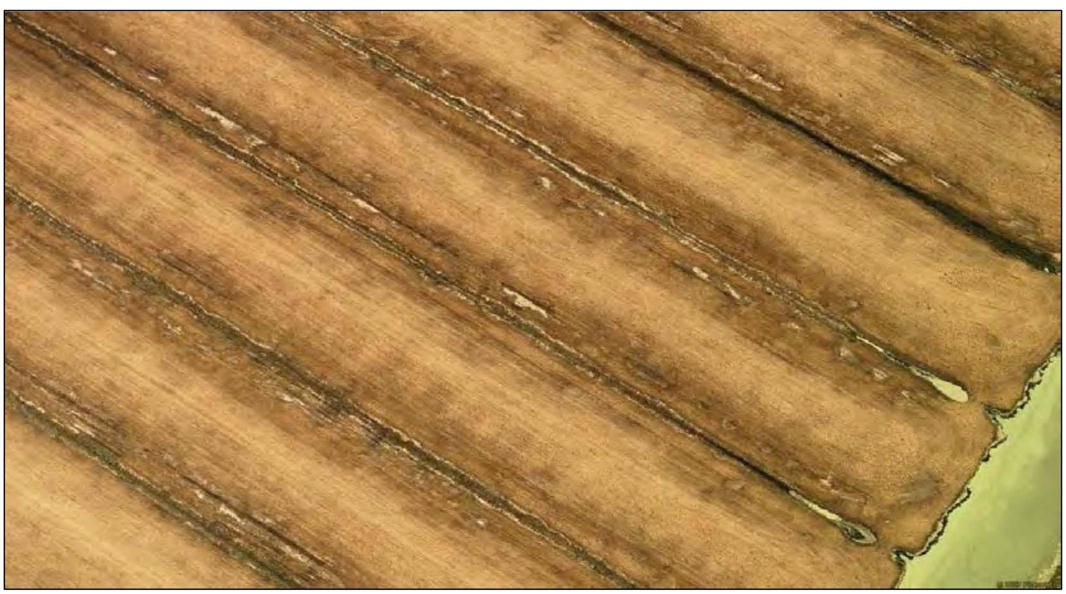
6. Pre-Isaac (July 2012 site visit): Canal and subsiding vegetation on the protected side of the Non-Federal Levee (NFL, back levee) on the background (right side).

7. Post-Isaac (2012): Emergent wetland near canal on protected side of NFL (back levee) with flooding impacts from Hurricane Isaac.

8. Aerial image of pasture (partially wetland) southwest of LA 23, with cattle and drainage ditches visible.

9. Post-Isaac (2012): Canal transecting the study area between pasture with emergent wetland to the south, nearest the NFL (back levee).

10. Aerial image of emergent wetland in subsided pasture and drainage channels near west canal by the NFL (back levee) at the southwestern end of the proposed diversion channel footprint.



11. Post-Isaac (2012): Emergent wetland in pasture with wetland conditions attributable to subsidence (note the vegetation community impacts resulting from saltwater flooding during Hurricane Isaac).

Representative Aerial Photographs: Outfall Area

12. Example of broken emergent marsh habitat near the proposed outfall with a mosaic of natural open water, submerged areas (previously marsh), excavated canals, and scrub/shrub (spoil banks).

13. Pre-Isaac (summer 2012): Emergent marsh habitat on southern edge of BA-39 marsh restoration area, submerged vegetated shallows to the left, and open water in background.

14. Previous emergent marsh habitat in north-central portion of outfall area with only remnant marsh areas, submerged areas (previously marsh), and scrub/shrub (spoil banks) along oil and gas canals.

15. Pre-Isaac (summer 2012): Natural open water area with the remnants of field structures.

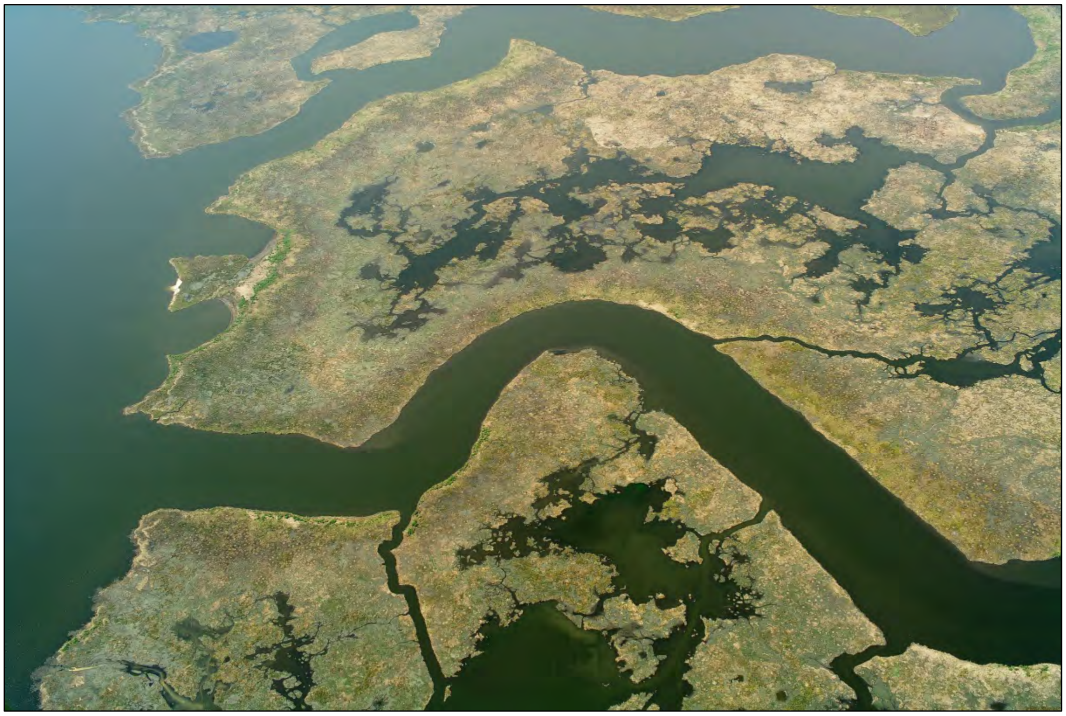
16. Pre-Isaac (summer 2012): Scrub shrub habitats on low spoil berms from excavated oil canal excavation. Typical elevation is within 12 inches of mean high tide, allowing establishment of marsh on lower intertidal elevations and shrubs in intermittently and seasonally flooded areas.

17. Emergent marsh habitat near Bayou Dupont in outfall area.

18. Emergent marsh habitat in central Barataria Basin with marsh collapse in background; natural bayous and excavated canals with scrub/shrub (bright green vegetation) along spoil banks; lighter brown vegetation in lower right quadrant of the photograph is predominantly *Spartina patens*.

19. Pre-Isaac (July 2012): Open water in collapsed marsh area consisting of both vegetated shallows and deep water habitats.

20. Emergent marsh habitat near the confluence of Bayou Dupont and Round Lake, presumably protected by natural sand deposition ridges, with marsh collapse beginning in the interior likely because of effects of saltwater intrusion and tidal erosion in areas with smaller particle and organic soils.



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Attachment A. Dataset Comparison Figures

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Figure A-1. 2010 USGS Land/Water Classification Dataset compared with 2010 aerial imagery (Microsoft Corp. and its data suppliers). Visual estimate of 25 to 30 percent of emergent marsh misclassified as open water.

Figure A-2. 2011 USGS National Land Classification Dataset compared with 2010 aerial imagery (Microsoft Corp. and its data suppliers). Visual estimate of 15 to 20 percent of emergent marsh misclassified as open water.

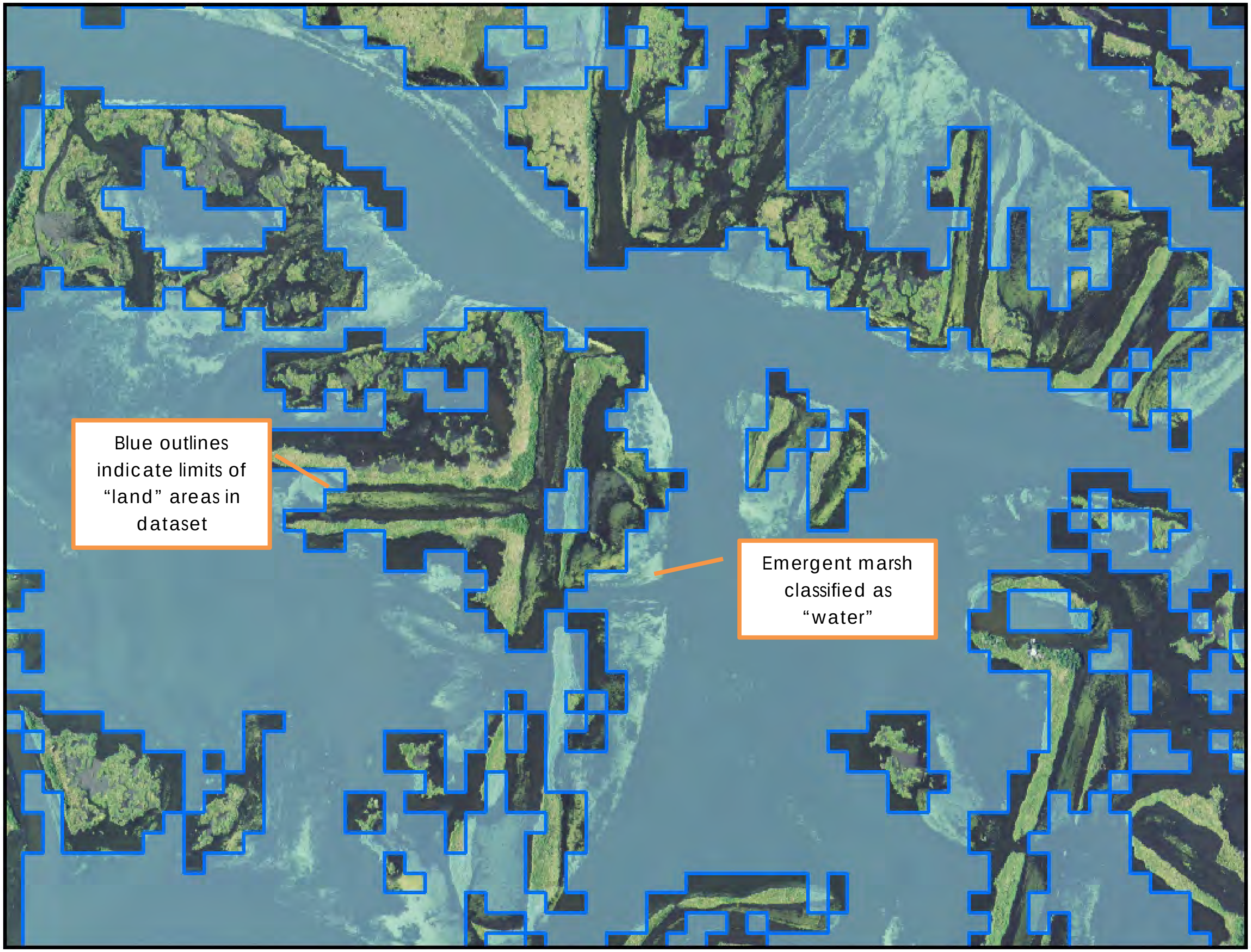
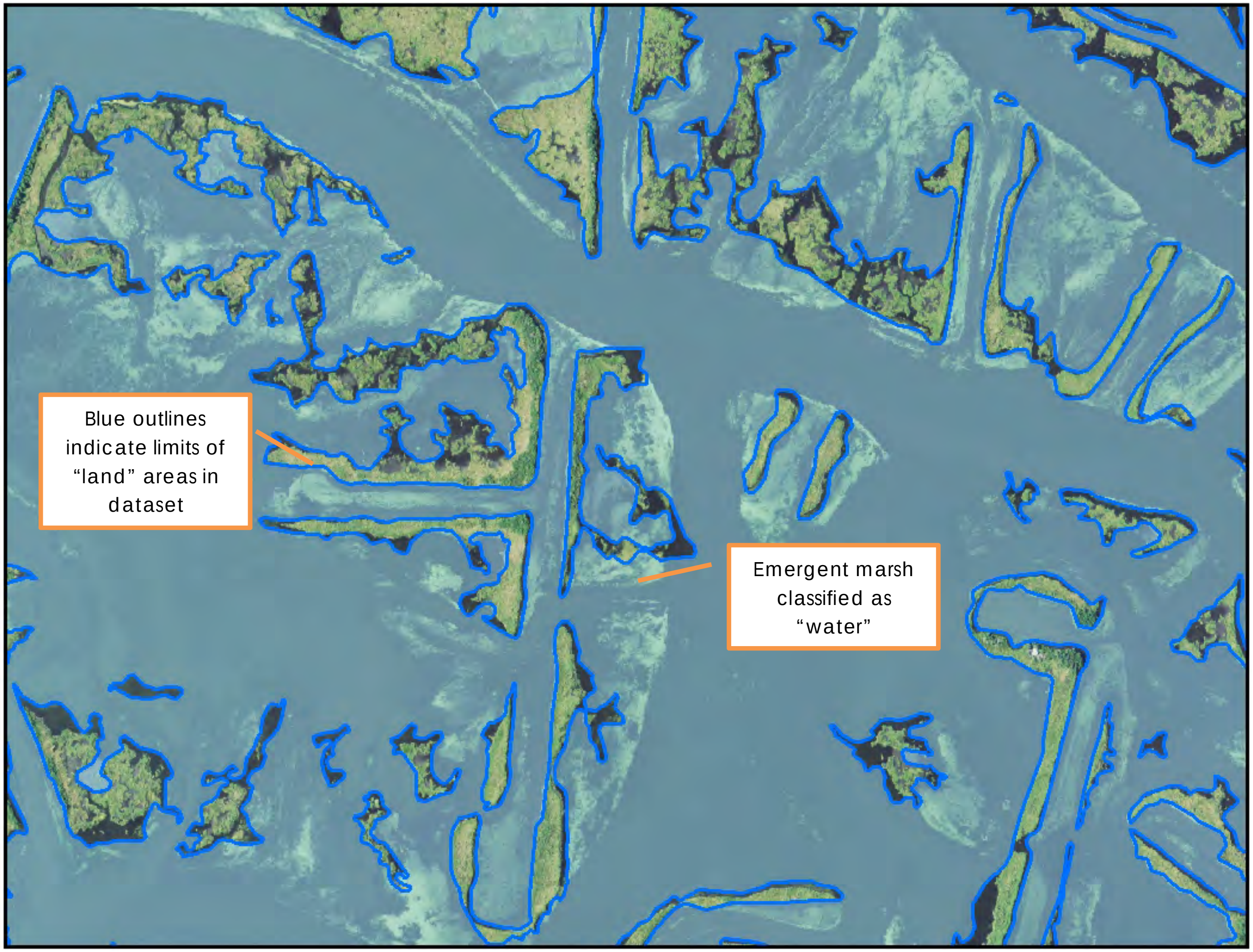


Figure A-3. 2013 NRCS Soil Mapping (web soil survey) compared with 2010 aerial imagery (Microsoft Corp. and its data suppliers). Visual estimate of 25 to 30 percent of emergent marsh misclassified as open water.



Attachment B. Wetland Determination Data Forms and Site Photographs

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WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-1

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Batture Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.622 N Long: 89.9631 W Datum: NAD 83

Soil Map Unit Name: Carville, Cancienne, and Schriever soils, frequently flooded NWI classification: PFO1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

Between river and levee.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___ No X	Depth (inches): ___	
Water Table Present?	Yes ___ No X	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___ No X	Depth (inches): ___	**Wetland Hydrology Present? Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-1

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	20	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	10	Y	OBL
2. Triadica sebifera	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Physalis angulata	40	Y	FACU
2. Colocasia esculenta	20	Y	FACW
3. Persicaria hydropiperoides	20	Y	OBL
4. Cardiospermum halicacabum	10	N	FAC
5. Brunnichia ovata	10	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					Sandy clay loam	
5-14	10YR 4/2	95	10YR 3/6	S	C	M	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Organic Bodies (A6) **(LRR P, T, U)**
- [ ] 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- [ ] Muck Presence (A8) **(LRR U)**
- [ ] 1 cm Muck (A9) **(LRR P, T)**
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Coast Prairie Redox (A16) **(MLRA 150A)**
- [ ] Sandy Mucky Mineral (S1) **(LRR O, S)**
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR P, S, T, U)**
- [ ] Polyvalue Below Surface (S8) **(LRR S, T, U)**
- [ ] Thin Dark Surface (S9) **(LRR S, T, U)**
- [ ] Loamy Mucky Mineral (F1) **(LRR O)**
- [ ] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Marl (F10) **(LRR U)**
- [ ] Depleted Ochric (F11) **(MLRA 151)**
- [ ] Iron-Manganese Masses (F12) **(LRR O, P, T)**
- [ ] Umbric Surface (F13) **(LRR P, T, U)**
- [ ] Delta Ochric (F17) **(MLRA 151)**
- [ ] Reduced Vertic (F18) **(MLRA 150A, 150B)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- [ ] 1 cm Muck (A9) **(LRR O)**
- [ ] 2 cm Muck (A10) **(LRR S)**
- [ ] Reduced Vertic (F18) **(outside MLRA 150A,B)**
- [ ] Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- [ ] Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

Data Point 1

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-2

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Batture Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6608 N Long: 89.9629 W Datum: NAD 83

Soil Map Unit Name: Carville, Cancienne, and Schriever soils, frequently flooded NWI classification: PFO1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

Between levee and river.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [x] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [x] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [x] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-2

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	70	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Forestiera acuminata	5	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		
Herb Stratum (Plot size: 30' radius)			
1. Persicaria hydropiperoides	30	Y	OBL
2. Ampelopsis arborea	20	Y	FAC
3. Saururus cernus	10	N	OBL
4. Colocasia esculenta	10	N	FACW
5. Hibiscus moscheutos	10	N	OBL
6. Physalis angulata	5	N	FACU
7. Boehmeria cylindrica	5	N	FACW
8.			
9.			
10.			
11.			
12.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	10	Y	FAC
2. Campsis radicans	5	Y	FAC
3. Brunnichia ovata	5	Y	FACW
4.			
5.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/2	97	10YR 4/6	3	C	M	Sandy clay loam	
8-14	10YR 5/2	95	10 YR 4/6	5	C	M	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes X **No** ____

Remarks:

Data Point 2a

Data Point 2b

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-3

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6617 N Long: 89.9645 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-3

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya aquatica	10	Y	OBL
2. Cornus drummondii	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	30	Y	FAC
2. Acer rubrum	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Saururus cernus	5	Y	OBL
2. Ampelopsis arborea	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		

50% of total cover: 5 20% of total cover: 2

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/1	99	10YR 4/6	1	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** X

Remarks:

Redox concentrations not common.

Data Point 3

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-4

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6605 Long: 89.9642 Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-4

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	35	Y	FAC
2. Triadica sebifera	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	45 = Total Cover		

50% of total cover: 22.5 20% of total cover: 9

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	15	Y	FAC
2. Cornus drummondii	10	Y	FAC
3. Morella cerifera	5	Y	FAC
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Echinochloa colona	30	Y	FACW
2. Ampelopsis arborea	5	N	FAC
3. Acer negundo	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	99	10YR 4/6	1	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

Redox concentrations not common.

Data Point 4

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-1

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Batture Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.622 N Long: 89.9631 W Datum: NAD 83

Soil Map Unit Name: Carville, Cancienne, and Schriever soils, frequently flooded NWI classification: PFO1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____

Hydric Soil Present? Yes X No ____

Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:

Between river and levee.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-1

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	20	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	10	Y	OBL
2. Triadica sebifera	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Physalis angulata	40	Y	FACU
2. Colocasia esculenta	20	Y	FACW
3. Persicaria hydropiperoides	20	Y	OBL
4. Cardiospermum halicacabum	10	N	FAC
5. Brunnichia ovata	10	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: ______ 20% of total cover: ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					Sandy clay loam	
5-14	10YR 4/2	95	10YR 3/6	S	C	M	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Data Point 1

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-2

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Batture Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6608 N Long: 89.9629 W Datum: NAD 83

Soil Map Unit Name: Carville, Cancienne, and Schriever soils, frequently flooded NWI classification: PFO1R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

Between levee and river.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-2

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	70	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		

50% of total cover: 35 20% of total cover: 14

Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Forestiera acuminata	5	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Herb Stratum (Plot size: 30' radius)			
1. Persicaria hydropiperoides	30	Y	OBL
2. Ampelopsis arborea	20	Y	FAC
3. Saururus cernus	10	N	OBL
4. Colocasia esculenta	10	N	FACW
5. Hibiscus moscheutos	10	N	OBL
6. Physalis angulata	5	N	FACU
7. Boehmeria cylindrica	5	N	FACW
8.			
9.			
10.			
11.			
12.			
	90 = Total Cover		

50% of total cover: 45 20% of total cover: 18

Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	10	Y	FAC
2. Campsis radicans	5	Y	FAC
3. Brunnichia ovata	5	Y	FACW
4.			
5.			
	20 = Total Cover		

50% of total cover: 10 20% of total cover: 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/2	97	10YR 4/6	3	C	M	Sandy clay loam	
8-14	10YR 5/2	95	10 YR 4/6	5	C	M	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes X **No** ____

Remarks:

Data Point 2a

Data Point 2b

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-3

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6617 N Long: 89.9645 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-3

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya aquatica	10	Y	OBL
2. Cornus drummondii	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Acer negundo	30	Y	FAC
2. Acer rubrum	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Herb Stratum (Plot size: 30' radius)			
1. Saururus cernus	5	Y	OBL
2. Ampelopsis arborea	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/1	99	10YR 4/6	1	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Redox concentrations not common.

Data Point 3

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-4

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6605 Long: 89.9642 Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [x] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-4

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	35	Y	FAC
2. Triadica sebifera	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	45		

50% of total cover: 22.5 20% of total cover: 9

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	15	Y	FAC
2. Cornus drummondii	10	Y	FAC
3. Morella cerifera	5	Y	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	30		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Echinochloa colona	30	Y	FACW
2. Ampelopsis arborea	5	N	FAC
3. Acer negundo	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	40		

50% of total cover: 20 20% of total cover: 8

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	5		

50% of total cover: 2.5 20% of total cover: 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	99	10YR 4/6	1	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

Redox concentrations not common.

Data Point 4

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-5

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6607 N Long: 89.9659 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland?	Yes ___ No X
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes ___ No X		

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___ No X	Depth (inches): ___	
Water Table Present?	Yes ___ No X	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___ No X	Depth (inches): ___	**Wetland Hydrology Present? Yes ___ No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-5

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus nigra	20	Y	FAC
2. Acer negundo	10	Y	FAC
3. Acer rubrum	10	Y	FAC
4. Celtis occidentalis	10	Y	FACU
5.			
6.			
7.			
8.			
	50	= Total Cover	

50% of total cover: 25 20% of total cover: 10

Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Acer negundo	20	Y	FAC
2. Triadica sebifera	10	Y	FAC
3. Quercus nigra	5	N	FAC
4.			
5.			
6.			
7.			
8.			
	35	= Total Cover	

50% of total cover: 17.5 20% of total cover: 7

Herb Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2. Ligustrum sinense	1	Y	FAC
3. Triadica sebifera	1	Y	FAC
4. Quercus nigra	1	Y	FAC
5. Sambucus nigra	1	Y	FAC
6. Acer negundo	1	Y	FAC
7. Rubus trivialis	1	Y	FACU
8.			
9.			
10.			
11.			
12.			
	11	= Total Cover	

50% of total cover: 5.5 20% of total cover: 2.2

Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2. Toxicodendron radicans	5	Y	FAC
3.			
4.			
5.			
	10	= Total Cover	

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 13 (A)

Total Number of Dominant Species Across All Strata: 15 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/1	97	10YR 4/6	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-6

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6598 Long: 89.9653 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

Depression between river levee and Highway 23. Hurricane Isaac has resulted in some atypical conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [x] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [x] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Duckweed (Lemna sp.) on soil surface. Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-6

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	20	Y	OBL
2. Triadica sebifera	25	Y	FAC
3. Acer rubrum	10	N	FAC
4.			
5.			
6.			
7.			
8.			
	55	= Total Cover	
50% of total cover: 27.5		20% of total cover: 11	
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Triadica sebifera	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10	= Total Cover	
50% of total cover: 5		20% of total cover: 2	
Herb Stratum (Plot size: 30' radius)			
1. Lemna sp.	5	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	= Total Cover	
50% of total cover: 2.5		20% of total cover: 1	
Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
50% of total cover: 2.5		20% of total cover: 1	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					Clay	
2-16	10YR 5/1	90	10YR 4/6	10	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** X **No** ____

Remarks:

Data Point 6

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-7

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6596 Long: 89.9656 Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:

Depression between river levee and Highway 23. Hurricane Isaac has resulted in some atypical conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [x] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-7

Tree Stratum (Plot size: 30' radius)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer rubrum	40	Y	FAC
2.	Acer negundo	10	N	FAC
3.	Triadica sebifera	10	N	FAC
4.	Quercus nigra	5	N	FAC
5.				
6.				
7.				
8.				
		65 = Total Cover		

50% of total cover: 32.5 20% of total cover: 13

Sapling/Shrub Stratum (Plot size: 30' radius)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	Triadica sebifera	20	Y	FAC
2.	Acer negundo	10	Y	FAC
3.	Diospyros virginiana	10	Y	FAC
4.	Cornus drummondii	5	N	FAC
5.				
6.				
7.				
8.				
		45 = Total Cover		

50% of total cover: 22.5 20% of total cover: 9

Herb Stratum (Plot size: 30' radius)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	Saururus cernus	10	Y	OBL
2.	Acer rubrum	5	Y	FAC
3.	Rubus trivialis	5	Y	FACU
4.	Ampelopsis arborea	5	Y	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		25 = Total Cover		

50% of total cover: 12.5 20% of total cover: 5

Woody Vine Stratum (Plot size: 30' radius)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	Vitis rotundifolia	5	Y	FAC
2.				
3.				
4.				
5.				
		5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 89 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					Clay	
2-16	10YR 5/1	95	10YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

Data Point 7

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-8

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6591 N Long: 89.9661 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-8

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	10	Y	FAC
2. Acer negundo	10	Y	FAC
3. Ilex decidua	10	Y	FACW
4. Triadica sebifera	10	Y	FAC
5.			
6.			
7.			
8.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ilex decidua	10	Y	FACW
2. Acer negundo	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Allium canadense	5	Y	FACU
2. Viola bicolor	5	Y	FAC
3. Brunnichia ovata	5	Y	FACW
4. Rubus trivialis	5	Y	FACU
5. Quercus nigra	1	N	FAC
6. Sambucus nigra	1	N	FAC
7. Persicaria hydropiperoides	1	N	OBL
8.			
9.			
10.			
11.			
12.			
	23 = Total Cover		

50% of total cover: 11.5 20% of total cover: 4.6

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: ______ 20% of total cover: ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	98	10YR 4/6	2	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

Data Point 8

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-9

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6600 N Long: 89.9675 W Datum: NAD 83

Soil Map Unit Name: Cancienne silt loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? **Yes ____ No X**
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [x] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-9

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	20	Y	FAC
2. Triadica sebifera	10	Y	FAC
3. Salix nigra	10	Y	OBL
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		

50% of total cover: 20 20% of total cover: 8

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	30	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Saururus cernus	5	Y	OBL
2. Acer negundo	1	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	6 = Total Cover		

50% of total cover: 3 20% of total cover: 1.2

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Campsis radicans	5	Y	FAC
2. Ampelopsis arborea	5	Y	FAC
3.			
4.			
5.			
	10 = Total Cover		

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/1	97	10YR 4/1	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Data Point 9

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-10

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6587 N Long: 89.9694 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-10

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	10	Y	FAC
2. Acer negundo	20	Y	FAC
3. Quercus virginiana	5	N	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	35		

50% of total cover: 17.5 20% of total cover: 7

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	20	Y	FAC
2. Fraxinus pennsylvanica	5	Y	FACW
3. Quercus nigra	2	N	FAC
4. Ilex decidua	3	N	FACW
5.			
6.			
7.			
8.			
= Total Cover	30		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	20	Y	FAC
2. Cyperus sp.	2	N	
3. Triadica sebifera	2	N	FAC
4. Commelina sp.	1	N	
5. Brunnichia ovata	1	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	26		

50% of total cover: 13 20% of total cover: 5.2

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	10	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	10		

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/2	96	10YR 4/6	4	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Data Point 10

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-11

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6574 N Long: 89.9687 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-11

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	25	Y	FAC
2. Acer negundo	20	Y	FAC
3. Fraxinus pennsylvanica	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	50	= Total Cover	

50% of total cover: 25 20% of total cover: 10

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	20	Y	FAC
2. Acer negundo	10	Y	FAC
3. Cornus drummondii	5	N	FAC
4.			
5.			
6.			
7.			
8.			
	35	= Total Cover	

50% of total cover: 17.5 20% of total cover: 7

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Allium canadense	15	Y	FACU
2. Ampelopsis arborea	10	Y	FAC
3. Rubus trivialis	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	

50% of total cover: 15 20% of total cover: 6

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	

50% of total cover: 2.5 20% of total cover: 1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					Silty clay	
6-16	10YR 4/2	98	10YR 4/6	2	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Data Point 11

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-12

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6578 N Long: 89.9711 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicator due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-12

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus nigra	30	Y	FAC
2. Acer rubrum	10	N	FAC
3. Acer negundo	10	N	FAC
4. Melia azedarach	5	N	UPL
5.			
6.			
7.			
8.			
	55 = Total Cover		
50% of total cover: 27.5	20% of total cover: 11		

Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Cornus drummondii	10	Y	FAC
2. Triadica sebifera	10	Y	FAC
3. Acer negundo	5	N	FAC
4. Quercus nigra	5	N	FAC
5. Liquidambar styraciflua	5	N	FAC
6. Ligustrum sinense	5	N	FAC
7.			
8.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Herb Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2. Rubus trivialis	1	N	FACU
3. Quercus nigra	1	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	7 = Total Cover		
50% of total cover: 3.5	20% of total cover: 1.4		

Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/3	100					Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-13

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6573 N Long: 89.9716 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP-13

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Triadica sebifera	20	Y	FAC
2. Acer negundo	10	Y	FAC
3. Cornus drummondii	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
	40	= Total Cover	
50% of total cover: 20		20% of total cover: 8	
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. Ilex decidua	20	Y	FACW
2. Acer negundo	10	Y	FAC
3. Triadica sebifera	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
	40	= Total Cover	
50% of total cover: 20		20% of total cover: 8	
Herb Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	1	N	FAC
2. Triadica sebifera	1	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	2	= Total Cover	
50% of total cover:		20% of total cover:	
Woody Vine Stratum (Plot size: 30' radius)			
1. Ampelopsis arborea	10	Y	FAC
2.			
3.			
4.			
5.			
	10	= Total Cover	
50% of total cover: 5		20% of total cover: 2	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					Silty clay	
2-14	10YR 4/2	96	10YR 4/6	4	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Data Point 13

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-14

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6559 N Long: 89.9709 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-14

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus virginiana	40	Y	FACU
2. Acer negundo	20	Y	FAC
3. Ilex decidua	10	N	FACW
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ilex decidua	10	Y	FACW
2. Triadica sebifera	10	Y	FAC
3. Acer negundo	10	Y	FAC
4. Cornus drummondii	5	N	FAC
5.			
6.			
7.			
8.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		

Herb Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	1	N	FAC
2. Quercus virginiana	1	N	FACU
3. Brunnichia ovata	1	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3 = Total Cover		
50% of total cover:	20% of total cover:		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis rotundifolia	5	Y	FAC
2. Brunnichia ovata	1	N	FACW
3.			
4.			
5.			
	6 = Total Cover		
50% of total cover: 3	20% of total cover: 1.2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	99	10YR 4/6	1	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks:

Redox concentrations not common.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/13/12

Applicant/Owner: CPRA / Ram Terminals State: LA Sampling Point: DP-15

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6559 N Long: 89.9713 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Between river levee and Highway 23. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2010 ESRI & USDA

Remarks:

Atypical situation, false positive indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-15

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis occidentalis	15	Y	FACU
2. Salix nigra	10	Y	OBL
3. Cornus drummondii	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
	45	= Total Cover	
50% of total cover: 23		20% of total cover: 9	

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer negundo	30	Y	FAC
2. Cornus drummondii	20	Y	FAC
3. Triadica sebifera	10	N	FAC
4.			
5.			
6.			
7.			
8.			
	60	= Total Cover	
50% of total cover: 30		20% of total cover: 12	

Herb Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Brunnichia ovata	3	Y	FACW
2. Ampelopis arborea	2	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	= Total Cover	
50% of total cover: 2.5		20% of total cover: 1	

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Ampelopsis arborea	5	Y	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
50% of total cover: 2.5		20% of total cover: 1	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 88 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP-15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/6	99	10YR 4/6	1	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

Redox concentrations not common.

Data Point 15

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-16

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6475 N Long: 89.9843 W Datum: NAD 83

Soil Map Unit Name: Harahan clay NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators. Cattle trampling evident.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): -
Water Table Present?	Yes X	No ___	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 3

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-16

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 20% of total cover:

Sapling/Shrub Stratum (Plot size: 30' radius)

1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		

50% of total cover: 20% of total cover:

Herb Stratum (Plot size: 30' radius)

1. Cynodon dactylon	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Woody Vine Stratum (Plot size: 30' radius)

1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 20% of total cover:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (If observed, list morphological adaptations below).

Herb stratum with dead Cynodon dactylon and dead Persicaria hydropiperoides (30% cover). Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					clay	
2-6	7.5YR 2.5/2	100					clay	
6-10	10YR 4/1	100					clay	
10-14	10YR 4/1	98	10YR 3/6	2	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance has removed typical redox concentrations for hydric soil indicators.

Data Point 16

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-17

Investigator(s): RW,CM,JM Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6475 N Long: 89.9846 W Datum: NAD 83

Soil Map Unit Name: Harahan clay NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present?	Yes ____	No X		

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators. Slight high between old agricultural ditches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Atypical situation, false indicators due to hurricane.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-17

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		

50% of total cover: ______ 20% of total cover: ______

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		

50% of total cover: ______ 20% of total cover: ______

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	2	N	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	2		

50% of total cover: ______ 20% of total cover: ______

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		

50% of total cover: ______ 20% of total cover: ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks: (If observed, list morphological adaptations below).

Herb stratum also with dead Cynodon dactylon (95% cover) due to hurricane disturbance.

SOIL

Sampling Point: DP-17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/2						Organic	
1-16	10YR 4/1	95	10YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** X **No** ____

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance.

Data Point 17

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-18

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6474 W Long: 89.9848 W Datum: NAD 83

Soil Map Unit Name: Harahan clay NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators. Appears lower than adjacent DP-17.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-18

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 30' radius)			
1. Cynodon dactylon	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (If observed, list morphological adaptations below).

Herb stratum also with dead Cynodon dactylon and dead Persicaria hydropiperoides (60% cover). Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 3/1						Clay	
2-5	7.5 YR 3/2						Clay	High Organic Matter
5-16	10 YR 4/1	95	7.5YR 3/4	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-19

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6469 N Long: 89.985 W Datum: NAD 83

Soil Map Unit Name: Harahan clay NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators. Area adjacent to old excavated ditch.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [x] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15) **(LRR U)**
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [x] Saturation Visible on Aerial Imagery (C9)
- [x] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 8

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-19

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

Herb stratum with dead Persicaria hydropiperoides (30% cover) and Typha sp. (10% cover). Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 4/1	90	7.5YR 4/6	10	C	M	Clay	
9-12	10YR 2/1	100					Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ____

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance.

Data Point 19

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-20

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6483 N Long: 89.9866 W Datum: NAD 83

Soil Map Unit Name: Cancienne silty clay loam NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-20

Tree Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		

50% of total cover: ____ 20% of total cover: ____

Herb Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	0		

50% of total cover: ____ 20% of total cover: ____

Woody Vine Stratum (Plot size: 30' radius)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		

50% of total cover: ____ 20% of total cover: ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

Herb stratum with dead Cynodon dactylon (90% cover) and dead Persicaria hydropiperoides (10% cover). Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					Clay	Organic matter
2-14	10YR 5/1	95	10YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Likely past agricultural disturbance.

Data Point 20

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-21

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6452 N Long: 89.9878 W Datum: NAD 83

Soil Map Unit Name: Westwego clay NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland?	Yes X No ___
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes X No ___		

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 5

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-21

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	1	N	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	1 = Total Cover		
50% of total cover: -		20% of total cover: -	

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (If observed, list morphological adaptations below).

Herb stratum with dead Cynodon dactylon and dead Typha sp. (20% cover). Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Organic matter	
5-16	7.5YR 2.5/1	97	7.5YR 3/4	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance.

Data Point 21

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: MBSD City/County: Plaquemines Sampling Date: 11/12/12

Applicant/Owner: CPRA / Midway Cattle Ranch State: LA Sampling Point: DP-22

Investigator(s): CM, JM, RW Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Delta / Fastland Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR or MLRA): Outer Coastal Plain (LRR T) Lat: 29.6443 N Long: 89.9907 W Datum: NAD 83

Soil Map Unit Name: Westwego clay NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

Pasture between canal and levee adjacent to marsh. Hurricane Isaac has resulted in atypical conditions and hydrologic indicators. Between old excavated ditches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☑ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerials: 2007 Pictometry, 2010 ESRI & USDA

Remarks:

Although atypical situation due to hurricane, area appears to have hydrology under normal conditions due to subsidence.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP-22

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cynodon dactylon	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Woody Vine Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below).

Herb stratum with dead Cynodon dactylon and dead Persicaria hydropiperoides (10% cover).
Hurricane disturbed vegetation so with other indicators, hydrophytic vegetation assumed.

SOIL

Sampling Point: DP-22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	97	2.5YR 2.5/3	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) **(LRR P, T, U)**
- ☐ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ☐ Muck Presence (A8) **(LRR U)**
- ☐ 1 cm Muck (A9) **(LRR P, T)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) **(MLRA 150A)**
- ☐ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR P, S, T, U)**
- ☐ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ☐ Thin Dark Surface (S9) **(LRR S, T, U)**
- ☐ Loamy Mucky Mineral (F1) **(LRR O)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) **(LRR U)**
- ☐ Depleted Ochric (F11) **(MLRA 151)**
- ☐ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ☐ Umbric Surface (F13) **(LRR P, T, U)**
- ☐ Delta Ochric (F17) **(MLRA 151)**
- ☐ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR O)**
- ☐ 2 cm Muck (A10) **(LRR S)**
- ☐ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ☐ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ☐ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Mapped as hydric soil. Likely past agricultural disturbance.

Data Point 22

Attachment C. Supplemental Preliminary Jurisdictional Determinations Provided by USACE for Reference (by others)

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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267
MAY - 5 2009

REPLY TO
ATTENTION OF:

Operations Division
Surveillance and Enforcement Section

Mr. Barton Rogers
Gulf Engineers & Consultants
9337 Interline Ave.
Baton Rouge, Louisiana 70809

Dear Mr. Rogers:

Reference is made to your request, on behalf of Conoco-Phillips, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Sections 5 & 16, Township 16 South, Range 11 East, Plaquemines Parish, Louisiana (enclosed map). Specifically, this property is identified as a 656 acre proposed borrow pit west of LA Highway 23 near Alliance, LA.

Based on review of maps, aerial photography, and soils data, we have determined that part of the property is wetland and may be subject to Corps' jurisdiction. The approximate limits of the wetland are designated in red on the map. A Department of the Army (DA) permit under Section 404 of the Clean Water Act will be required prior to the deposition or redistribution of dredged or fill material into wetlands that are waters of the United States. Additionally, a DA permit will be required if you propose to deposit dredged or fill material into the waters of the US designated in blue on the map.

You and your client are advised that this preliminary jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date or the District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

Please be advised that this property is in the Louisiana Coastal Zone. For additional information regarding coastal use permit requirements, contact Ms. Christine Charrier, Coastal Management Division, Louisiana Department of Natural Resources at (225) 342-7591.

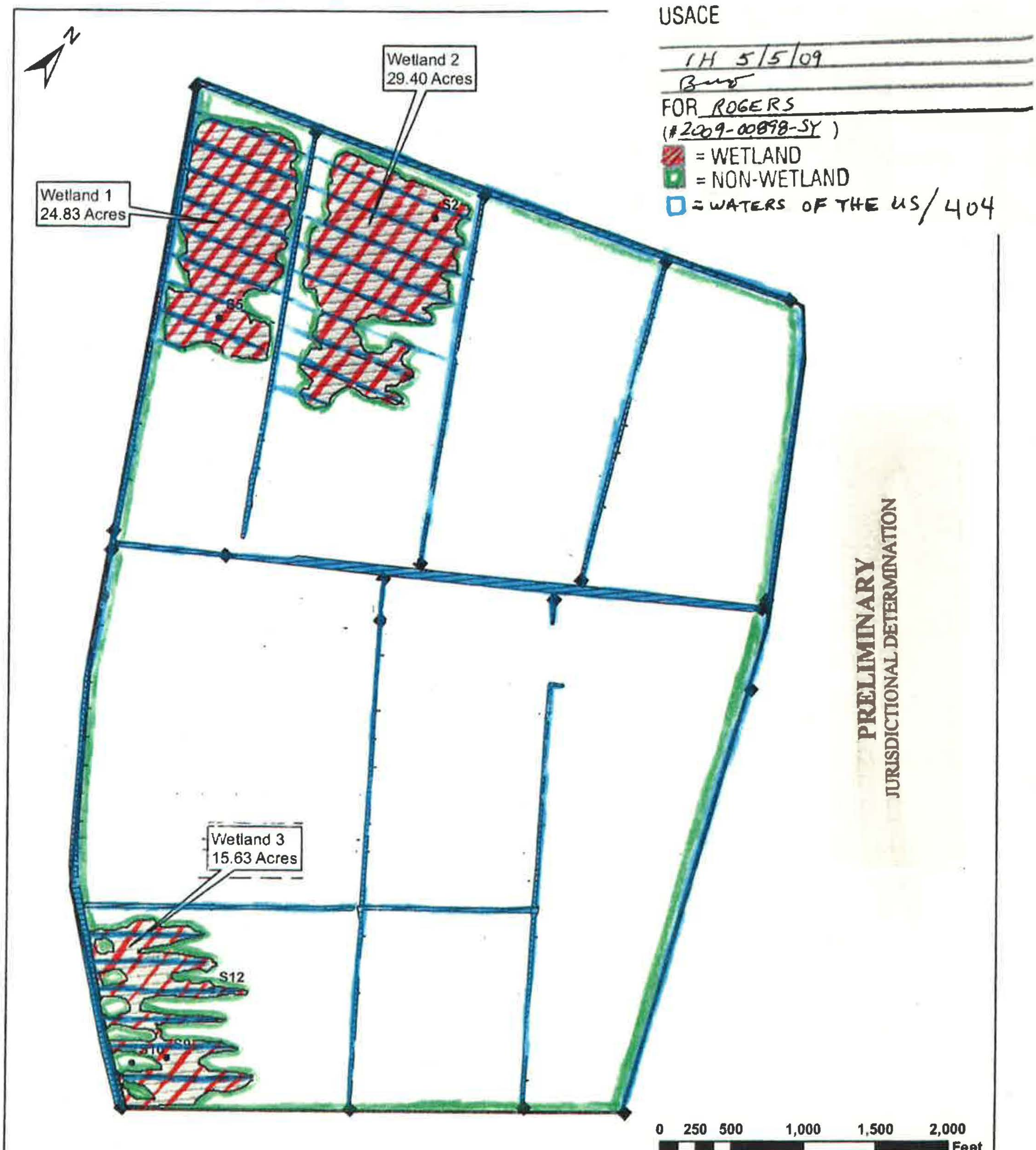
Should there be any questions concerning these matters, please contact Mr. Brian Oberlies at (504) 862-2275 and reference our Account No. MVN-2009-00898-SY. If you have specific questions regarding the permit process or permit applications, please contact our Eastern Evaluation Section at (504) 862-2766. The New Orleans District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please complete and return the enclosed Customer Service Survey or complete the survey on our web site at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Robert A Heffner

Pete J. Serio
Chief, Regulatory Branch

Enclosures

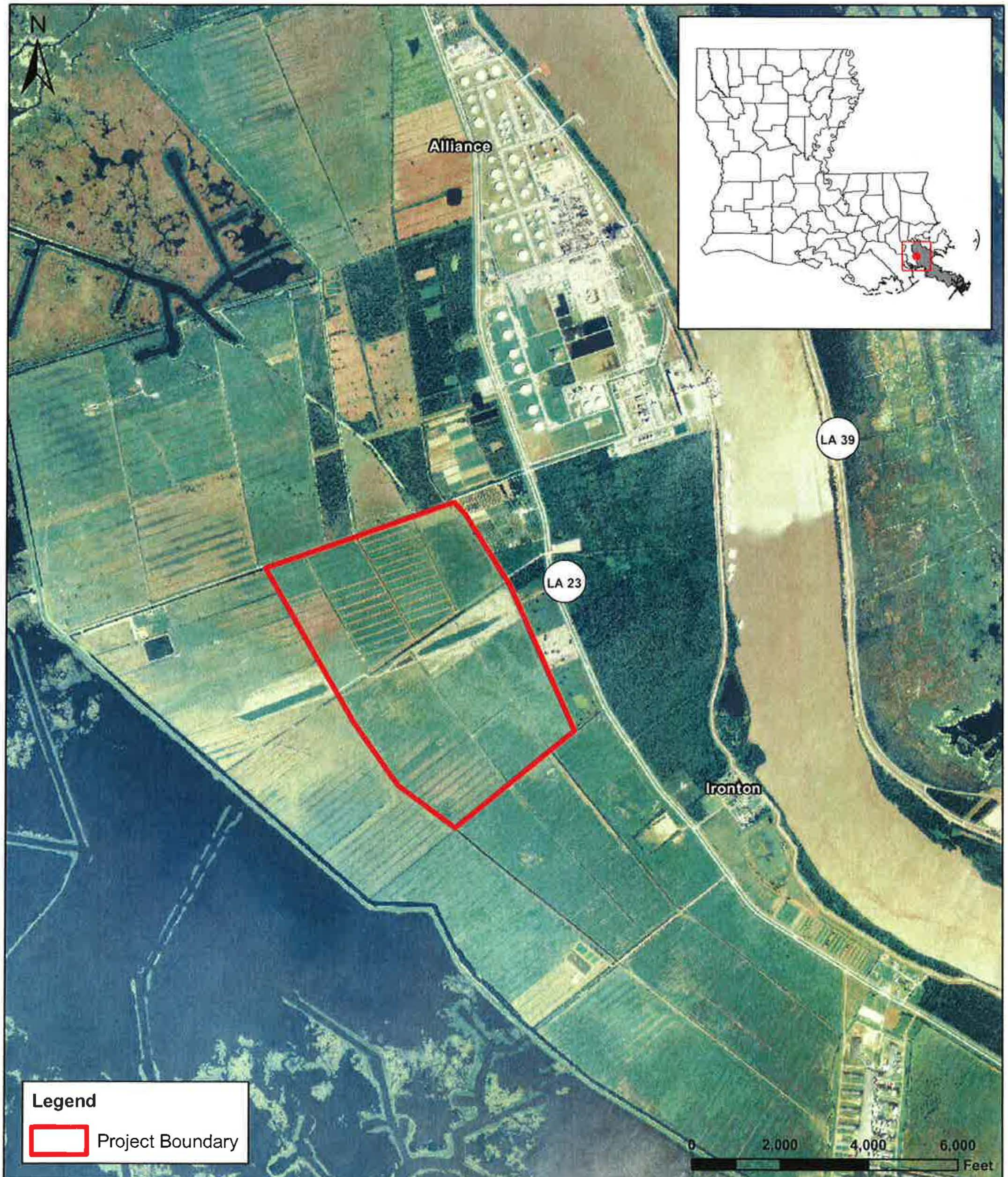


WETLAND DELINEATION MAP

Conoco Phillips Project
Alliance, Louisiana
Plaquemines Parish

GEC

Figure: C1
Date: April 2009
Scale: 1:11,000
Source: GEC
Map ID: 27498102-1361



SITE LOCATION

Conoco Phillips Project
Alliance, Louisiana
Plaquemines Parish

Image: 2007 Plaquemines Parish USDA-FSA-APFO NAIP MrSID Mosaic

GEC	
Figure: 1	
Date: April 2009	
Scale:1:36,000	
Source: GEC/USDA	
Map ID: 27498102-1281	

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

FEB 10 2012

Operations Division
Surveillance and Enforcement Section

Mr. Josh McEnany
Gulf South Research Corporation
8081 GSRI Avenue
Baton Rouge, Louisiana 70820

Dear Mr. McEnany:

Reference is made to your request, submitted on behalf of RAM Terminals, LLC, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Sections 5, 6, and 7, Township 16 South, Range 25 East, Plaquemines Parish, Louisiana (enclosed map). Specifically, this property is identified as a 600 acre tract of land on and east of LA-23 along the right descending bank of the Mississippi River at river mile 61.

Based on review of recent maps, aerial photography, soils data, and the information submitted with your request, we have determined that part of the property is wetland and may be subject to Corps' jurisdiction. The approximate limits of the wetland are designated in red on the map. A Department of the Army permit under Section 404 of the Clean Water Act will be required prior to the deposition or redistribution of dredged or fill material into wetlands that are waters of the United States. Additionally, a DA permit will be required if you propose to deposit dredged or fill material into other waters subject to Corps jurisdiction. On the protected side of the levee, other waters that may be subject to Corps' jurisdiction are indicated in blue on the map. Furthermore, the Mississippi River and the wetlands on the river side of the levee are also subject to Corps' jurisdiction under Section 10 of the Rivers and Harbors Act. A DA Section 10 permit will be required prior to any work in this waterway or the wetlands on the river side of the levee.

You and your client are advised that this preliminary jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date or the District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

Please be advised that this property is in the Louisiana Coastal Zone. For additional information regarding coastal use permit requirements, contact Ms. Christine Charrier, Coastal Management Division, Louisiana Department of Natural Resources at (225) 342-7953.

You are advised that you must obtain a permit from a local assuring agency, usually a Levee Board or Parish Council, for any work within 1500 feet of a federal flood control structure such as a levee. You must apply by letter to the appropriate agency including full-size construction plans, cross sections, and details of the proposed work. Concurrently with your application to the assuring agency, you must also forward a copy of your letter and plans to Ms. Amy Powell, Operations Manager for Completed Works of the Corps and to the appropriate regional office of the Louisiana Department of Transportation and Development (LA DOTD) or the Office of Coastal Protection and Restoration (OCPR) for their review and comments concerning the proposed work. The assuring agency will not issue a permit for the work to proceed until they have obtained letters of no objection from both of these reviewing agencies. For additional information, please contact Ms. Amy Powell at (504) 862-2241.

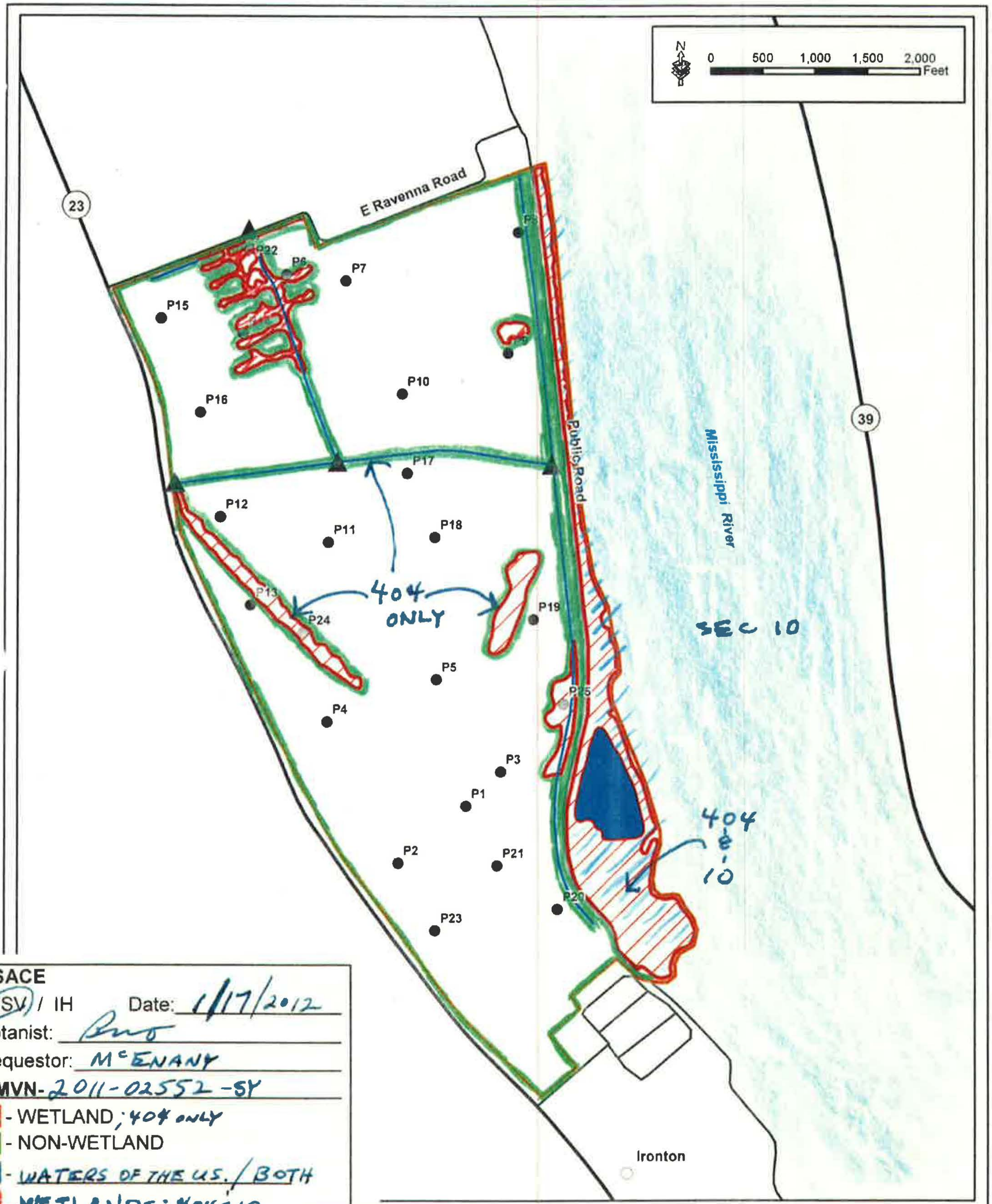
Should there be any questions concerning these matters, please contact Mr. Brian Oberlies at (504) 862-2275 and reference our Account No. MVN-2011-02552-SY. If you have specific questions regarding the permit process or permit applications, please contact our Eastern Evaluation Section at (504) 862-2766. The New Orleans District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please complete and return the enclosed Customer Service Survey.

Sincerely,

Robert A Heffner

for Pete J. Serio
Chief, Regulatory Branch

Enclosures



PRELIMINARY
JURISDICTIONAL DETERMINATION

Figure 4: Wetland Map
Sections 5, 6, & 7, T16S, R25E

GSRC
September 2011

Figure 2: Project Location Map
Sections 5, 6, & 7, T16S, R25E

GSRC
September 2011

G2: Wetland Value Assessment Methodology and Assumptions

MID-BARATARIA SEDIMENT DIVERSION PROJECT

Methodology and Assumptions for Determining Environmental Benefits

The Wetland Value Assessment (WVA) methodology was selected as the most appropriate tool for determining project wetland benefits. Described below are the models and methods used to determine marsh acreages and the methods for predicted benefits of the proposed project alternatives.

The Wetland Value Assessment (WVA) model, was developed under the Coastal Wetlands Planning, Protection, and Restoration program for determine benefits of proposed coastal wetland restoration projects. The 2017 Corps approved version was used to assess benefits for diversions and other features proposed under this project. Further information on this model may be obtained from the U.S. Army Corps of Engineers, New Orleans District, Regional Planning and Environmental Division South (Point of Contact: Patrick Smith, Phone: 504-862-1583).

The WVA is similar to the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures (HEP), in that habitat quality and quantity are measured for baseline conditions and predicted for future without-project and future with-project conditions. Separate models were used for intermediate marsh and brackish marsh. Instead of the species-based approach of HEP, each WVA model utilizes an assemblage of variables considered important to the suitability of that habitat type for supporting a diversity of fish and wildlife species. As with HEP, the WVA allows a numeric comparison of each future condition and provides a quantitative estimate of project-related impacts to fish and wildlife resources.

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 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 the Suitability Indices for each variable into a single value for wetland habitat quality, termed the Habitat Suitability Index (HSI). The WVA models assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. This standardized, multi-species, habitat-based methodology facilitates the assessment of project-induced impacts on fish and wildlife resources.

HSI values are determined for each target year (TY). Target years, determined by the model user, represent significant changes in habitat quality or quantity expected during the 50-year project life, under future with-project and future without-project conditions. In this study, diversion alternative with and without terraces TYs include TY0, 1, 10, 20, 30, 40, 50.

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

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

The WVA models for intermediate and brackish marsh consist of six variables: 1) percent of wetland covered by emergent vegetation; 2) percent open water dominated by submerged aquatic vegetation (SAV); 3) degree of marsh edge and interspersion; 4) percent of open water less than or equal to 1.5 feet deep; 5) salinity; and 6) aquatic organism access. Changes in each variable are predicted for future without-project and future with-project scenarios over a 50-year project life. By incorporating variables for SAV and shallow open water into each of the marsh models, impacts to those habitat components are combined with impacts to emergent marshes. Because emergent marsh is of higher overall fish and wildlife value than SAV, and because SAV is of higher value than shallow open water, those latter components receive proportionally less weight when combined into one AAHU value.

General Assumptions For Diversions:

- The USACE Civil Works WVA – Intermediate and Brackish Marsh Models Version 2.0 were used for the analysis. It is approved for regional use for USACE Civil Works Projects. The proposed project occurs within the certified region of the USACE Civil Works WVA – Intermediate and Brackish Marsh Models Version 2.0.
- The Delft 3D Hydrologic and Hydraulic (HH) model was used to provide most inputs into WVA for analysis. Staff with The Water Institute for the Gulf (TWIG) used modeling outputs to calculate WVA inputs for this analysis. For more details on the Delft 3D model including descriptions and assumptions, please see the document TO48: Mid-Barataria Sediment Diversion Engineering Modeling Support: Production Runs with the Basin Wide model Version 3 (Messina 2019).
- The Habitat Evaluation Team (HET) is a collection of professionals and/or researchers from various agencies, who are consulted and reach group consensus on variable inputs and their assumptions for the WVA on all alternatives evaluated in a project. The HET for this project includes the US Army Corps of Engineers, Department of the Interior (DOI), Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), Environmental Protection Agency (EPA), US Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS), Coastal Protection and Restoration Authority (CPRA), and Gulf Engineers and Consultants (GEC).

General Assumptions For Beneficial Use and Terracing in the outfall area:

- Three of the Mid-Barataria Sediment Diversion (MBSD) alternatives will include construction of earthern terraces in the outfall area (coupled with 50,000 cfs, 75,000 cfs, and 150,000 cfs sediment diversion alternatives) in the outfall area to promote sediment deposition and resultant benefits. The terraces would be strategically placed to help establish a delta and distributary channels within the sediment deposition outfall area.
- Excavated material during project construction will be used beneficially in designated areas. All alternatives will include varying amounts of beneficial use of dredged material depending on the construction of the project features.
    - Marsh created by beneficial use of dredged material will not be quantified in the delft model for input into WVAs, therefore, WVAs will not capture beneficial use benefits. Terraces were incorporated into the modeling and thus their benefits were captured in the WVAs.
    - Since the beneficial use areas will vary depending on which diversion size is constructed, the HET agreed to not include these additional acres in the WVAs.
    - Though these acres will not be captured in the WVA and will provide some benefits, they will be a relatively small amount compared to the expected land created, nourished, and/or maintained due to the diversions.
- Hydrologic and Hydraulic (HH) model runs for the three sediment diversions with terracing will have the same assumptions as the diversion only assumptions (including loss rates, subsidence, SLR, all that apply).

Project Life:

- Period of analysis will be from 2020 (TY0) to 2070 (TY50).
- The Delft Hydraulic and Hydrologic (HH) model was run to provide outputs for the 50 years period of analysis.
- Hydrologic and environmental (vegetation and SAV) modeling considered benefits of plans over the 50 year period of analysis.
- The Modeling Team conducted HH model runs during 2015-2020 to initialize the model prior to the project life simulation.

Target Year (TY) Assumptions:

General and Diversion TY Assumptions

- There was agreement among the Habitat Evaluation Team (HET) for simplification of the WVA to assume all features (e.g., all diversions with and without terraces) are built by TY1 regardless of implementation schedule, replenishing sediment sources, etc. The HET acknowledges that real time implementation of all the features for a project of this magnitude and complexity would likely span several years.
- The initial 5 year simulation from 2015-2019 represents Target Year (TY) 0 which is also the baseline year or existing conditions in WVA. See Table 1.
- The existing conditions info are projected forward in the HH models to the start of the project life at year 2020 and then the model runs are conducted over the 50 year period of analysis from 2020 to 2070.
- All output from HH modeling was provided at the end of the requested target year unless defined differently by the HET. For instance salinity (averages over designated time periods depending on habitat type).

- Target Years (TYs) will be consistent for all diversion (with and without terraces) alternatives thus preventing potential bias toward alternatives with more frequent target years.
- Diversion alternative (including terraces) TYs include TYs 0, 1, 10, 20, 30, 40, and 50.
- Interim target years will not be modeled. Discharge will be in primarily open water with the Outfall Transition Feature in place before operation, thus eliminating or minimizing scour. Salinity impacts are expected to occur in TY1.
- Delft 3D provided the following inputs for each TY(TYs 0, 1, 10, 20, 30, 40 and 50):
    - Average salinity during the growing season (March through November) for fresh and intermediate marsh, and average annual salinity for brackish marsh.
    - Functional Marsh Acreage includes Deflt predicted marsh acres plus that for terraces. Once land can grow vegetation based on LAVeg modeling, it is considered functional marsh (see below).
    - Shallow Open Water (<1.5 ft deep but not within the functional marsh elevation window) Acreage
    - Deep Open Water (>1.5 feet) Acreage
    - Non-Functional Marsh Acreage (overall and per marsh creation cell) – The non-functional marsh acreage is defined as the area of a newly created marsh platform that is not considered fully functional marsh.
    - SAV at the end of the cycle.

Table 1. Explanation of target years

Decade	Cycle	Period of time	Morpho simulations	Hydro and Water qualitysimulations			
				Representative year (used to estimate vegetation spatial distribution and organic accretion)	Landscape (topo/bathy/veg distribution) setup used in the simulation	Other name	Additional years simulated
Initialization	Initialization	2015-2019	5 year simulation	2014	2015	Yr 0	1994, 2006, 2010, 2011
First	Cycle 0	2020-2029	10 year simulation	1970	2020	Yr 1	1994, 2006, 2010, 2011
Second	Cycle 1	2030-2039	10 year simulation	1975	2030	Yr 10	1994, 2006, 2010, 2011
Third	Cycle 2	2040-2049	10 year simulation	1985	2040	Yr 20	1994, 2006, 2010, 2011
Fourth	Cycle 3	2050-2059	10 year simulation	2002	2050	Yr 30	1994, 2006, 2010, 2011
Fifth	Cycle 4	2060-2069	10 year simulation	2008	2060	Yr 40	1994, 2006, 2010, 2011
Sixth	Cycle 5	-	-	2008	2070	Yr 50	1994, 2006, 2010, 2011

Terraces TY Assumptions

- Assume sediment availability is sufficient for creation of all terraces.
- The terraces in the model are subject to same forces as surrounding wetlands and will not be mechanically maintained. The terraces are assumed to have the short-term function to trap sediment early in the project life and in some cases may be subsumed by the active diversion delta.
- To maintain consistency between alternatives in WVA analysis, the HET agrees to not have the TY3 and 5 after construction of terraces. The target years for terraces include TYs 0, 1, 10, 20, 30, 40, and 50. These direct marsh benefits, plus indirect sediment accretion marsh benefits will be incorporated together with the Delft predicted diversion marsh benefits.
- The HET assumes all terraces that have delft predicted vegetation will be considered fully functional at the target year vegetation appears.

HH Modeling Assumptions:

- The Delft 3D Hydrologic and Hydraulic (HH) model runs were developed and run by The Water Institute of the Gulf (TWIG) contracted by the State's CPRA. See modeling details in Production Runs with the Basin Wide model Version 3, Messina et. al 2019).
- It is assumed that the model will be able to show anticipated sediment trapping benefits of the terraced outfall area.
- The Mid-Barataria Sediment Diversion would be run under the following scenarios. Flows through diversions would be "variable" in that they would be driven by head difference and dependent on river flow (450,000 cubic feet per second (cfs) or greater) as well as changing morphology in the basins. The target maximum diversion discharge (75,000 cfs, 50,000 cfs, or 150,000 cfs, depending on the diversion alternative) will be achieved when the Mississippi River reaches 1 million cfs. The model assumes if the river flow is below 450,000 cfs, all diversion alternatives will have a maintenance (base) flow of 5,000 cfs (see table 2).
- Each of these scenarios will be modeled both with and without the marsh terracing feature in the outfall area. Modeling is expected to include efficiencies of water and sediment delivery resulting from terraces.

Table 2.
Range of Alternatives Carried Forward for Analysis

Alternative	Location (RM)	Trigger (Belle Chasse gage)	Base Flow[1]	Maximum Flow	Outfall Features[2]
1	60.7	450,000 cfs	5,000 cfs	75,000 cfs	OTF
2	60.7	450,000 cfs	5,000 cfs	75,000 cfs	OTF + Marsh Terracing
3	60.7	450,000 cfs	5,000 cfs	50,000 cfs	OTF
4	60.7	450,000 cfs	5,000 cfs	50,000 cfs	OTF + Marsh Terracing
5	60.7	450,000 cfs	5,000 cfs	150,000 cfs	OTF
6	60.7	450,000 cfs	5,000 cfs	150,000 cfs	OTF + Marsh Terracing

[1] Depending on river flow and head differential

2 OTF = Outfall Transition Feature

- There will be two types of model runs, Traditional and Hysteresis Runs relative to the sand rating curve used in the model.
    - The "Traditional curve" predicts sand concentration for a given flow rate – rising or falling limb of hydrograph doesn't matter. "Suspended sand concentrations in the Mississippi River were estimated from water discharge using the Belle Chasse . . . traditional sand rating curve developed by TWIG from boatbased USGS measurements for the period 2008 to 2012" (Meselhe et al., 2016).
    - "For fine sediment load, a hysteresis rating curve developed for the V2 model was incorporated in the basinwide model V3. There is a difference in the fine sediment concentration peak and the flow peak, which is referred to as 'hysteresis behavior'."(Sadid et al. 2018)

- Models provided outputs for most relevant WVA variables by habitat type: distribution of land (land and water acres), shallow open water (<1.5 foot NAVD 88), total open water, salinity, vegetation habitat type and SAV by TYs as requested and defined by the HET. Modeling outputs for V3 Interspersion were not provided, as there is no way of estimating this with the model. The HET agreed to hold V3 constant for all alternatives. See Interspersion (V3) Section below for more details.
- All alternatives will include the construction of an outfall channel flow transition feature to insure the receiving basin can handle maximum capacity flows of the diversion. These transition features will be accounted for in the HH models and would be classified as deep open water in the WVAs.
- The HET agreed to use the Delft 3D outputs even in cases where we may have previously relied on best professional judgment when modeling outputs were not available to inform WVAs. This is a more conservative approach that ensures the WVA model is based on the objectivity of model outputs rather than the subjectivity of HET consensus.
- Where the model output value is a 0 that would result in a WVA model spreadsheet error (e.g., dividing by 0), the HET agreed to use 0.000001 instead of 0 to eliminate the error. Informal sensitivity analyses indicated little effect on the overall AAHUs.

<u>Functional Marsh - General and Diversion Assumptions:</u>

- An area is classified as marsh when the soil surface elevation is 0 ft NAVD88 or greater at the simulation start (which is adjusted with time to account for sea level rise) in combination with morphological and LaVeg models data to determine when conditions are right for vegetation to grow. The HET assumed, based on input from the modelers, that when the model determines an area becomes vegetated land it is considered to be fully functional tidal marsh. This applies to both land created and maintained with diversions as well as land created through beneficial use and terracing.
- Functional marsh will be determined by the models as the time when land conditions are right for vegetation to grow.
- The Delft model uses excessive salinity and flooding to determine vegetation mortality. Areas of vegetation mortality are removed from functional marsh acres.
- There is no maximum elevation that distinguishes the vegetation between marsh and uplands. Because of the overall small amount of high land and because of the work involved in establishing an upper limit (applying 2.5ft MSL plus SLR over time (or 1% inundation criteria)), the HET agree to not define an upper limit for tidal marsh.
    - The purpose of applying an upper limit (2.5 ft msl) is because the coastal marsh model is geared toward evaluating the quality and quantity of tidal marsh. Any wetlands higher than this threshold normally would not be considered tidal marsh until it subsided to marsh elevation.
    - There are values and functions for land greater than 2.5 feet not captured in the tidal marsh model. There is no intent to plant trees on higher elevations to account for those lands as other habitats.
    - The HET does not expect to see much land building beyond tidal marsh elevations by the diversion. Possible exceptions for high marsh would be land near the diversion outfall as delta splays and/or terraces are created, though with increased water levels from the diversions these finger ridges may still be inundated at times.

- If land is not shown as functional marsh immediately but becomes functional shortly after, it will be captured in the next TY.
- There will not be vegetative plantings on terraces. The model will predict vegetation of e new areas (land created by the diversion; terraces, etc.) based on hydrology (water depth and salinity) and the LaVeg Model. Once conditions are suitable for vegetative establishment, the model will establish that vegetation the very next year. The LaVeg model has a 1-year time step.
- With 10 year increments between TYs, functional marsh acres may not appear until the following TY.
- The terraces are assumed to be short-term and will not be maintained over the project life. Rather they will be subsumed into the delta landscape.

Bathymetry

- The Modeling Team has an extensive collection of bathymetry/elevation/water depth data sets for Barataria basin and the diversion outfall area. This model has been updated using all available bathymetry data provided by CPRA and USACE, including recent data collected by Louisiana's System-Wide Assessment and Monitoring Program (SWAMP).
- The HET agrees this data set, especially with regard to areas with <1.5 foot NAVD 88, is sufficient for our use and that it is not necessary for the HET to conduct field surveys to collect additional water depth data.
- Following is a list of the specific bathymetry/elevation/water depth data sets used in the HH models:
    - 2012 multibeam bathymetry provided by the U.S. Army Corps of Engineers (USACE), New Orleans District for the Mississippi River (unpublished source)
    - 2012 LIDAR data provided by the U.S. Geological Survey (USGS) for the entire Barataria and Breton basins and also the Mississippi River bird's foot delta (unpublished source)
    - 2014 bathymetry data collected by the Water Institute (TWIG) for the channels in the Barataria and Breton basins (described in Chapter 3 of Meselhe at al. (2015a))
    - ADCIRC bathymetry data for the deeper GOM area (http://adcirc.org/products/grids/nc_inundation_v6c.grd)
    - The multi-beam bathymetry transects collected by CPRA during the implementation of CPRA's System Wide Assessment and Monitoring Program (Hijuelos & Hemmerling, 2015) have been included into the Delft3D V3 model bathymetry.
    - 2017 bathymetric survey in Mardi Gras Pass in the Bohemia Spillway (Songy et al., 2017)

Sea Level Rise and Subsidence

The rate of Eustatic Sea Level Rise (SLR) to be used in Delft model simulations will be the same as the 2017 Coastal Master Plan 'Moderate Scenario' of 1.5 meters (m) by 2100 (0.8 m by 2068).

Subsidence in the Delft model is spatially variable and was determined by the 2012 Master Plan Moderate Scenario (20% into the range of subsidence) map as amended in 2015 by the prior Delta Management Federal Study Project Delivery Team.

The Modeling Working Group (MWG) discussed ways to capture the potential variability of SLR over the 50-yr analysis period. The MWG members agreed that the 1.5-meter Gulf-regional sea level rise (GRSLR) scenario could be considered a high estimate of GRSLR by 2100, and Sweet et al. (2017) estimated that a GMSL rise of 1.5 meters had only a 1.3% chance of being exceed by the "worst-case" Representative Concentration Pathways (RCP) 8.5 global climate change scenario. For this reason, the MWG members preferred a less severe GRSLR scenario with a greater exceedance probability under RCP8.5. Based on the science of predicted sea level rise as outlined in Sweet et al. (2017), which was developed to technically underpin the U.S. Global Climate Change Program's 4th National Climate Assessment (NCA4; USGCRP 2018), the MWG agreed to evaluate the No action and alternative 4 (applicant's preferred alt) with the global mean sea level (GMSL) rise scenarios of 0.79 m by 2100 with around a 50% exceedance probability.
NOTE: The Delft model incorporated 1.5m RSLR for all alternatives modeled. The outputs of that model were used for inputs into the WVAs. Delft also incorporated the 0.79m RSLR for the selected alternative. However, WVAs were not run on the Delft outputs using 0.79 m SLR scenario as not all necessary WVA data was available. However it is assumed those WVAs would result in more benefit than the higher SLR used.

Habitat Zones – The purpose of determining the habitat zone (fresh, intermediate, brackish, saline) is so the HET can receive all model output by habitat zones of each alternative for use in WVAs. The WVAs must be run by habitat type. Because this is a diversion project it is expected that future shifts in habitat zones of each alternative maybe different between alternatives and for the future without action. Ecological/vegetation model outputs for individual cells were aggregated to determine standard intermediate and brackish marsh habitat type zones. As an area changes with and without action, the weighted average of all cells for each habitat type will change accordingly.

- Salinity and water level thresholds, as well as vegetation colonization rules, are used to determine what plant species grow in a grid/cell. There are some fresh species that have salinity tolerances ranges that overlap with some intermediate species. Where such overlap occurs, the most dominant taxa determined the habitat type (Tables 3 and 4).
- All modeling output data by habitat type (intermediate and brackish) were provided by target year those capturing shifts in habitat types over time for existing and future projections.
- The 7 taxa (vegetation) evaluated by the Delft 3D model were grouped by habitat type (as defined by the HET) to determine habitat type zones over time (Table 3).
- The most dominant taxa determined the habitat type.
- Because there are no veg types in open water, isohalines (salinities) were used where the veg/habitat type boundaries cross open water areas (Table 3).
- It was agreed to move Typha sp. to the intermediate category for determining habitat zones based on best professional judgment of the HET and input from vegetation experts. It makes sense to move Typha to intermediate because it has higher salinity tolerances than the other fresh species.

- The fresh and intermediate habitats were combined because the resolution of the HH model is within the uncertainty range for fresh habitats (based on a fresh salinity of up to 0.5ppt) coupled with the overlapping vegetation types between fresh and intermediate marshes. As a result, most of the fresh/intermediate habitat is interpreted as intermediate with minimal amounts of fresh.
- The fresh and intermediate WVAs are on the same spreadsheet, though they are considered two separate models. The fresh and intermediate WVAs were run together, though inputted into both habitat types.
- The HET agreed we should combine saline habitats into the brackish model similar to the fresh/intermediate habitats. The extremely small amount of saline habitat would be problematic if a separate saline model was run because there is very little saline marsh to begin with and it disappears/shifts to brackish habitat within the project life. For such a small amount of saline marsh it is typical and within the standard operating procedure of the WVAs to lump a small amount of one habitat type with the majority of another where appropriate.

Table 3. Vegetation species in LaVeg that will be used to determine habitat types for WVA purposes

Habitat Types	
saline	Spartina alterniflora
brackish	Spartina patens
intermediate	Sagittaria lancifolia, Phragmites, and Typha sp.
fresh	Sagittarai latifolia, Zizaniposis miliacea

Table 4. Salinity Total Ranges to be used in to determine isohalines in open water for Habitat Zones

Marsh Type	Ave Annual Salinity (ppt)
Fresh Marsh	< 1.5
Intermediate Marsh	1.5 thru 4.0
Brackish Marsh	4.1 thru 10.0
Saline Marsh	> 10.0

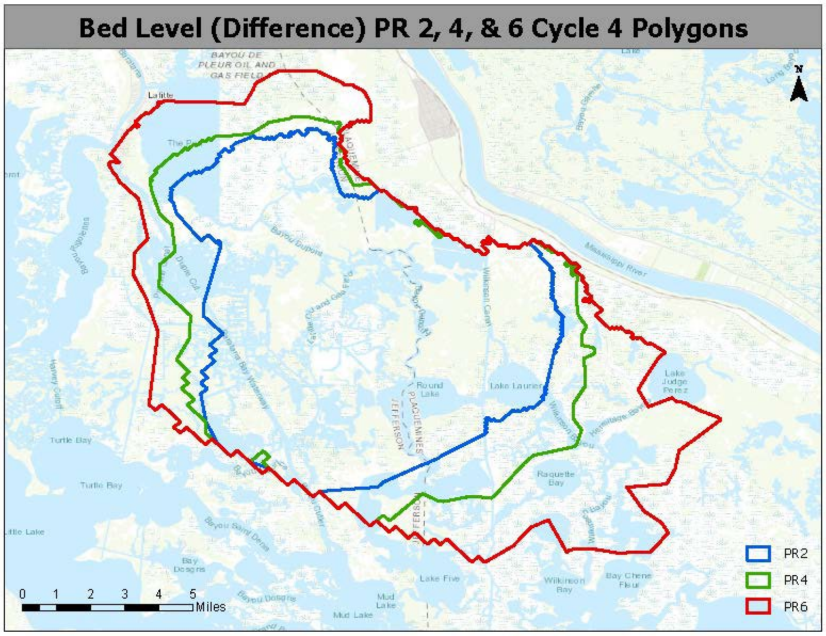
Note: the average annual salinity ranges proposed for application to outputs (to identify habitat zones) have brackish marsh as 4.1 ppt through 9.9 ppt. However, given that the WVA model has optimal brackish salinity through 10.0 ppt, we modified our range for brackish to 4.1 ppt through 10.0 ppt and saline to be > 10.0 ppt.

- The above (Table 3) proposed salinity ranges were derived from 2012 LA Vegetation Model Report (modified to fit the WVA habitat models). It should be noted that by using this approach, we assume the habitat types switch with changes in salinity rather than showing benefits or stress to vegetation due to changes in salinities.

WVA Polygons

- The purpose of the WVA polygons is to provide the modelers with an outer limit to provide outputs for use in the WVA analysis. The model-predicted area of direct impact for sediment accretion was used to delineate the WVA polygon area to be analyzed (Figure 1). By using this approach the HET attempted to capture the majority of accretion to all substrates including subaqueous, intertidal, and existing wetlands.
- The WVA boundary polygons were determined for each diversion alternative (50,000cfs, 75,000cfs, and 150,000cfs). The primary determinant of each diversion polygon size was based on the majority of land change as seen in Figure 1.
    - Initially a combination of impacts for each diversion was reviewed including land change area (land that is maintained, gained or lost), water level changes, salinity differences between alternatives, and vegetation type maps for habitat switching at the end of the project life.
    - By viewing the various components, the HET agreed that WVA was best suited to capture the land change features similar to a CWPPRA WVA standard operating procedure for marsh creation project rather than trying to capture all indirect environmental changes due to the project.
    - Because there is extensive modeling and evaluation, other components (habitat switching, salinity impacts, water quality impacts, etc.) would be discussed in the EIS through other modeling tools available (HSIs, Aquatic modeling, vegetation maps, etc).
    - By using this approach, the near field impacts (land changes due to nutrient inputs, land maintenance, inundation impacts) are captured to the greatest extent in the WVA model and far field impacts are captured through other modeling and evaluation efforts.
    - Parts of the study area that are excluded, such as the rest of the Barataria basin beyond the WVA footprint, are removed because the HET doesn't expect to see measurable WVA differences in FWOA vs FWA in these areas. By including an area larger than the direct footprint, the WVA benefits have been shown in other projects to artificially reduce the sensitivity of the WVA analysis for the project. For example, the land building value of the diversion is diluted over a larger area (the land built/maintained by a diversion is a small amount compared to natural losses over the entire basin).
    - Areas of large open water are removed because they may artificially reduce the sensitivity of the WVA analysis. By leaving large open water areas in, it can skew numbers for variables such as V1, V2, V3, and V4. In addition they do not add much to the WVA analysis. Removing large open water bodies from a project footprint follows the CWPPRA Standard Operating Procedures.
- The HET agreed to encompass at least 80% (or more) of the model-predicted land change impacts within the WVA polygon for each diversion alternative. If far field impacts were isolated or scattered then including them may unnecessarily increase the wva analysis area and might include areas having minimal impacts due to the project compared to no action.

- The WVA project area polygon for the future with diversion for each diversion alternative will be used for the corresponding future without action condition. The three diversion polygons will be applied to the alternatives with and without terraces. For example, the 75,000cfs diversion will have the same polygon sized for the future without action compared to 75,000cfs future with action for both with and without terraces alternatives.
- The WVAs were run for both traditional runs and hysteresis runs (see HH Model Section for info on both modeling runs, Meselhe et. al 2015 and Messina et. al 2019). Previous production runs of the Delft3D basinwide model used a traditional rating curve that predicts sediment load as a direct function of river discharge at a specific river location. That means that for a given water discharge, the rating curve predicts only one corresponding sediment load value regardless of whether the stage is rising or falling or what sediment movement has occurred in the months preceding. Observational data indicates that there are actually a wide range of potential sediment loads that might occur for a given water discharge, in particular on rising and falling river stages, and based upon the sediment load of the months immediately prior to the time of prediction. This phenomenon is called hysteresis behavior.
- Below are the HET agreed upon WVA polygons for the Traditional Runs (Figure 1) followed by the Hysteresis Runs (Figure 2). Several factors were analyzed to help determine the WVA polygons including land change, water level change, and bed elevation change. Changes in bed elevation captured the majority of the changes due to the diversion alternatives. Therefore the below figures shows the WVA project area overlaid on the bed elevation change.


Bed Level (Difference) PR 2, 4, & 6 Cycle 4 Polygons
PR2
PR4
PR6
0 1 2 3 4 5 Miles

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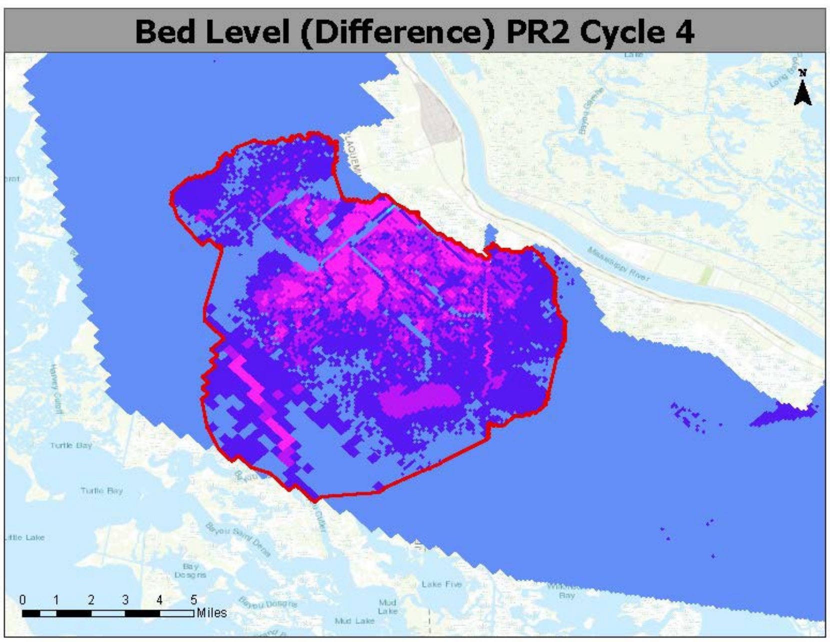
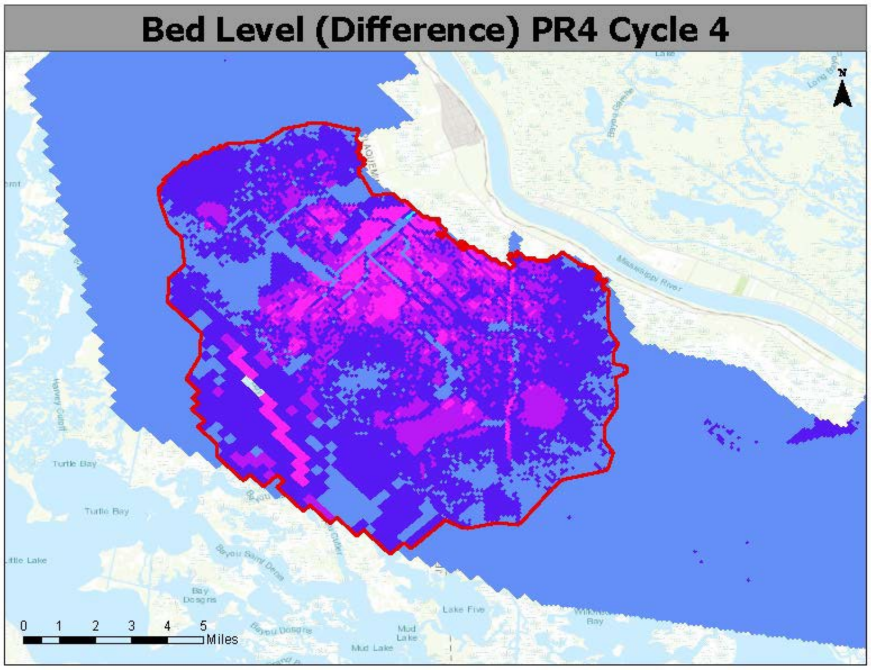

Bed Level (Difference) PR2 Cycle 4
0 1 2 3 4 5 Miles



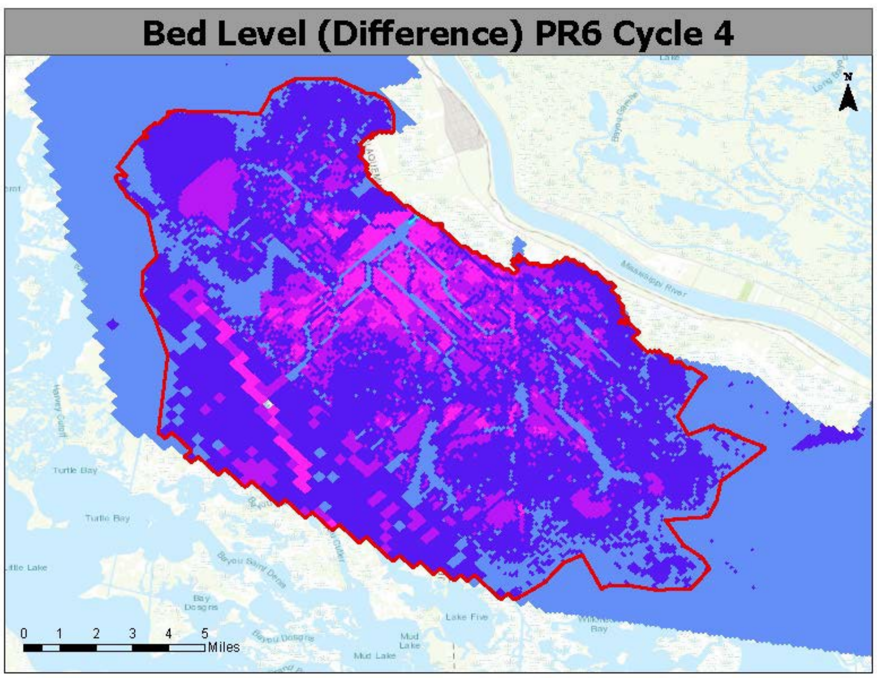
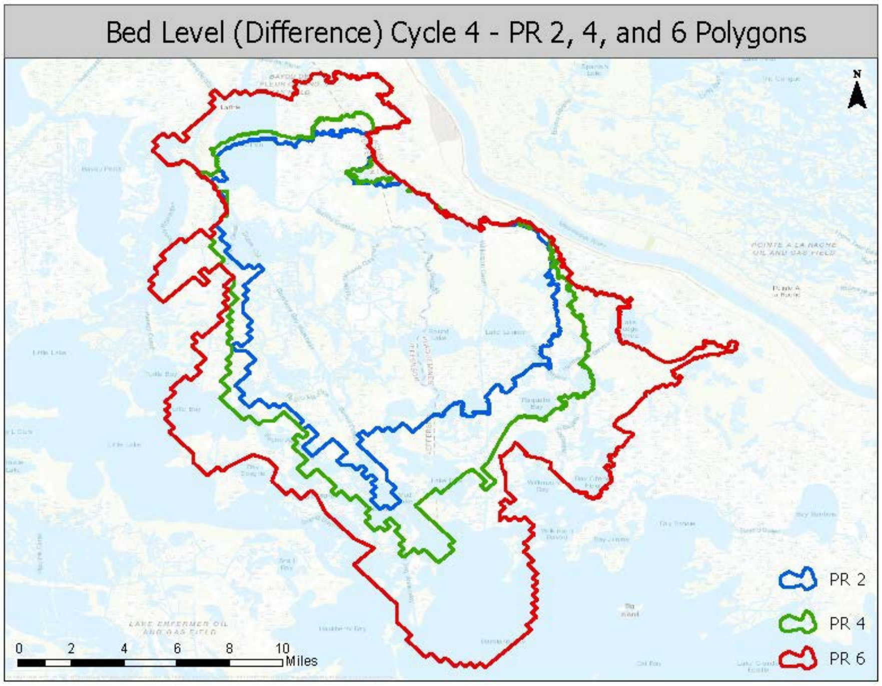
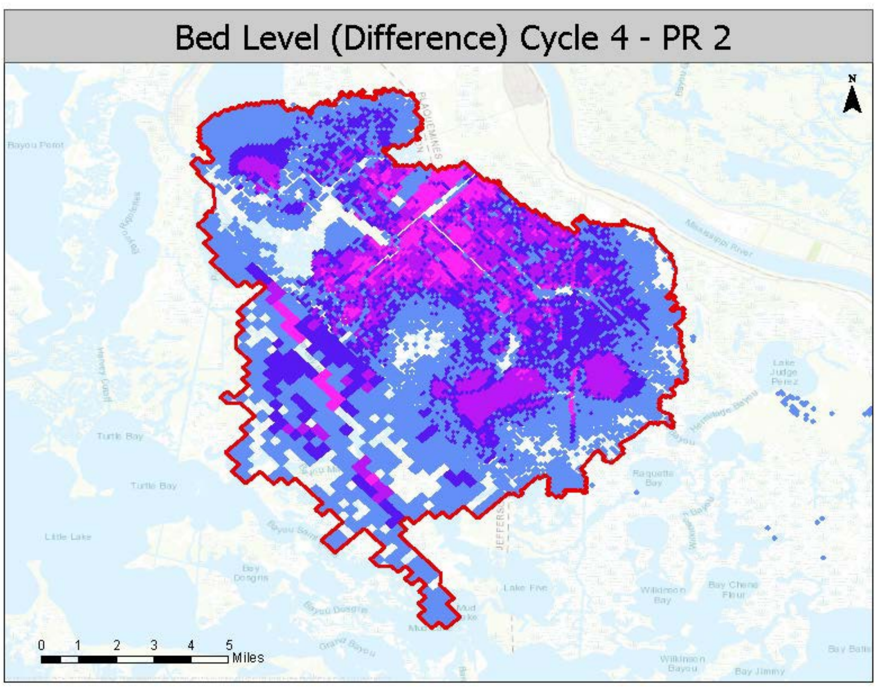


Figure 1. MidBarataria Sediment Diversion Project footprint for three diversion sizes used in the Traditional Wetland Value Assessment. PR2 is the 50,000 cfs, PR4 is the 75,000 cfs, and PR6 is the 150,000 cfs diversion alternatives, cycle 4 represents conditions at the end of the project period of analysis (50 years).


Bed Level (Difference) Cycle 4 - PR 2, 4, and 6 Polygons
PR 2
PR 4
PR 6
0 2 4 6 8 10 Miles


Bed Level (Difference) Cycle 4 - PR 2
0 1 2 3 4 5 Miles

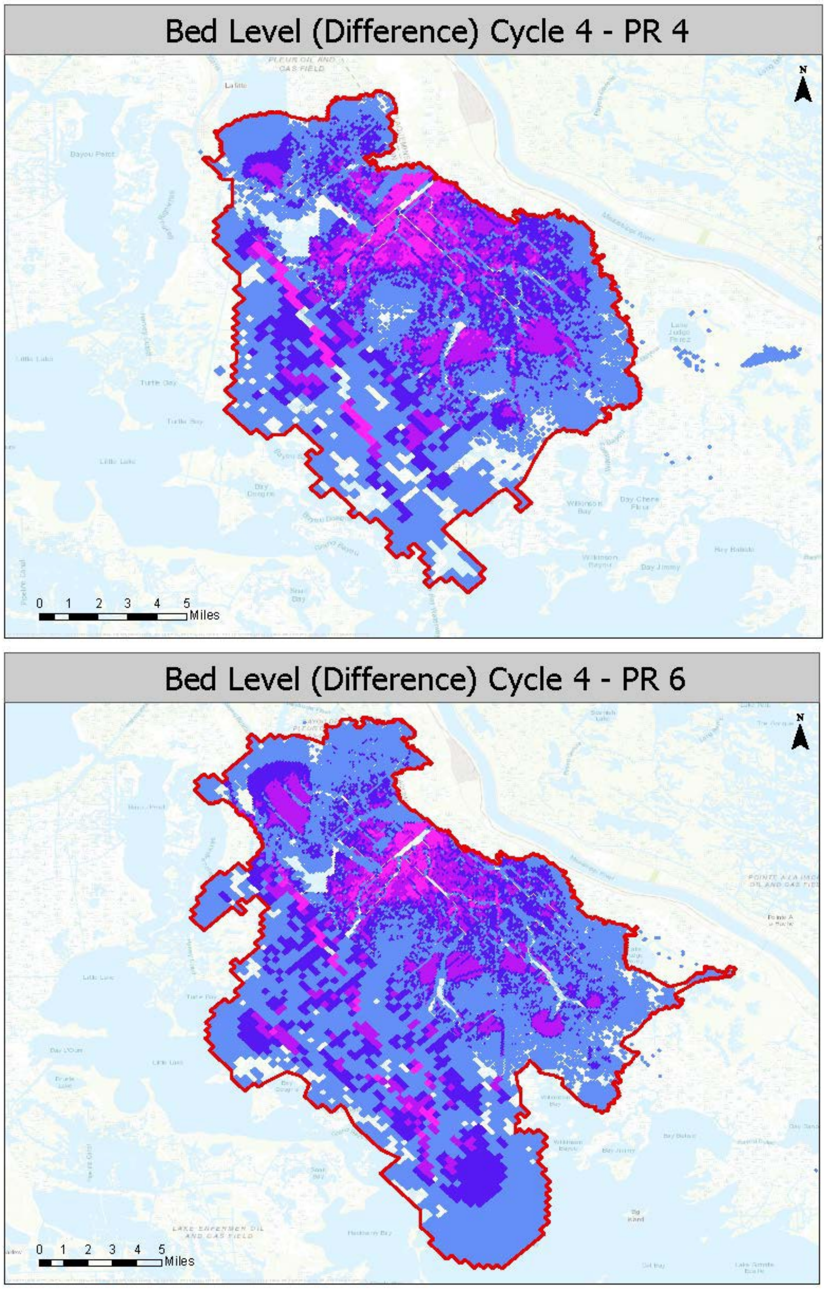


Figure 2. MidBarataria Sediment Diversion Project footprint for three diversion sizes used in the Hysteresis Wetland Value Assessment. PR2 is the 50,000 cfs, PR4 is the 75,000 cfs, and PR6 is the 150,000 cfs diversion alternatives, cycle 4 represents conditions at the end of the project period of analysis (50 years).

<u>Percent Land (V1)</u> –The ecological model will predict land (marsh or wetlands) and water acreage for each ecological model cell under FWOP and FWP conditions. Rather than use USGS land area extrapolations (from coastwide or another series of polygons), we would use ecological model predicted land acreage outputs to inform the WVA. The land acres from the ecological model would be aggregated by habitat type.

- The Modeling Team will provide the HET functional marsh and total water acres within each habitat type. That marsh acreage would include both wetland building, maintenance, and loss to all existing and created marsh. As with other variables the values are for the last day of any requested year.
- The land-acres provided by the HH model outputs include natural processes such as land loss, subsidence, RSLR.
- Components of the model includes vegetative establishment and recruitment features. Therefore functionality of newly created marsh are already incorporated in the outputs
  - The LaVeg model uses environmental variables such as water level and salinity to determine when conditions are suitable for a specific vegetation species (and also when a marsh would collapse). Thus, the HET assumption is that marsh would be considered functional once land becomes suitable for vegetation.
  - Plant death is based on outputs from Dr. Snedden's organ study (Snedden et al 2015).
  - The HET understands that alternatives with terraces are included in the modeling landscape for Delft 3D, and once on the landscape, will be subject to all of the same processes as previously existing land and land built by diversions.
- We also expect to see short term (within the first 10 years) impacts due the diversions from initial plant die off as habitats shift, reestablish, and start to thrive again. These impacts will primarily be seen through the morphology model outputs on the alternative runs.

Terraces – Upon noticing a slight decrease in land acres for diversions with terraces vs without terraces, TWIG responded with the following: The presence of the terraces causes a small but significant modification to the distributary channels' orientation. Specifically, the terraces cause a relative increase in sedimentation between the terrace field and the outfall, selectively 'pushing' channel formation away from that immediate area. This changes the pattern in where the diverted flow and sediment end up. These changes should be quite small; as per our land building analyses. The presence of the terraces doesn't alter the land building magnitude as much as modify the land building pattern.

<u>**SAV (V2)**</u> – This variable is the percent of open water having 100% Submerged Aquatic Vegetation (SAV) coverage.

- The Delft 3D Modeling Team provided information on the salinity, turbidity, exposure, and water depth for the SAV team to work with to develop existing conditions and future projections for fresh/Intermediate and Brackish/saline habitat types for each cycle.
- Because there is no difference in flow between an alternative and its corresponding alternative with terraces (i.e. 75,000cfs alternative vs 75,000 cfs plus terraces alternative), the SAV numbers developed for PR2, PR4, and PR6 were used for PR3, PR5, PR7 respectively.
- Baseline or existing conditions for SAV (Table 5) were determined by using Remotely Sensed SAV predictive modeling data developed by USGS (Couvillion, pers. Comm. 2019). See Appendix A for more details.
- Change in turbidity, water depth, exposure, and salinity, obtained from the Delft 3D model, combined with the premises developed through the SAV Likelihood of Occurrence Model(or SLOO) model for likelihood of occurrence (DeMarco et. al. 2018) were used to develop the projected change in SAV (Table 6) over time for each alternative (PR2, PR4, PR6). See Appendix B for more details.

- See Appendix C for more detail on the method of using Delft 3D data for SAV modeling.

Table 5. SAV Baseline Assessment (2015-2018) using remotely sensed SAV predictive modeling data developed by USGS (Couvillion, pers. Comm. 2019).

RS Classification SAV Baseline Assessment (2015-2018)		
Region/Model Run	Salinity_Zone	% of Water Area Containing SAV
V3PR2_HYST_cycle1	Fresh/Inter	10.0633%
V3PR2_HYST_cycle1	Brackish/Saline	1.6476%
V3PR2_TRAD_cycle1	Fresh/Inter	12.2452%
V3PR2_TRAD_cycle1	Brackish/Saline	1.7930%
V3PR4_HYST_cycle1	Fresh/Inter	8.8769%
V3PR4_HYST_cycle1	Brackish/Saline	1.2564%
V3PR4_TRAD_cycle1	Fresh/Inter	11.7902%
V3PR4_TRAD_cycle1	Brackish/Saline	1.9325%
V3PR6_HYST_cycle1	Fresh/Inter	6.8072%
V3PR6_HYST_cycle1	Brackish/Saline	0.6356%
V3PR6_TRAD_cycle1	Fresh/Inter	10.3548%
V3PR6_TRAD_cycle1	Brackish/Saline	1.3766%

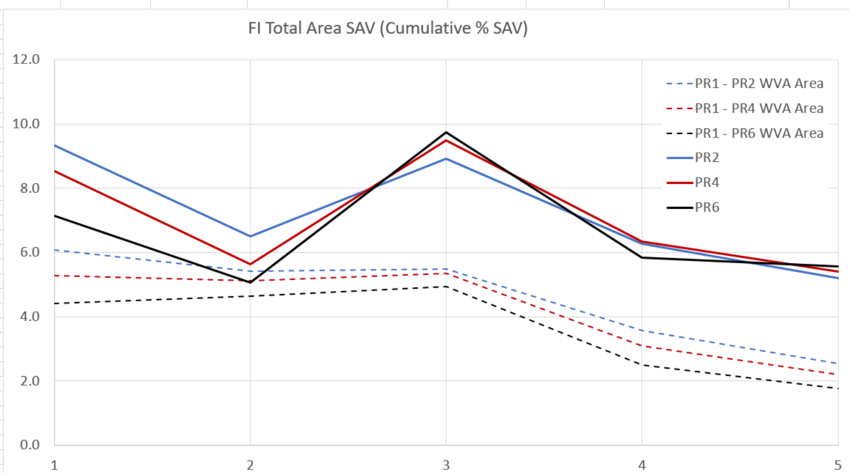
Table 6. SAV summary projections and trends.

Mid Barataria Diversion FWOA SAV Model Runs (Hysteresis Influence Areas)			
	FI Mean Cumulative SAV Percent Change		
Interval	PR1 - PR2 WVA Area	PR1 - PR4 WVA Area	PR1 - PR6 WVA Area
Change_10	6.1	5.3	4.4
Change_21	5.4	5.1	4.7
Change_32	5.5	5.4	4.9
Change_43	3.6	3.1	2.5
Change_54	2.5	2.2	1.8

Mid Barataria Diversion FWA SAV Model Runs (Hysteresis) 110419			
	FI Mean Cumulative SAV Percent Change		
Interval	PR2	PR4	PR6
Change_10	9.3	8.5	7.1
Change_21	6.5	5.6	5.1
Change_32	8.9	9.5	9.7
Change_43	6.3	6.3	5.8
Change_54	5.2	5.4	5.6

Mid_Barataria Diversion FWOA SAV Model Runs (Hysteresis Influence Areas)			
	BS Mean Cumulative SAV Percent Change		
Interval	PR1 - PR2 WVA Area	PR1 - PR4 WVA Area	PR1 - PR6 WVA Area
Change_10	No BS Cells	No BS Cells	0.2
Change_21	0.8	0.3	0.2
Change_32	0.1	0.1	0.0
Change_43	No BS Cells	No BS Cells	0.0
Change_54	No BS Cells	No BS Cells	0.0

Mid_Barataria Diversion FWA SAV Model Runs (Hysteresis) 110419			
	BS Mean Cumulative SAV Percent Change		
Interval	PR2	PR4	PR6
Change_10	No BS Cells	No BS Cells	No BS Cells
Change_21	No BS Cells	No BS Cells	No BS Cells
Change_32	No BS Cells	No BS Cells	No BS Cells
Change_43	No BS Cells	No BS Cells	No BS Cells
Change_54	No BS Cells	No BS Cells	No BS Cells

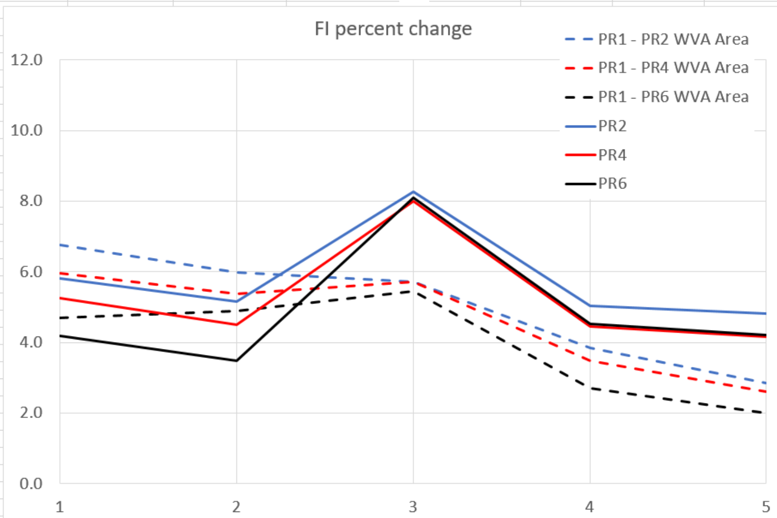


Mid_Barataria Diversion FWOA SAV Model Runs (TRAD Influence Areas)			
	FI Mean Cumulative SAV Percent Change		
Interval	PR1 - PR2 WVA Are	PR1 - PR4 WVA Area	PR1 - PR6 WVA Area
Change_10	6.8	5.9	4.7
Change_21	6.0	5.4	4.9
Change_32	5.7	5.7	5.4
Change_43	3.8	3.5	2.7
Change_54	2.8	2.6	2.0

Mid_Barataria Diversion FWA SAV Model Runs (TRAD) 111819			
	FI Mean Cumulative SAV Percent Change		
Interval	PR2	PR4	PR6
Change_10	5.8	5.3	4.2
Change_21	5.2	4.5	3.5
Change_32	8.3	8.0	8.1
Change_43	5.0	4.5	4.5
Change_54	4.8	4.2	4.2

Mid_Barataria Diversion FWOA SAV Model Runs (TRAD Influence Areas)			
	BS Mean Cumulative SAV Percent Change		
Interval	PR1 - PR2 WVA Are	PR1 - PR4 WVA Area	PR1 - PR6 WVA Area
Change_10	No BS Cells	No BS Cells	0.252086
Change_21	No BS Cells	0.296678	0.179372
Change_32	0.012195	0.06215	0.04799
Change_43	No BS Cells	No BS Cells	No BS Cells
Change_54	No BS Cells	No BS Cells	No BS Cells

Mid_Barataria Diversion FWA SAV Model Runs (TRAD) 111819			
	BS Mean Cumulative SAV Percent Change		
Interval	PR2	PR4	PR6
Change_10	No BS Cells	No BS Cells	No BS Cells
Change_21	No BS Cells	No BS Cells	No BS Cells
Change_32	No BS Cells	No BS Cells	No BS Cells
Change_43	No BS Cells	No BS Cells	No BS Cells
Change_54	No BS Cells	No BS Cells	No BS Cells



Interspersion (V3)

Approach used: In order to reduce the importance or influence of V3 given the large uncertainty associated with determining the V3 values at this scale, the HET agreed to hold V3 constant for all alternatives.

- The HET agreed to keep the interspersion variable constant for all alternatives, with the caveat that Best Management Practices for beneficial use include creating marsh with optimization for interspersion (this will minimize carpet marsh issues).
- Keeping the interspersion variable constant throughout the WVAs for all alternatives reduces the effects of this subjective variable.
- Class 3 will be used throughout the WVAs for all alternatives, all habitat types and all baseline, existing, and future target years.
- Given the scale of this project, the multiple years that would have to be analyzed, and 5 classes in which to assign each habitat type, the HET agreed to the simplifying approach above.
- In cases where marsh is lost in the future (brackish and saline habitats) the HET agreed to keep the Interspersion (V3) class as a class 3, a simplifying assumption originally agreed to by the HET as interspersion would not be calculable with Delft outputs. Typically with little or no marsh left the interspersion variable would move to a class 5. However the HET felt for a project area this large it would be highly subjective to determine class values, particularly as we can not broadly estimate interspersion at the resolution of the

Delft output data. Thus, in order to eliminate any bias that we would introduce to V3, all values are set to a standardized class 3 for all alternatives and all target years.

Percent Shallow Open Water (V4) - This variable is computed as the percent of water acres less than 1.5 feet deep (feet NAVD 88).

- Like the other variables, this one will be determined by habitat type.
- Modelers can provide the total water acreage by habitat type, and the total shallow water acres by habitat type in order to easily compute the percent of open water that is shallow.
- Shallow open water acreages are provided based on the last day of the Target Year.

Salinity (V5) – This variable is derived from model-predicted average monthly salinity in parts per thousand (ppt) for baseline, existing, and future conditions, by habitat type for all alternatives. Ideally, the habitat type average monthly values would be aggregated as a weighted average based on water acres of the model cells.

- In regards to model outputs for V5 Salinity, the modelers provided salinity outputs averaged for the growing season for fresh and intermediate habitat zones and averaged annually for brackish and saline zones following the CWPPRA protocol.
- The optimal (and full) range for salinities (according to the approved WVA models) in each habitat type are as follows:

Marsh Type	Total Range in Parts Per Thousand (ppt)	Optimal Range ppt	Period of Measure
Fresh Marsh	< 5.5	<0.5	Avg Growing Season Salinity (Marsh -November)
Intermediate Marsh	0 thru 7.5	0 thru 2.5	Avg Growing Season Salinity (Marsh -November)
Brackish Marsh	0 thru 16	0 thru 10	Average Annual Salinity
Saline Marsh	0 thru 24	9 thru 21	Average Annual Salinity

- The HET expects the bulk of the with-project changes to occur in TY1 due to salinity changes and shifts associated with diversion operation.
- Salinity was based on Delft Hydrologic modeling results grouped by habitat type/zones
  - Fresh/intermediate – average salinity during the growing season (March through November)
  - Brackish and saline – average annual salinity
- Salinity table provided by The Water Institute of the Gulf (TWIG) had some n/a values. This represents areas that no longer have open water in that habitat type. For instance, FWP in the intermediate and fresh zones the land may still have intermediate marsh (habitat switching may take time) while all the open water becomes fresh. The same is true for brackish where the open water presumably became fresher but a small amount of brackish marsh remained.
- Delft combined the Fresh and Intermediate salinity. In the WVAs we used the same salinity for Fresh and Intermediate.

Fish Access (V6)

- The value was kept constant and fully optimal for all alternatives. There was no expectation that any alternatives would restrict fish access differently than without the action in any way.
- Because the WVA analysis jumps from TY1 to TY10 the HET agreed to use the simplifying assumption to apply complete fish access to beneficial use areas by TY1. The beneficial use areas are relatively small compared to the entire project area and containment would be degraded closely to the first target year after construction.
- Assuming best management practices are incorporated for beneficial use areas for tidal creeks and where containment is degraded between one to three years after construction to allow for ingress and egress.

Diversion Benefits Results

Alternatives	NET ACRES[1]				AAHUs[2]		
	Fresh/Intermediate	Brackish	TOTAL		Fresh/Intermediate	Brackish	TOTAL
MBSD 50,000cfs	10869	-1441	9428		6703	-4264	2439
MBSD 50,000cfs + Terraces	11062	-1445	9617		6782	-4266	2516
MBSD 75,000cfs	14772	-1620	13151		10108	-6260	3848
MBSD 75,000cfs + Terraces	15121	-1620	13501		10093	-6256	3837
MBSD 150,000cfs	30765	-2099	28667		18651	-9741	8909
MBSD 150,000cfs + Terraces	30708	-2098	28609		18556	-9667	8890

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THE MID-BARATARIA SEDIMENT DIVERSION PROJECT

Wetland Assessment For Direct Impacts

The following are the assumptions for assessing the direct impacts associated with construction activities of the Mid-Barataria Sediment Diversion Project (Figure 1 and Table 1). Wetlands within the proposed construction footprint were documented by wetland delineation surveys conducted by CPRA and later approved by USACE. The USACE approved surveys determined that the construction footprint included emergent wetlands (wet pasture), scrub/shrub , and forested bottomland hardwood (BLH) wetland types.

A Habitat Evaluation Team (HET) was formed to assist with and concur on the methodology and quantification of environment impacts.

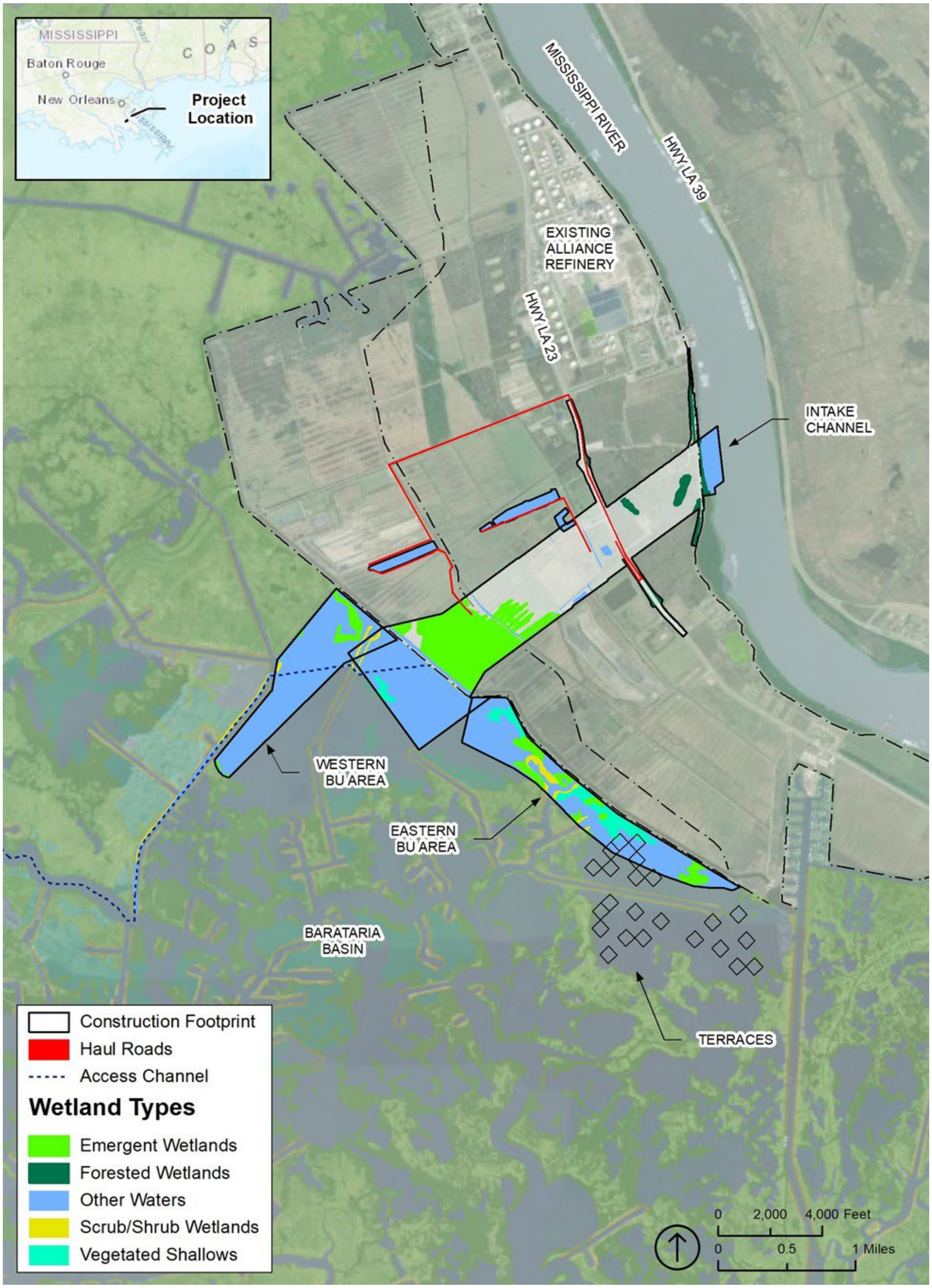

Figure 1. Permanent wetlands impacted within the construction footprint of the MBSD project.

Table 1. Summary of Direct Wetland Impacts

Wetland Type	Impacts	
	Net Acres	AAHUs
Forested wetlands	21.6	-12.1
Emergent Wetlands (Wet Pasture)	151.0	-61.0
Emergent Wetlands (Marsh/scrub/shrub)	6.2	-21.3
Total Project Impacts	**178.8**	**-94.4**

Emergent Wetlands or Wet Pasture

The 151 acres of wet pasture within the project area consists of seasonally flooded, partially drained/ditched, emergent wetlands contained between the levee and the adjacent marsh.

The Corps' Habitat Evaluation System (HES) for open lands was used for the HSDRRS NOV – NFL used to evaluate wet pasture impacts in the same area as the MBSD wet pasture. This was deemed to be the most appropriate tool at the time because there is no wet pasture WVA. However for the MBSD project and future NOV – NFL and other projects with wet pasture impacts, the civil works (CW) fresh marsh WVA (latest version) will be used for the following reason.

Wet pasture, beneficial to wildlife resources is thought to be of lower quality than fresh marsh. Thus, the standard was set that wet pasture can be mitigated for with fresh or intermediate marsh. When the HES was previously used a mitigation potential ratio between 0.5 and 0.75 reinforces the thought that wet pasture has a lower value to marsh.

In the MBSD project, the Service staff compared the HES to the CW Fresh Marsh V2.0 outputs for the wet pasture impacts. See table 1 for the results of each.

For these reasons and for simplicity and consistency on future wet pasture evaluations, the Service and USACE agree to use the CW Fresh Marsh WVAs for wet pasture.

Table 2. Results for the MBSD openland HES compared to Civil Works Fresh Marsh V2 applied to wet pasture impacts.

	Net Acres	AAHUs
MBSD Wet Pasture CW FR Marsh V2.0	-151	-61.0
MBSD Wet Pasture HES	-151	-102.4

Variable V_1 – Percent of Wetland area covered by emergent vegetation

FWOP – It was assumed the 151 acres of wet pasture within the levee system is expect to remain for the full period of analysis.

FWP- all 151 acres would be permanently removed.

Variable V_2 – Percent of open water covered by aquatic vegetation

The HET assumed no submerged aquatic vegetation for the period of analysis for both FWOP and FWP.

Variable V3 – Marsh edge and interspersion

FWOP – the wet pasture is consider to be similar to a carpet marsh or Class 3 and will remain so for the period of analysis.

FWP - all 151 acres would be permanently removed.

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

FWOP – it is assumed that all open water would be shallow.
FWP - all 151 acres would be permanently removed.

Variable V_5 – Mean high salinity during the growing season (March through November

FWOP – it is assumed that salinity is fresh as it is feed by rainfall and drainage. 0ppt was used for all target years.

FWP - all 151 acres would be permanently removed.

Variable V_6 – Aquatic Organisms (% wetland accessible & type of access)

FWOP – Fish access was given the lowest value since it is separated from the basin by levees.
FWP - all 151 acres would be permanently removed.

Wet Pasture Results

	Impacts	
Wetland Type by Location	**Net Acres**	**AAHUs**
Permanent Impacts		
Wet Pasture/Marsh La23 to Basin	-163.4	-66.0
Temporary Impacts		
Wet Pasture/Marsh	0.0	-0.9
TOTAL Wet Pasture/Marsh	**-163.4**	**-66.9**
Based on 60% design acres provided 13 April 2022		

Wetland Value Assessment (WVA)

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.

Intermediate Marsh WVA

Note: Scrub/shrub, open water, and SAV acres are included in the marsh evaluation.

Land Loss/ Sea Level Rise Effects

Land loss rates estimated by the Service were adjusted by the projected effects of the medium relative sea level rise (RSLR) scenario for these analyses. The estimations were calculated using the USACE's Sea-Level Calculator. The land loss rate for the Lake Laurier (USGS Polygon 195, figure 3) region was used (-0.31% per year for the period 1985-2016) for the project outfall area background loss rate.

An average accretion rate of 6.5 mm/year was used for this site (6.5 mm/yr from Barataria Basin accretion measurements, Jarvis et al. 2010 an ERDC publication).

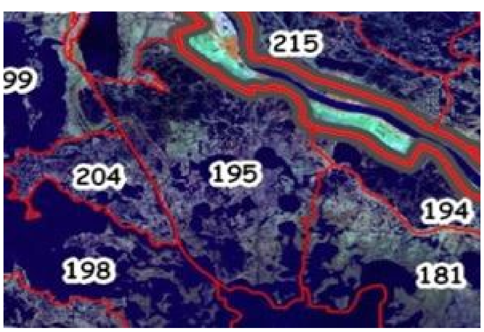

Figure 2. USGS polygon key for land loss rate data from 1985 to 2016

An estimated subsidence rate of 5.3 mm/yr was used based on the average subsidence rates of the outfall area used in Delft 3d modeling which was based on the 2012 Coastal Master Plan subsidence values (MRHDM Project Delivery Team. 2015), which matches with the closest long-term gage station to proposed sites (Bayou Barataria at Barataria guage (82750), 5.3mm/yr).

Baseline Year and Project Start Year

The baseline year (TY0) is 2022 and construction (TY1) starts in 2023. Marsh and water acres of the outfall area and access were measured in Oct 2016. RSLR was applied to the 2016 acres and projected forward to determine TY0, TY1, and TY50 marsh and water acres for the future with the Applicant's Preferred Alternative or APA and the future with the No Action Alternative or NAA. The HET assumed all habitats in the construction footprint would be impacted within the first construction year either by habitat clearing or by ongoing construction activities.

Impacted baseline (TY0) marsh acres (measured in 2016 as 10.3 acres) is 9.5 acres. Beginning (TY0) water acres are 228 acres (227.4 acres in 2016) with a total project area of 237.7 acres.

Variable V_1 – 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. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0). In each coastal marsh model, this variable is weighted the highest and thus influences project benefits the most.

FWOP – A predetermined land loss rate of -0.56% (see above) was applied to the existing marsh acreage and projected through the period of analysis (50 years).

Intermediate marsh projected forward to 2022 (TY0) is **9.5 acres** with a total project area of 237.7 acres (Table 4: 4% marsh, 96% open water).

Table 3. FWOP acres and percent Emergent Vegetation by Target Year.

	NAA Marsh (acres)	APA Percent Marsh
TY0	9.8	4.1%
TY1	9.7	4.1%
TY50	6.2	2.6%

FWP- all 9.8 acres would be permanently removed.

Variable V_2 – Percent of open water covered by aquatic vegetation

The CWPPRA BA-164 project, Bayou Dupont Marsh Creation #3 cell 1 (Figure 4 and Table 6 - highlighted brown) directly overlays the area we are evaluating. Therefore the HET agreed the observed field data (**5% SAV**) found in the same footprint as this WVA is the most appropriate data for baseline SAV (Table 5).

Table 4. Percent SAV by target year.

% SAV	TY0	TY1	TY50
FWOP	5	5	0
FWP		0	0

Figure 3. The CWPPRA BA-164 project, Bayou Dupont Sediment Delivery - Marsh Creation and Terrace #3, proposed marsh creation cells.

This is further supported by the review of a variety of other projects in the outfall area (Table 6).

Table 5. Other Projects near the Mid-Barataria Sediment Diversion (MBSD) outfall area.

SAV		
Year	**Project**	**Data**
2015-2018	MBSD Fr/Int	8.9%
	MBSD Br/Sal	1.3%
	CWPPRA	
2012	BA-164	5%
2002	BA-39	25%[1]
2010	BA-48	0%
2013	Demarco	2%
	Average w/o BA-39	**3%**
	Average All	**7%**

[1] Outlier, influenced by Naomi siphon

The MBSD WVA area of analysis baseline conditions for SAV data (top two lines of Table 6) were determined by using Remotely Sensed SAV predictive modeling data developed by USGS. Both the fresh/intermediate (9% SAV) and the brackish/saline (1.3% SAV) WVA areas are considerably larger than the area of interest for direct impacts. The direct impact area is being evaluated as intermediate habitat based on salinity but has characteristics of the adjacent brackish habitat. Additionally wave fetch from the south across the open water area would reduce SAV against the Nonfederal Levee at the outfall. The HET would expect the direct impact area SAV to be somewhere between the two MBSD estimates.

All three CWPPRA projects (Figure 5 and Table 6) claimed to see little or no SAV. BA-164 directly overlays the area being evaluated. BA-39 was thought to be influenced by Naomi, however, would have less influence on the direct impact area since it is separated by the creation of BA-39. As mentioned above wave fetch across the open water area would reduce SAV in the direct impact area.

Figure 4. CWPPRA projects near MBSD

The Demarco paper (Demarco et al. 2018) looked at several WVAs and collected data throughout the basin. The 2% SAV were based on the data closest to the direct impact area which is from 2 CWPPRA WVAs that were located slightly south in a higher salinity (presumably brackish) habitat (figure 6).

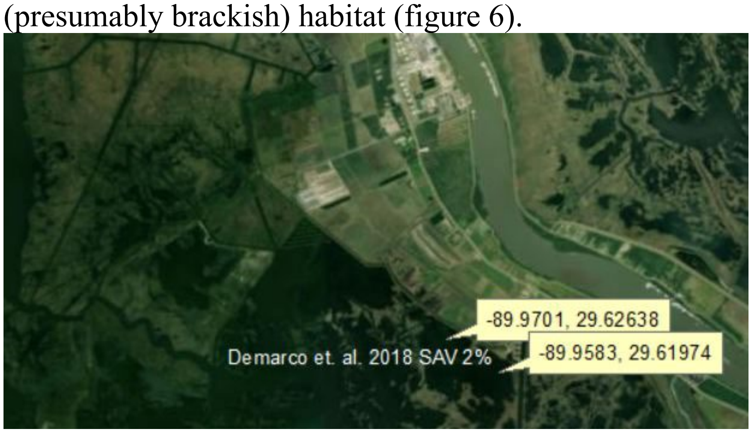

Figure 5. Demarco et. al. 2018 points for CWPPRA WVA data.

Finally all data was averaged to 7% SAV and averaged again by removing the CWPPRA BA-39 data as an outlier influenced by the Naomi siphon to get 3% SAV. For all the reasons above the HET believed the impact area would have a lower % SAV than what is seen is areas further away or in areas that are better protected from wave energy.

All the data review confirmed the use of the marsh creation cell 1 of the BA-164 project for a baseline SAV of 5% (Table 6).

Future projections (TY50) assumed conditions would not be suitable for SAV growth with effects of SLR and saltwater intrusion.

FWP- all SAV would be permanently removed from the construction footprint.

Variable V3 – Marsh edge and interspersion

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

FWOP-5% marsh is considered a class 5 for all target years.

FWP- n/a, habitat would be permanently removed

Variable V_4 – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

The HET used **7.9%** shallow open water (SOW, Table 7) based on the data for CWPPRA BA-164, cell 1 because the cell and data overlaps directly in the same place as the impact area. BA-164 "corrected" the field water depth measurements for long-term average water level using the convention adopted by the CWPPRA Environmental Work Group.

Table 6. Shallow open water.

	TY0	TY1	TY50
FWOP % SOW	8%	8%	0%
FWP % SOW	8%		

FWP- n/a, habitat would be permanently removed

Variable V_5 – Mean high salinity during the growing season (March through November)

Because salinity from the MBSD ranged over a far greater area than the impact area the HET reviewed CRMS data in the area (Table 8). A baseline salinity of **1.7ppt** (Table 8, highlighted brown) was used based on the four CRMS stations mean growing season salinity. In the intermediate marsh model salinity is based on mean salinity during the growing season (March – November). This is similar to the CWPPRA BA-164 Bayou Dupont marsh creation project that used the mean growing season salinity of 1.5 ppt for CRMS4103 for the period of record (2008-2012).

Table 7. Salinity of CRMS stations near the MBSD Impact area.

CRMS	Mean Salinity (ppt) from 2007(8)- 2020	Mean Growing Season Salinity (ppt) for 2019	Notes on guage location relative to the MBSD impact area
248	3.6	2.4	at BBWW across from outfall
4103	1.7	0.8	closer but slightly north
261	2.0	1.6	midbasin
4218	1.6	1.8	midbasin
	2.2	1.7	Average

Future projections are expected to increase by 0.7ppt shifting from 1.7ppt to 2.4ppt based on Delft 3d salinity output increase for FWOP MBSD (Table 10). Table 9 shows the Delft 3d 50 year projections for fresh/intermediate and brackish habitats.

Table 8. MBSD Delft 3d modeling results for salinity (ppt) for the No Action Alternative.

Delft Salinity output NAA (ppt)		
	Fr/In	Brackish
Year 1	1.0	3.8
Year 50	1.7	3.8

Table 9. Salinity Used for Direct Impact Marsh WVA.

	TY0	TY1	TY50
FWOP	1.7ppt	1.7ppt	2.4ppt
FWP	1.7ppt	-	-

FWP- n/a, habitat would be permanently removed

Variable V_6 – Aquatic Organisms (% wetland accessible & type of access)

FWOP – Fish access would be considered open with no obstructions

FWP- n/a, habitat would be permanently removed
(PPL18 Grand Liard Marsh and Ridge Restoration, PPL16 Bayou Dupont Marsh and Ridge Restoration, LCA Wetland Creation

Marsh WVA Results

Wetland Type by Location	Net Acres	AAHUs
Permanent Impacts		
Basin-side Marsh	-3.6	-20.3
Based on 60% design acres provided 13 April 2022		

Bottomland Hardwoods WVA

The 21.6 acres of forested wetlands in the construction and trestle footprint dominated by invasive Chinese tallow and native species commonly found in disturbed, early successional forested wetlands, such as black willow, rather than high-quality bottomland hardwood wetlands. Also present, to a lesser extent, was boxelder and red maple (<10%, HDR, 2014).

The forested wetlands in the construction and trestle footprint have been hydrologically altered, they are found between the River Levee (Levee) and Highway (Hwy) 23 and are no longer exposed to natural flooding events and have characteristics of regrowth colonizing and non-native species typically found in disturbed, early successional forested wetlands (such as black willow and Chinese tallow) rather than mature bottomland hardwood forest (HDR, 2014).

Updated (in 2015) BLH WVA data for the Plaquemines Parish Nonfederal Levees (NFL), WBVMRL (West Bank and Vicinity, Mississippi River Levee) Project was pulled from the three nearest sites (WBVMRL1.1, WBVMRL3.1, and WBVMRL5.2, Figure 7) for use in the MBSD Direct Impact BLH WVAs. The NFL WBVMRL project sites are similar to the MBSD BLH site in their location adjacent to the River and developed lands and forest specie associations. The following variables were averaged to achieve representative values: size of contiguous forested areas (V5), surrounding land use (V6), and disturbance (V7). Data for tree species association (V1), stand maturity (V2), understory/midstory (V3), and hydrology (V4) were taken from field data provided in the HDR 2014 report “Mid-Barataria Sediment Diversion (BA-153), Plaquemines Parish, Louisiana, Report for Delineation and Evaluation of Potential Waters of the U.S., Including Wetlands, July 2014 Amendment.”

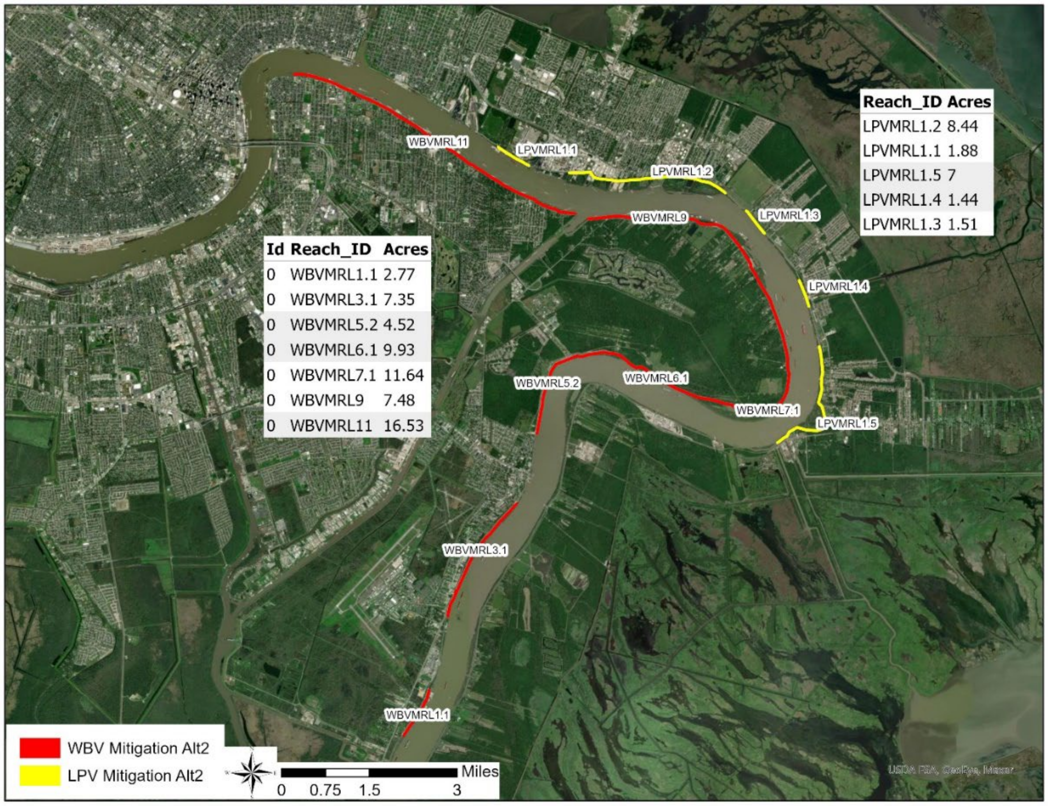

Figure 6. Bottomland hardwood sites for the Plaquemines Parish Nonfederal Levees (NFL) Project.

Separate BLH WVAs were created for the batture (area from the River to the Levee) and for the area between the Levee and Hwy 23. The batture portion consisted of 3.96 acres and the Levee to Hwy 23 is 17.64 acres (Figure 1). They were kept separated because the hydrology and stand structure differed. Once complete the AAHUs from the two BLH WVAs can be combined to provide total impacts to BLH habitat.

Target years were kept to a minimum and included TY0, TY1, TY10, TY20, and TY50. These were the target years used for the WBVMRL WVAs. For consistency the assumptions are the same.

<u>Variable V1 – Tree Species Association</u>

Wildlife species which utilize bottomland hardwoods depend heavily on mast, other edible seeds, and tree buds as primary sources of food. Based on the below tree species association class definitions (Figure 8) and the HDR 2014 plot data (plots were averaged for each area), baseline (TY0) classification was Class 2 for the batture and a Class 3 for area between Levee and Hwy 23. The batture was dominated by willow which is a non-mast producer and had an average of 45% canopy cover. The area between the Levee and Hwy 23 included oaks and hickory (providing for greater than 10% hard mast producers) and an average of 48% canopy cover.

Class 1:	Less than 25% of overstory canopy consists of mast or other edible-seed producing trees or more than 50% of soft mast present but no hard mast.
Class 2:	25% to 50% of overstory canopy consists of mast or other edible-seed producing trees, but hard mast producers constitute less than 10% of the canopy
Class 3:	25% to 50% of overstory canopy consists of mast or other edible-seed producing trees, and hard mast producers constitute more than 10% of the canopy.
Class 4:	Greater than 50% of overstory canopy consists of mast or other edible-seed producing trees, but hard mast producers constitute less than 20% of the canopy.
Class 5:	Greater than 50% of overstory canopy consists of mast or other edible-seed producing trees, and hard mast producers constitute more than 20% of the canopy.

Figure 7. Bottomland Hardwood Wetland Value Assessment, Variable V1 Tree Species Association, class definitions.

Following the assumptions of the NFL WVAs, it was assumed that by TY50 the trees would have matured to the next level class value (Table 11).

Table 10. Variable 1, Tree Association for Bottomland Hardwood in the Mid-Barataria Sediment Diversion Structure Footprint.

Bottomland Hardwood Area	TY0	TY1	TY10	TY20	TY50
Batture	Class 2	Class 2	Class 2	Class 3	Class 3
River Levee to Hwy 23	Class 3	Class 3	Class 3	Class 4	Class 4

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V2 – Stand Maturity

Stand maturity is based upon the average age or dbh of canopy-dominant and canopy-codominant trees. The average dbh of the three WBVMLR sites (Table 12) were used for both WVAs (batture and Levee to Hwy 23).

Table 11. Variable 2, Stand Maturity (in dbh) for the Bottomland Hardwood in the Mid-Barataria Sediment Diversion Structure Footprint.

Bottomland Hardwood Area	TY0 (dbh)	TY1 (dbh)	TY10 (dbh)	TY20 (dbh)	TY50 (dbh)
Batture	7.8	8.1	10.4	12.9	21.3
River Levee to Hwy 23	7.8	8.1	10.4	12.9	21.3

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V3 - % Understory / Midstory

Baseline (TY0) % were taken from the 2 batture plots and 15 Levee to Hwy 23 plots of the HDR data (Table). For projections we followed the pattern and assumptions used in the WBVMRL except for the batture understory projection. Batture understory started at 95%. The HET assumed that as the mid story increased that the understory wouldn't be able to increase fully to 100%.

Table 12. Variable 3, Percent Understory and Midstory for Bottomland Hardwood in the Mid-Barataria Sediment Diversion Structure Footprint.

Bottomland Hardwood Area	% Cover	TY0	TY1	TY10	TY20	TY50
Batture	Understory	95	95	95	95	95
Batture	Midstory	13	13	18	23	23
River Levee to Hwy 23	Understory	15	15	17	20	20
River Levee to Hwy 23	Midstory	35	35	40	45	45

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V4 – Hydrology

This variable considers the duration and amount/degree of water flow/exchange.

Table 13. Variable 4, Hydrology Suitability Index (SI) values.

		Flow/Exchange			
		High	Moderate	Low	None
Flooding Duration	Temporary	1.00	0.85	0.70	0.50
	Seasonal	0.85	0.75	0.65	0.40
	Semi-Permanent	0.75	0.65	0.45	0.25
	Permanent/Dewatered	0.65	0.45	0.30	0.10

Hydrology was based on the HDR 2014 report and knowledge of the area. With direct access to the Mississippi River, the batture is temporarily flooded and has a high flow/exchange (SI = 1). The Levee to Hwy 23 floods temporarily but has no flow/exchange because the Levee and Hwy 23 isolate this area from water inputs and exchanges (SI = 0.5).

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V5 – Size of Contiguous Forested Area
The basic assumption for this variable is that larger forested tracts are less common and offer higher quality habitat than smaller tracts. The forest patch size is taken into consideration and corridors less than 75-feet-wide do not constitute a break in the forested area contiguity (Table 15).

All three WBVMRL sites have a class 3 forest size for all target years. Using those WVAs as a basis both the batture and Levee to Hwy 23 used class 3 for all target years.

Table 14. Variable 5,Size of Contiguous Forested Area Class values.

Class 1	0 to 5 acres
Class 2	5.1 to 20 acres
Class 3	20.1 to 100 acres
Class 4	100.1 to 500 acres
Class 5	> 500 acres

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V6 – Suitability and Traversability of Surrounding Land Uses
Many wildlife species commonly associated with bottomland hardwoods will often use adjacent areas as temporary escape or resting cover and seasonal or diurnal food sources. Surrounding land uses which meet specific needs can render a given area of bottomland hardwoods more

valuable to a cadre of wildlife species. Additionally, the type of surrounding land use may encourage, allow, or discourage wildlife movement between two or more desirable habitats. Land uses which allow such movement essentially increase the amount of habitat available to wildlife populations.

Land use was averaged across the three WBVMRL sites to use in both the batture and Levee to Hwy 23 WVAs (Table 16).

Table 15. Variable 6, Suitability and Traversability of Surrounding Land Uses values used in the MBSD direct impact BLH WVAs.

LAND USE	WBVMRL 5.2 (%)	WBVMRL 3.1 (%)	WBVMRL 1.1 (%)	Average %
Forest / marsh	40	10	25	25
Abandoned Ag	0	0	0	0
Pasture / Hay	10	10	15	12
Active Ag	45	50	40	45
Development	5	30	20	18

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Variable V7 – Disturbance

Human-induced disturbance can displace individuals, modify home ranges, interfere with reproduction, cause stress, and force animals to use important energy reserves. The effects of disturbance are a factor of the distance to disturbance and the type of disturbance (Table 17).
Table 16. Variable 7, Disturbance Class values.

Distance Classes	Type Classes
Class 1. 0 to 50 ft.	**Class 1.** Constant/Major. (Major highways, industrial, commercial, major navigation.)
Class 2. 50.1 to 500 ft.	**Class 2.** Frequent/Moderate. (Residential development, moderately used roads, waterways commonly used by small to mid-sized boats).
Class 3. > 500 ft.	**Class 3.** Seasonal/Intermittent. (Agriculture, aquaculture.)
	Class 4. Insignificant. (Lightly Used roads and waterways, individual homes, levees, rights of way).

The average of the three WBVMRL WVA Disturbance values (Distance is 1, Type is 2) was used for all target years for both batture and Levee to Hwy 23 WVAs (Table 18).

Table 17. Variable 7, Disturbance Class values used in the MBSD BLH WVAs.

WVA Sites	Distance Class	Type Class
WBVMRL 5.2	1	2
WBVMRL 3.1	1	2
WBVMRL 1.1	1	2
Average	**1**	**2**

Temporary impacts assumed TY1-10 no habitat existed during construction and while naturally reseeding. Assumed by FWP TY20 the area would return back to equivalent to FWOP TY0 and that FWP TY50 would be equivalent to FWOP TY20 for all variables.

Bottomland Hardwood WVA Results

Wetland Type by Location	Net Acres	AAHUs
Permanent Impacts		
BLH River Levee to Hwy 23	-18.5	-10.4
BLH Batture	-7.5	-4.3
Temporary Impacts		
BLH River Levee to Hwy 23	0.0	-0.2
TOTAL BLH Impacts	**-26.1**	**-14.9**
Based on 60% design acres provided 13 April 2022		

Literature Cited

DeMarco, Kristin Elise, "Shifting Niche Space in Coastal Landscapes: Spatio-temporal Patterns Driving Submerged Aquatic Vegetation across the Northern Gulf of Mexico" (2018).LSU Doctoral Dissertations. https://digitalcommons.lsu.edu/gradschool_dissertations/4603

Project Adverse and Beneficial Impacts Results

Table 18. MidBarataria Sediment Diversion Construction Impacts.

	Impacts	
Wetland Type by Location	**Net Acres**	**AAHUs**
Permanent Impacts		
BLH River Levee to Hwy 23	-18.5	-10.4
BLH Batture	-7.5	-4.3
Wet Pasture/Marsh La23 to Basin	-163.4	-66.0
Basin-side marsh	-3.6	-20.3
Total Permanent Impacts	**-193.1**	**-100.9**
Temporary Impacts		
BLH River Levee to Hwy 23	0.0	-0.2
Wet Pasture/Marsh	0.0	-0.9
TotalTemporary Impacts	**0.0**	**-1.1**
Based on 60% design acres provided 13 April 2022		

Table 19. MidBarataria Sediment Diversion Total Project Adverse and Beneficial Impacts.

Wetland Type	Impacts	
	Net Acres	**AAHUs**
Forested wetlands	-26.1	-14.9
Emergent Wetlands (Wet Pasture)	-163.4	-66.9
Emergent Wetlands (Marsh/scrub/shrub)	-3.6	-20.3
Total Project Impacts	**-193.1**	**-102.0**
Project Benefits	**13,151**	**3,848**
Difference (Benefits - Impacts)	**13,344**	**3,746**
Beneficial Use Site	**Net Acres**	**AAHUs**
Outfall North	146.8	59.3
Outfall South 1	152.2	60.6
Outfall South 2	102.9	38.5
Total Direct Benefits	**401.9**	**158.4**

Appendix A

Remotely Sensed Submerged Aquatic Vegetation Base Layer

Remotely Sensed Submerged Aquatic Vegetation Base Layer

Introduction

Submerged aquatic vegetation (SAV) is an important resource for fish and wildlife (Heck et al., 2003; Hitch et al., 2011; Kanouse et al., 2006; La Peyre and Gordon, 2011). Mapping the distribution of submerged aquatic vegetation (SAV) is however difficult due to limited water clarity across much of the coastal Louisiana (DeMarco et al. 2016). Indeed, many attempts at accurately identifying SAV in a particular date of remotely sensed imagery, particularly in turbid areas, are unsuccessful. Mapping methodologies that have successfully identified SAV remotely often take place in clear water or require hyperspectral imagery, which is typically limited in availability (Hestir et al. 2008, Williams et al. 2003, Visser et al. 2013). This effort develops a method for identifying SAV occurrence over long periods via multi-temporal remotely sensed imagery, ensuring the likelihood of SAV presence in general over large areas.

Study Area

Baseline conditions regarding the presence and absence of SAV were requested for six areas of interest in Barataria Basin, Louisiana as detailed in Figure 1 below.

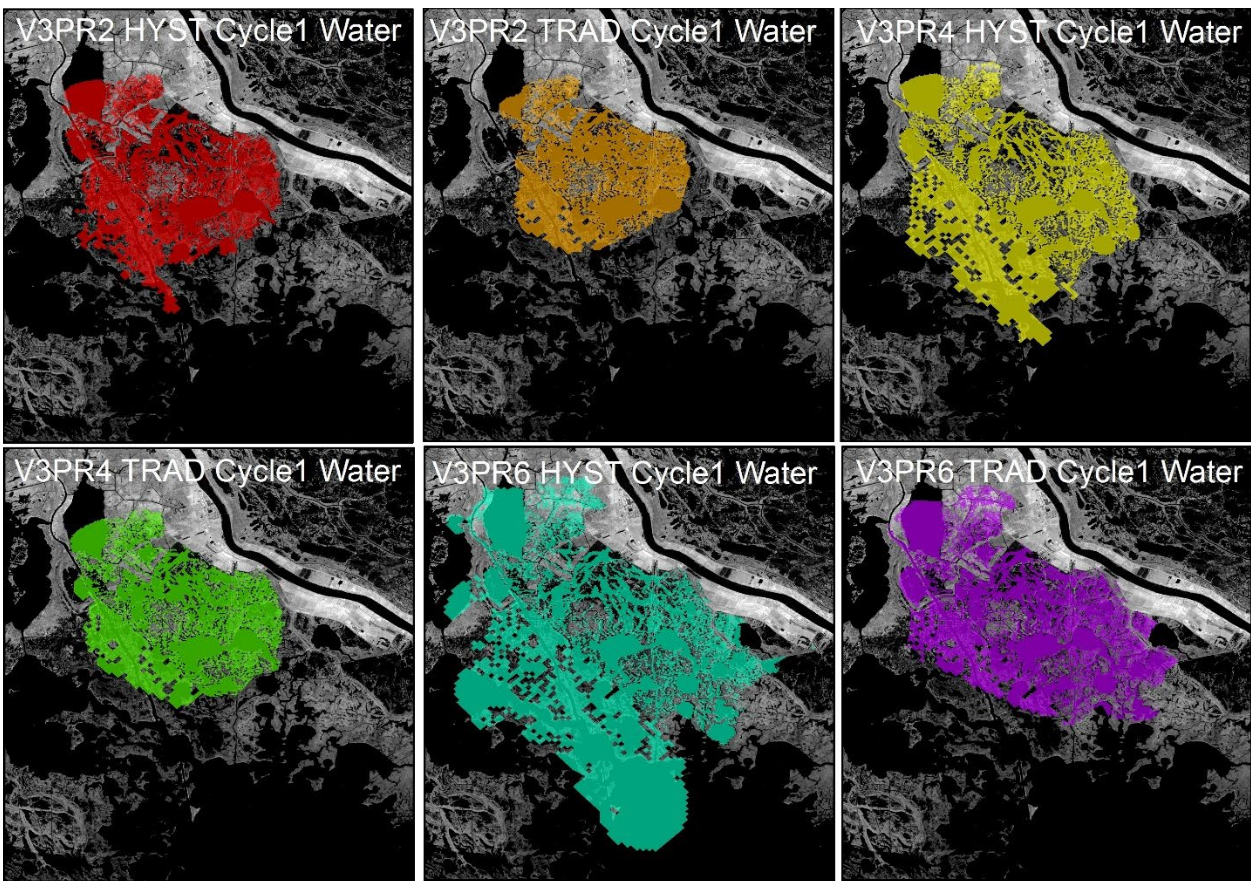

Figure 1. Study areas for baseline SAV coverage.

Methodology

2.1 Aquatic Vegetation Identification Approach

Identification of any particular category of land cover via remotely sensed imagery begins with brainstorming on what unique characteristics of that class could be used to distinguish it from other classes. In the case of submerged aquatic vegetation (SAV), its reflectance values will be characterized by a strong water signal, but also, during clear conditions, at least some vegetation signal. Perhaps of particular note for this technique, those signals will also vary through time, as changing water conditions lead to changes in the reflectance of the target.

We therefore created a SAV layer for coastal Louisiana by querying pixels that contained a variable NDVI signal as well as a variable mNDWI signal through the period of record. The resulting mask was then used to classify presence and absence of SAV during the initialization period of the model for the study area.

2.1.1 Imagery and Data

Sentinel-2 imagery was collected during the 2015-2018 observation period to match as closely as is possible to the model initialization period. Imagery was masked to exclude clouds and other sources of contamination using the "QA60" band, a band which contains flags for pixels determined to containing clouds, cloud shadows or other sources of contamination. Following these pre-processing steps, the following indices were calculated for each date of imagery during the observation period.

2.1.1 Modified Normalized Difference Water Index

A modified Normalized Difference Water Index (mNDWI) (Xu 2005, 2006) was calculated for each image. The mNDWI enhances water features while cutting down on noise from land, vegetation, and soil (Xu, 2006). The mNDWI is seen in Equation 1 below:

mNDWI = (Green-MIR)/(Green+MIR)

MIR: 1.57-1.65 µm
Green: 0.53-0.59 µm

2.1.2 Normalized Difference Vegetation Index

A Normalized Difference Vegetation Index (NDVI) was also calculated for each image. The NDVI formula is detailed in Equation 2 below:

NDVI = (NIR-Red)/(NIR+Red)

NIR: 0.85-0.88 µm
Red: 0.63-0.68 µm

2.1.3 Index Variability

All cloud-free dates of imagery were used to calculate a standard deviation of both the NDVI and mNDWI during the observation period. The resulting output quantifies variance in these indices on a per pixel basis, which can be visualized as a raster, such as that seen in Figure 2. It was noted that the areas in which high variance was observed in both indices corresponded with areas known to contain one of three types of targets: FAV, SAV, or land area change. Pixels containing NDVI variance values greater than 1 SD AND mNDWI variance values greater than 1 SD were masked and used in the next portion of this methodology.

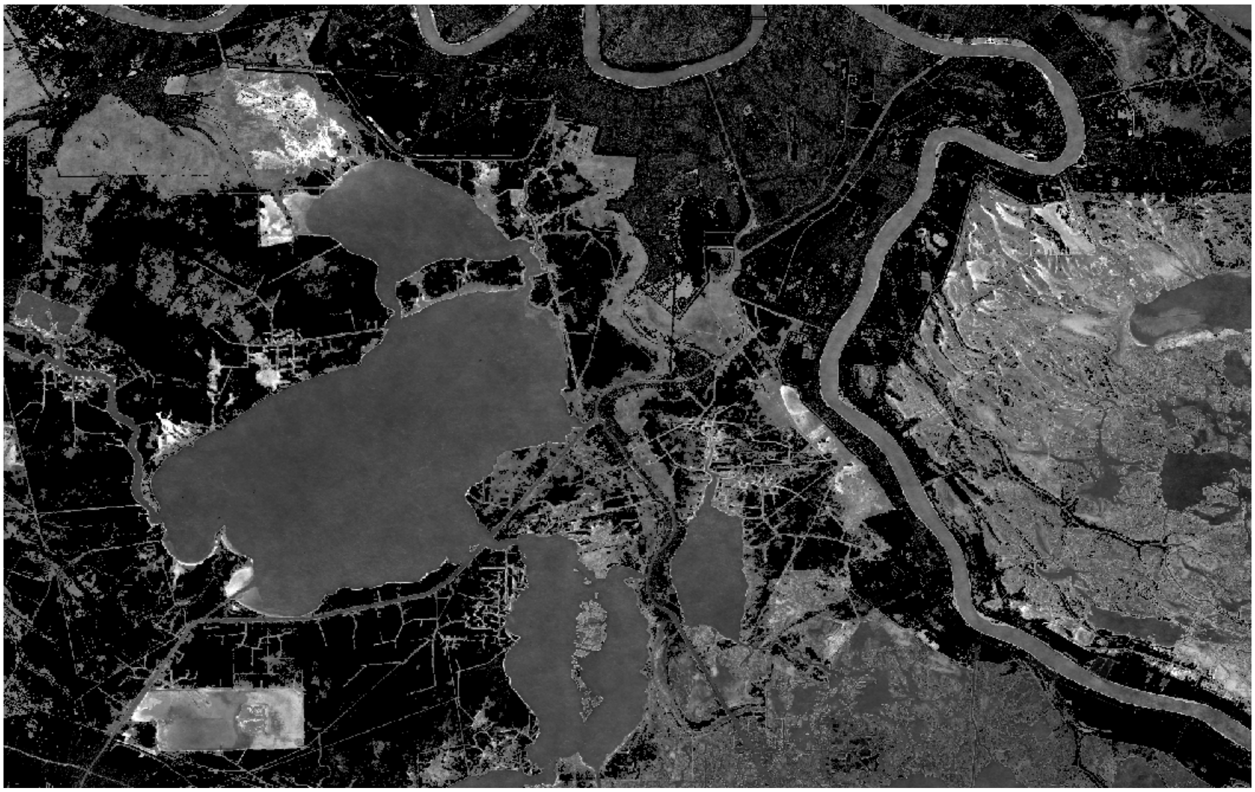

Figure 2. Variability of NDVI during the 2015-2018 observation period. Bright white areas represent areas with highly variable vegetation signals.

2.1.4 Linear Spectral Mixture Analysis

Linear Spectral Unmixing (LSU) is used to determine the relative abundance of materials in a given pixel of remotely sensed imagery based on the materials' spectral characteristics. In this case, the composition of all pixels within the mask created in the previous step were estimated for the percent FAV, SAV, and land for each date during the observation period. Majority composition was calculated for each pixel and the resulting data was queried for pixels containing SAV. This layer formed the final SAV Occurrence Layer.

Results

The resulting layer is shown in Figure 3 for a portion of southeast Louisiana. Areas in red are identified as containing SAV in this layer during the 2015-2018 observation period.

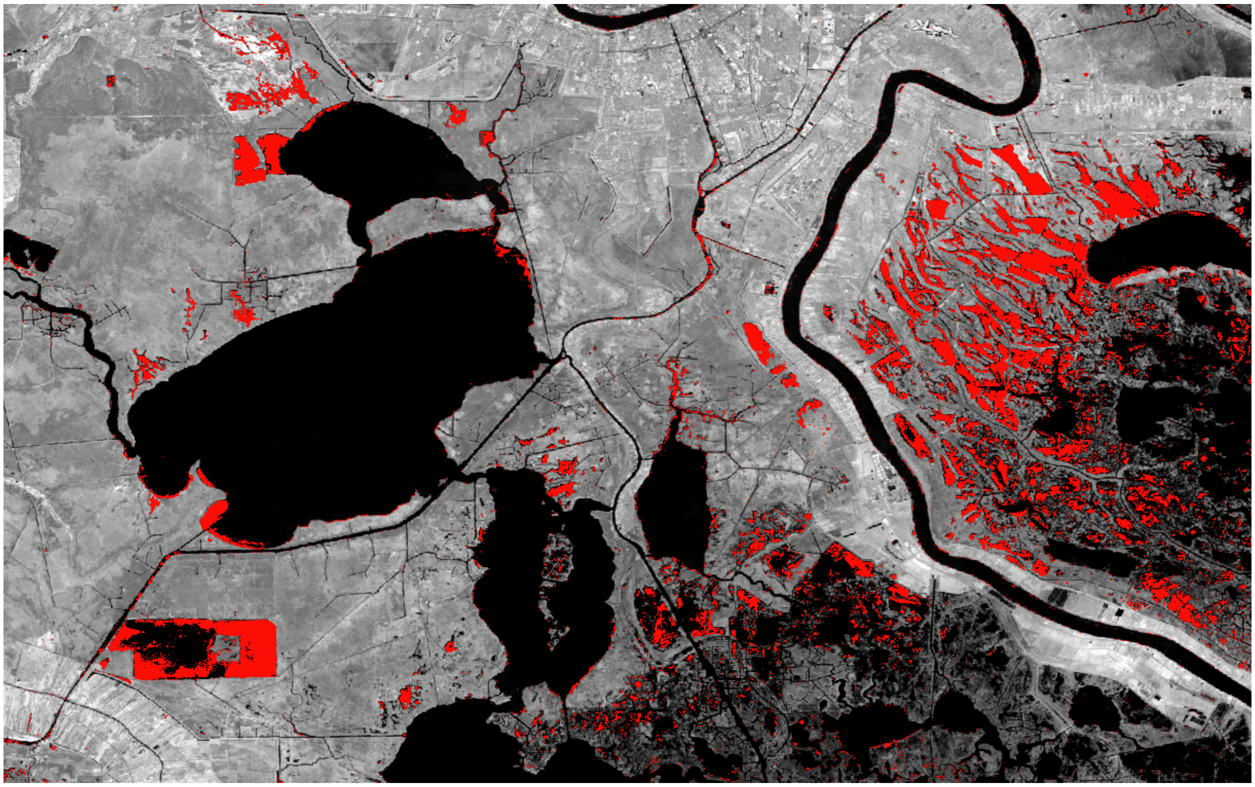

Figure 3. Draft map of SAV occurrence during the 2015-2018 observation period.

Accuracy Assessment

The remotely sensed SAV occurrence layer was compared to 126 locations in Barataria Basin at which field data (confirming the presence or absence of SAV) was available from a similar time-period. Much of the field data used is described in DeMarco et al. 2018. The collection dates of these field data vary from 2013-2015. While these field dates are not during the same time-period as the period of observation for this effort, there were used to provide general information regarding areas in which SAV has been known to occur. It is noted that the accuracy assessment of this effort could be affected by this temporal discrepancy. Additional data points were collected in 2018 as part of an effort to quantify and model SAV in and around Jean LaFitte National Park (JLNP).

Overall accuracy of the remotely sensed SAV occurrence layer was observed to be 74.6% based on the field data available (Table 1). Generally, in remotely sensed classifications, overall accuracies in the 70%-80% range are considered decent, but overall accuracy is not always the best metric of a layer's accuracy and/or applicability. A Kappa statistic, which is a measure of the deviation of a layer's accuracy as compared to what would be expected by chance is used. In this case, the Kappa statistic of 0.49 is considered to indicate moderate agreement between the field are remotely sensed layer.

The true accuracy of the SAV Occurrence Layer is likely much higher than the limited field data indicates.

Observed vs. SAV Mask Accuracy Assessment

		Field Data			
		Presence	Absence	Classified Totals	Producer Accuracy
RS - SAV Mask	Presence	55	9	64	85.94%
	Absence	23	39	62	62.90%
	Field totals	78	48	126	
	User Accuracy	70.51%	81.25%		
				Overall Accuracy	0.74603
				Kappa Statistic	0.49

Table 1. Accuracy Assessment of the remotely sensed SAV mask vs field sites in Barataria Basin, Louisiana.

SAV Composition in Areas of Interest

Landscape composition was assessed in each area of interest for three categories of land cover: land, water, and SAV. The results of said analysis are presented in acres (Table 2) and as a percent of the area (Table 3). While the areas of interest are intended to represent areas in which the model predicts water during the initialization period, there is some disagreement between the model predictions and the remotely sensed assessment, particularly with regard to land area. Once the land area is removed from consideration, the percent of the water area containing SAV was calculated in Table 4.

Land accounted for an average of approximately a third of the areas of interest (Table 3). The remaining two-thirds was comprised of approximately 92% Water/8% SAV for TRAD areas of interest, and approximately 94% water and 6% SAV (Tables 3&4).

Remotely Sensed Classification SAV Baseline Assessment (2015-2018)				
Region/Model Run	Cycle_0 Salinity_Zone	Water (acres)	SAV (acres)	Total Water Area (acres)
V3PR2_HYST_cycle1	Fresh/Inter	24,808.09	2,775.84	27,583.93
V3PR2_HYST_cycle1	Brackish/Saline	9,213.38	154.34	9,367.72
V3PR2_TRAD_cycle1	Fresh/Inter	16,784.83	2,342.13	19,126.97
V3PR2_TRAD_cycle1	Brackish/Saline	7,014.83	128.07	7,142.90
V3PR4_HYST_cycle1	Fresh/Inter	29,460.50	2,869.94	32,330.44
V3PR4_HYST_cycle1	Brackish/Saline	16,088.69	204.72	16,293.40
V3PR4_TRAD_cycle1	Fresh/Inter	20,131.70	2,690.82	22,822.52
V3PR4_TRAD_cycle1	Brackish/Saline	8,370.96	164.95	8,535.91
V3PR6_HYST_cycle1	Fresh/Inter	42,495.35	3,104.05	45,599.39
V3PR6_HYST_cycle1	Brackish/Saline	35,859.91	229.38	36,089.28
V3PR6_TRAD_cycle1	Fresh/Inter	24,652.12	2,847.54	27,499.66
V3PR6_TRAD_cycle1	Brackish/Saline	14,790.30	206.44	14,996.75

Table 2. Average water and SAV composition of the six areas of interest by habitat type during the 2015-2018 observation period as assessed by Sentinel-2 imagery (acres).

RS Classification SAV Baseline Assessment (2015-2018)		
Region/Model Run	Salinity_Zone	% of Water Area Containing SAV
V3PR2_HYST_cycle1	Fresh/Inter	10.0633%
V3PR2_HYST_cycle1	Brackish/Saline	1.6476%
V3PR2_TRAD_cycle1	Fresh/Inter	12.2452%
V3PR2_TRAD_cycle1	Brackish/Saline	1.7930%
V3PR4_HYST_cycle1	Fresh/Inter	8.8769%
V3PR4_HYST_cycle1	Brackish/Saline	1.2564%
V3PR4_TRAD_cycle1	Fresh/Inter	11.7902%
V3PR4_TRAD_cycle1	Brackish/Saline	1.9325%
V3PR6_HYST_cycle1	Fresh/Inter	6.8072%
V3PR6_HYST_cycle1	Brackish/Saline	0.6356%
V3PR6_TRAD_cycle1	Fresh/Inter	10.3548%
V3PR6_TRAD_cycle1	Brackish/Saline	1.3766%

Table 4. Average percent of water area containing SAV in the six areas of interest by habitat type during the 2015-2018 observation period as assessed by Sentinel-2 imagery (percent).

Discussion

The Hysteresis (HYST) analysis areas generally contain a larger total area of SAV coverage, but a lower value as a percent on the water area. This occurs as the traditional areas of interest are smaller and contain a larger percentage of small, protected, shallow water bodies, more likely to contain SAV. Conversely, the Hysteresis (HYST) analysis areas are larger and contain more large, open water bodies. These baseline compositions form a good starting estimate from which models can initiate and forecast changes in the future.

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Appendix B

Future projections of SAV based on SLOO model for likelihood of occurrence parameters

To assess the impact of potential changes in environmental conditions on SAV occurrence and coverage, both qualitative and quantitative methods were applied. Results and analyses from DeMarco et al., (2018) indicate that the primary drivers for SAV occurrence in coastal Louisiana include salinity, exposure (to wind, waves, and current velocities), and turbidity. While precise quantitative relationships were not possible to obtain for this effort given scheduling logistics and the inability to currently seamlessly connect hydrologic modeling output to the existing SAV model developed in DeMarco et al., (2018), best professional judgement was used to estimate coarse relationships of SAV to these environmental drivers.

SAV habitat was separated into habitat types (Fresh/Intermediate – F/I and Brackish/Saline – B/S) as well as depth types (0.5 – 2.0 meters = deep – D, 0 – 0.5 meters = shallow – S), where everything greater than 2 meters was assumed to have no SAV. While SAV is occasionally found at these high depths, it is rare in coastal Louisiana, particularly so in Barataria Bay (DeMarco, personal observation), and given the inherent error in elevation and bathymetry data, this cut off has been used previously (DeMarco et al., 2018). These habitat classifications were developed to characterize the unique responses of SAV assemblages in these areas to environmental conditions. For each habitat type (F/I-D, F/I-S, B/S-D, B/S-S), a weighted value was associated with each environmental driver (salinity, turbidity, exposure) to approximate the strength of each on the probability of occurrence and assumed SAV coverage unique to each habitat. Additionally, each driver was assigned a coarse value necessary to have an effect on SAV occurrence and assumed coverage, specifically, an estimated degree of change in a driver necessary to cause a small or large increase or decrease on SAV. Assigning a value that could potentially induce changes in SAV occurrence was needed to link SAV outputs to the hydrodynamic model.

The SAV Likelihood of Occurrence Model (or SLOO) in DeMarco et al., (2018) estimated only the presence or absence of SAV based on environmental conditions. For this effort, it was necessary to estimate how these conditions (ie., drivers of presence) might influence cover. Specifically, what effect a large or small change in an environmental driver (ie., salinity, turbidity, exposure) would then have on SAV coverage in terms of cover increase or decrease. These estimates of cover change were developed by first creating an index for large, small, and no change values that the drivers could have on SAV for each habitat class, then multiplying those estimates by each drivers weight, and finally converting it to a percent change (Table B3). Every possible combination of potential impacts of environmental drivers on SAV change was estimated for each habitat class, resulting in 125 possible combinations. The application of these SAV change values served as a good “check” on the weighted environmental drivers. For example, if there was a large decrease in salinity in F/I habitat types, the SAV change value was 0, reflecting that any decrease in salinity would have no effect on SAV cover in these habitats. Precise values relating cover change to these environmental drivers are not quantitatively known, and are coarse estimates made by years of observations of SAV patterns in the field across south

Louisiana (DeMarco, personal observations). Future efforts should attempt to quantify this SAV response to all environmental drivers found to be significant.

Drivers:

Variable	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**
Habitat Class	**Fresh/Intermediate**		
Shallow (< 0.50m)	0.25	0.25	0.5
Deep (0.50001 - 2.0m)	0.1	0.35	0.55
	Brackish/Saline		
Shallow (< 0.50m)	0.35	0.1	0.55
Deep (0.50001 - 2.0m)	0.25	0.25	0.5

Table B1: Weights of Environmental Variables (DtoL = Distance to Land)

Magnitude of cover change	**Large (+/-)**			**Small (+/-)**		
Variable	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**
Habitat Class	**Fresh/Intermediate**					
Shallow (< 0.50m)	1	15	50	0.1	7.5	25
Deep (0.50001 - 2.0m)	1	5	25	0.1	2.5	10
	Brackish/Saline					
Shallow (< 0.50m)	5	20	20	1	10	10
Deep (0.50001 - 2.0m)	5	10	10	1	5	5

Table B2: Degree of change in environmental drivers necessary to cause magnitude (large, small) of effect on SAV occurrence and assumed coverage

Magnitude of cover change	**Large (+/-)**			**Small (+/-)**			**No Change**		
	Fresh/Intermediate								
Variable	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**	**Salinity (ppt)**	**Turbidity (mg/L)**	**DtoL (m)**
Shallow (< 0.50m)	1	2	2	0	1	1	0	0	0
Deep (0.50001 - 2.0m)	1	2	2	0	1	1	0	0	0
	Brackish/Saline								

Shallow (< 0.50m)	2	2	2	1	1	1	0	0	0
Deep (0.50001 - 2.0m)	2	2	2	1	1	1	0	0	0

Table B3: Estimated strength of effect of environmental conditions on SAV cover. These values were multiplied by the unique weights given to each environmental driver (Table B1), then converted to a percentage to estimate SAV cover change for each habitat class.

Salinity

In F/I habitat classes, salinity acts primarily as a structuring mechanism (Burgos-León et al., 2013; Capers et al., 2010; Rodríguez-Gallego et al., 2015), as salinity changes the occurrence or coverage of SAV assemblages will be minimally impacted, although species communities will shift. Salinity changes are weighed slightly higher in F/I-S habitat types (weight=0.25) as shallow habitats in Barataria Basin are more often classified as intermediate marsh types, while deep ponds are characteristic of fresh marsh types (DeMarco, 2018). An increase or a decrease in salinity in shallow marsh could be generally assumed to be intermediate marsh, and would have a stronger effect on SAV occurrence and coverage. Salinity changes in deep areas was estimated to have a small effect on the SAV populations comparatively (weight=0.1)The magnitude of change necessary to cause a large impact on SAV occurrence and assumed coverage was 1 ppt (a large change in F/I marsh) and 0.1 ppt for a small effect.

Changes in salinity were assumed to impact SAV occurrence and assumed coverage in B/S marshes more strongly that F/I habitats overall. Shallow B/S habitats here are considered to be more sensitive (weight=0.35) to salinity compared to B/S-D (weight=0.25) as salinity increases concurrent with drought and/or dry conditions will be more influential at shallower depths (Kinney et al., 2014). In order to have a large impact on B/S habitats in shallow and deep classes, salinity changes were assumed to be at least 5 ppt, this is based on the knowledge that the species in these communities are adapted to high salinities, and therefore would take a relatively large change in salinity to induce a large decrease or increase in occurrence or coverage. To induce a large change in SAV occurrence or coverage in B/S habitats, 1 ppt was selected for both depth classes.

Turbidity

The original SLOO model (DeMarco et al., 2018) evaluated the effects of turbidity measured as NTUs, while the hydrodynamic model used for this effort expressed turbidity as total suspended solids (TSS). Quantitative relationships linking NTU data with TSS data are location specific, and are as yet unavailable for Barataria Bay and much of coastal Louisiana. Consequently, estimates of turbidity ranges describing their effects on SAV were coarse, and described using additional data (TSS data collected for SAV modeling in Jean Lafitte National Park) where possible. Future attempts to link hydrodynamic models to SAV models should specify this relationship between SAV and TSS.

Turbidity effects were weighted higher in deep classes for both the F/I and B/S habitat types. Turbidity is a measure of water clarity, which meaningful to SAV primarily as it effects light penetration. Turbidity is less important at shallow depths, as light is able to penetrate more of the water column in shallow compared to deep habitats. Similarly, B/S habitats were assumed to be less sensitive to turbidity, as SAV species typically found in these habitats are adapted to higher turbidity conditions (ie., *Ruppia maritima* and/or *Myriophyllum spicatum*; Cho and Poirrier, 2005; Cho et al., 2009; Martin and Valentine, 2012). Note this is not the case for true seagrass species, which are highly sensitive to turbidity, but these seagrass species are absent entirely from the Louisiana coastal zone and Barataria Basin with the exception of the Chandeleur Islands (DeMarco 2018). Many species characteristic to F/I habitats are sensitive to increases in turbidity, in particular, high turbidities can make it difficult for these species to establish (Jarvis and Moore, 2008), although this is highly dependent on seasonal turbidity.

Similarly, the degree of change required to induce an effect was smaller in both F/I habitat types and in deep classes (Table B2). To induce a large effect in SAV occurrence and coverage (Table B2) 5mg/L of TSS change was selected in F/I-D, and 10mg/L in B/S-D, compared to 15 mg/L in F/I-S and 20 mg/L in B/S-S. For turbidity to have a small effect the degree of change was set to 8 mg/L in F/I-S, 3 mg/L in F/I-D, 10 mg/L in B/S-D, and 20 mg/L in B/S-S.

Exposure

For the SLOO model (DeMarco et al., 2018), exposure was used as a proxy for the negative effects that physical activity, including wave energy, wind waves, and current velocities, can have on SAV presence (Barrat-Segretain, 2001; Fonseca and Bell, 1998; Gurbisz et al., 2015; Robbins and Bell, 2000; Strand and Weisner, 2001). In Barataria Bay, exposure is believed to have the strongest effect on SAV presence and assumed cover, given the organic sub-aerial soils, which are highly mobile if disturbed (leading to decreased water clarity) and the potentially erosive forces of exposure (DeMarco and Couvillion, personal observation, Jean Lafitte National Park Project). For the SLOO model (DeMarco et al., 2018), exposure was calculated as a measure of annually averaged omni-directional fetch, however, more recent efforts have developed more robust methodologies that include dominant wind direction and seasonality (Jean Lafitte work). However, there is no direct method to translate the hydrology modeling outputs for this effort into exposure as it impacts SAV. Here, distance to land (in meters) was used as an estimate of fetch and assumed exposure, distance to land is hereafter simply referred to as exposure. Future efforts to quantity hydrologic impacts on SAV occurrence and coverage should work to link hydrodynamic modeling impacts to SAV occurrence modeling more precisely.

Given large impact that exposure can have on SAV habitat in the study area, it was weighted the most heavily of all the environmental drivers evaluated in all habitats (Table B1). Meaning if exposure decreased conditions would improve significantly, and if exposure increased, conditions for SAV would decline significantly. In F/I habitats exposure was weighted as 0.5 in shallow and 0.55 in deep habitats, as it was assumed that F/I habitats had soils that were more easily suspended, and increased exposure would in turn decrease water quality, which has a larger effect in deep water. Exposure in shallow habitats of B/S areas has a slightly heavier weight than in deep classes due to impact of assumed erosion and was weighted at 0.55 in B/S-S, 0.50 in B/S-D.

To estimate changes in exposure (distance to land) that could have a large impact on assumed SAV presence and cover values were assigned as 50m in F/I-S, 5m in F/I-D, 20m in B/S-S, and 10m in B/S-D (Table B2). Values are higher in F/I habitats b/c species in these areas typically have stronger root and stem systems and are not as susceptible to increased current velocities or wave energies, and will consequently require a larger change in exposure to be impacted. Values are higher in shallow areas because light availability in shallow habitats will be less affected by changes in physical activity than deep water. Small changes in SAV occurrence and assumed cover were assigned as 25m in F/I-S, 10m in F/I-D, 10m in B/S-S, and 5m in B/S-D. These estimates attempt to describe the species-specific responses to exposure – F/I species are not as tolerant of decreased water quality (the result of physical activity) as species in B/S habitats.

It is well established that these environmental drivers influence the presence and cover of SAV, both as a single effect and as an interaction. This effort attempted to coarsely capture these interactions using the data that were available, estimating SAV response to changes in salinity, turbidity, exposure, and the combined effects of all 3 over large areas. This is a first attempt at quantifying these impacts on cover and at linking hydrodynamic and SAV models.

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Appendix C
SAV Workflow - Steps in getting SAV Change from DELFT outputs

SAV Workflow – version date: 20191120 (YMD) YCA

https://thewaterinstitute-my.sharepoint.com/:f:/g/personal/fmessina_thewaterinstitute_org/EoIQSq8FXfJJvvz_efmZCV8B9DukM6xjqi-tiqm4417s6Q?e=Yz7T8c

STEP A-C: Pull in all environmental vars from DELFT HYST (or TRAD)

A. Morphology/Exposure (polygons)
   a. Read in morphology files (*TO48_PR_HYST>Land Change Maps > Shapefiles*)
      i. For 2020 read in "Initial landscape 2020" – if bed elevation > 0.04, then land else water – This is the same initial morpho file for all PR
      ii. For all other decades (2030-2070; cycles 0,1,2,3,4) use "Value" to distinguish land and water
         1. For PR1 use "landloss" files
         2. For all other PR use "land change" files
   b. Create centroids
   c. Create subset to land only
   d. Use full data frame to calculate distance from each cell to nearest land cell (***this is slow***)

B. TSS (text files)
   a. Read in data directly from TWIG (*TO48_PR_HYST> HSI analysis TSS_Batataira*)

C. Water Level and Salinity (polygons)
   a. Water Level
      i. Read in water level files from Delft (*TO48_PR_HYST> Water Level Contour Maps format: Water_level_map_V3PR2_HYST_1970*)
      ii. Replace -999 with NA
      iii. Calculate annual averages for FWP and FWOP using May and Oct weekly values
      iv. Reproject to 1583
      v. Create centroids (instead of polygons)
   b. Salinity
      i. Same workflow as water level but do not create centroids (*TO48_PR_HYST> Salinity Contour Maps*)
      ii. Note that there are some really oddball salinity values in the original files – close to the river but 20-30ppt

D. Join above environmental input variables and calculate depth
    a. Join salinity and TSS (note that point location of TSS data is slightly different from other data)
    b. Join above to exposure and water level
    c. Create centroids
    d. Convert water level to m
    e. Calculate Depth: for cycle = 0 calculate depth using bed_PR1 otherwise use bed_PRX
        i. If PR = 1 and
            1. bed < 0 then Z = abs(bed) + WL_FWOP
            2. bed > 0 then Z = WL_FWOP – bed
        ii. If PR = 2,4,6 and
            1. bed < 0 then Z = abs(bed) + WL_FWP
            2. bed > 0 then Z = WL_FWP – bed
    f. Assign depth class as: If Z < 0.5, then "S", else if Z <2m then "D" otherwise "X"
    g. Assign salinity class as: If Salinity >= 4, then "BS", otherwise "FI"
    h. Write out to comboZ folder

E. Calculate change in environmental variables
    a. List all file names in folder by PR (each PR and cycle combination)
    b. Read in all cycles for a single PR from comboZ folder
    c. Calculate change in environmental variables for all cycles:
        i. E.g. change10 = cycle 1 – cycle 0
        ii. Add columns of Zclass and Salclass for the second cycle (e.g. using cycle 1 values in the above example)
        iii. Write out files: e.g as PR2change10.shp

F. Combine habitat and environmental files, assign change classes, accumulate % change
    a. Read in base SAV layer from Brady (e.g. PR2_Cycle0_join_utm_v3)
    b. Subset columns keeping: "FWP_avg", "Prc_SAV", "SAV_sqm", "sq_m"
    c. Read in first change file (change10)
    d. Read in thresholds file (SAV_QualtoQuantEst_091319.xlsx)
    e. Join A (SAV base layer) and C (change in env variables) by location
    f. Create "Start Class" from Z and SalClass Columns e.g. FI and S = FIS
    g. For each StartClass
        i. Use change values to assign a class of LD, SD, NC, SI, LI – note that I assigned a numeric code (0,1,2,3,4)
        ii. Paste together the numeric codes to get a unique code ("composite") for each change combination
        iii. Paste all StartClass results together into one file – note that any classes having NA are omitted!
    h. Read in Expert Opinion table (Expert Opinion on SAV Change - 5 and 3 Classes_2_Variablesvalued.xlsx)
        i. Create "composite" variable based on sal, TSS and exp impacts

i. Using "composite" as a common index - lookup the SAV impact (perSAVchange) for each observation in H
j. In this first run, populate "cumulative percent change" column using the percent change, and "cumulative SAV change" column using "cumulative percentage change" + initial "Prc_SAV" conditions
k. Write to outputs folder
l. **For subsequent runs**, use the output in k as the new base layer (step F.a above) and the next change file (e.g. change 21) for Step F.c

Columns in the output files (e.g. "PR*2*change*10*.shp")

FWP_avg	*inherited from base layer DO NOT USE*
Prc_SAV	*inherited from base layer DO NOT USE*
SAV_sqm	*inherited from base layer DO NOT USE*
sq_m	*inherited from base layer DO NOT USE*
cumprch	**cumulative percentage change**
cumSAVch	**cumulative percentage change added to initial Prc_SAV value – forced to limits of 0 and 100**
sal_ch	salinity change
TSS_ch	TSS change
exp_ch	exposure change
Depth	depth at second cycle
PRcycle	
salclass	salinity class
Zclass	depth class
StrtCls	combined Z and sal class
Salrange	numeric code of salinity change : LD, SD, NC, SI, LI
turbrange	numeric code of TSS change : LD, SD, NC, SI, LI
exprange	numeric code of exposure change : LD, SD, NC, SI, LI
composit	composite of sal, turb and exp range codes – used to lookup SAV change
prSAVch	resulting percent change in this iteration

Steps in getting SAV Change from DELFT outputs:

PR1
PR2
PR4
PR6

Cycle 0
Cycle 1
Cycle 2
Cycle 3
Cycle 4
Cycle 5

Change10
Change21
Change32
Change43
Change54

STEPS A-C: Prepare Environmental Input Layers from DELFT:

A. Exposure:
   a. Get morphology at the end of each cycle :
      i. have "Value" from land change (FWP) or land loss (FWOP) files ("Value" >=1)
   b. for initial conditions (landscape 2020) land = (bed elevations >0.04)
   c. for each cell, calculate exposure as distance (m) to nearest land for each cycle and PR

B. Turbidity:
   a. Use annual mean directly for each cycle and PR from files in HSI folder

C. Water Level and Salinity:
   a. calculate mean annual water level for representative years from **water level contour maps**
   for each cycle and PR as mean of weekly estimates in May and October
   b. calculate mean annual salinity values from **salinity contour maps** for each cycle and PR as mean of weekly estimates in May and October

STEP D: Calculate Z, assign depth & salinity classes

D. Join environmental input variables, calculate depths, assign depth and salinity classes
   a. Calculate Depth (Z)
      a. Convert water level to m
      b. Have bed elevations from morphology files (Step A)
      c. Have Mean Annual Water Levels (Step C)
         a. For cycle = 0 use bed_PR1 otherwise use bed_PRX
            a. For PR1 and
               a. bed < 0 then Z = abs(bed) + WL_FWOP
               b. bed > 0 then Z = WL_FWOP – bed
            b. For PR = 2,4,6 and
               a. bed < 0 then Z = abs(bed) + WL_FWP
               b. bed > 0 then Z = WL_FWP – bed
   b. Class assignments:
      a. Assign depth class as: if Depth < 0.5 then "Shallow", else if Depth <2m then "Deep", otherwise "X"
      b. Assign salinity class as: if FWP/FWOP Sal >= 4 "BS", otherwise "FI"
      c. Each PR and cycle has a single file with all environmental values, depth class and salinity class

STEPS E-F. Calculate change, combine habitat and change files, assign change classes and SAV impact, accumulate % change

E. Calculate change:
   a. for all PR, calculate change in environmental values between cycles (cycle1 – cycle0; cycle2 – cycle1….)
   b. Each PR has a single change file (change10, change21, change32, change43, change 54) with
      i. all environmental change variables
      ii. depth class and salinity class from the second cycle

F. Combine habitat and change files, assign change classes and SAV impact, accumulate % change
   a. Combine habitat and change files
      i. Read in base SAV layer from USGS
      ii. Read in first change file (change10)
      iii. Join base SAV layer and change file
   b. Create new habitat class by merging Z and Sal Class codes (e.g. FIS)
   c. Read in thresholds file: "SAV_QualtoQuantEst_091319.xlsx"
   d. For each habitat class and environmental variable, assign change **class** based on change ***values and associated impact thresholds*** – *NOTE that any cells having missing values for any environmental value are omitted*
   e. Combine change classes (from d above) into a "unique change combination code"

f. Read in “Expert Opinion on SAV Change - 5 and 3 Classes_2_Variablesvalued.xlsx” and translate to the same “unique change combination codes” as above (500 unique combos = 125 unique combos per habitat class)
g. Using “unique change combination codes” as a common index, lookup SAV impact (from F.f) for each cell in F.e
h. For each PR and change calculate a new “SAV State”
   i. In the first run, SAV state = initial “Prc_SAV” conditions + SAV impact
   ii. In subsequent runs, the output above (F.h.i) becomes new base layer (step F.a.i above) and the next change file (e.g. change 21) goes to step F.a.ii (i.e. start with base habitat file and apply changes serially)

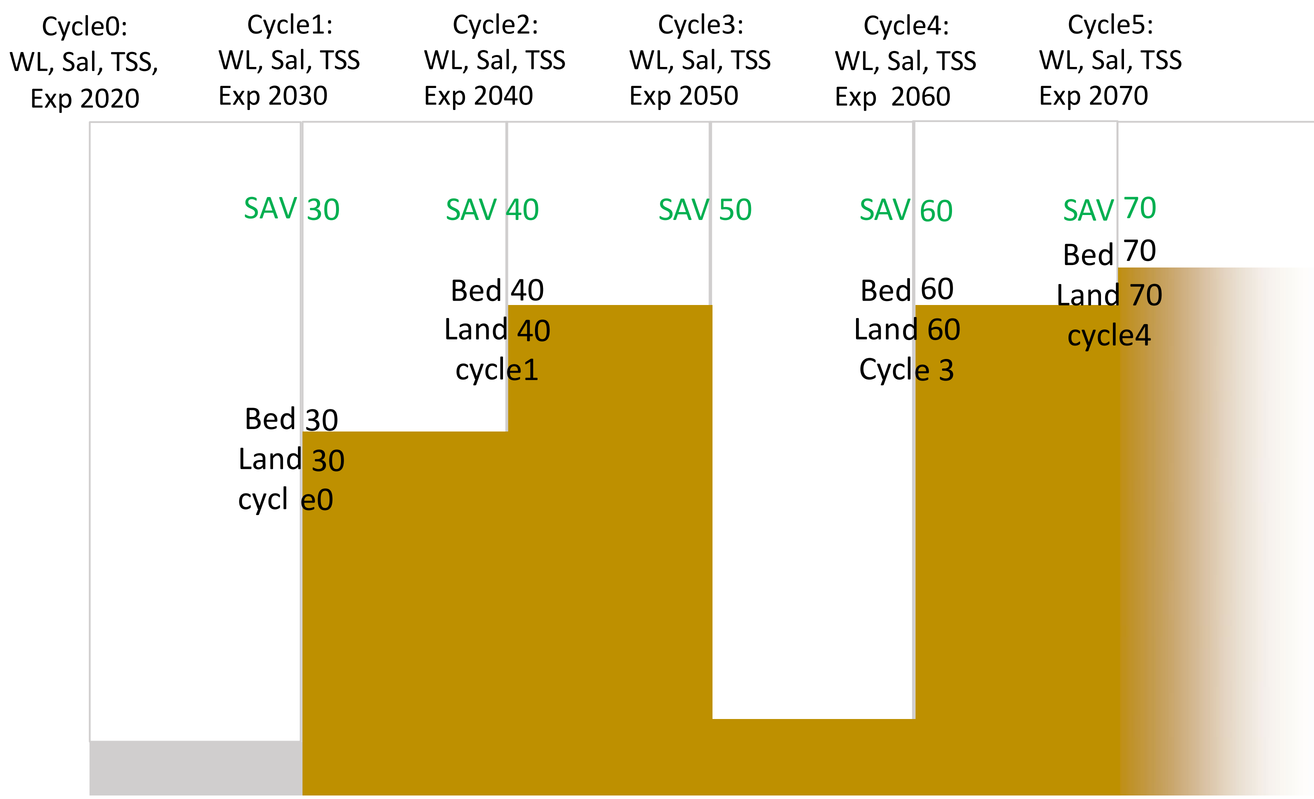
“SAV_QualtoQuantEst_091319.xlsx”

StartClass	Sal	Turb	Exp	changeclass
FIS	-1	-15	-50	LD
FIS	-0.1	-7.5	-25	SD
FIS	0.1	7.5	25	SI
FIS	1	15	50	LI
FID	-1	-5	-25	LD
FID	-0.1	-2.5	-10	SD
FID	-0.1	2.5	10	SI
FID	1	5	25	LI
BSS	-5	-20	-20	LD
BSS	-1	-10	-10	SD
BSS	1	10	10	SI
BSS	5	20	20	LI
BSD	-5	-10	-10	LD
BSD	-1	-5	-5	SD
BSD	1	5	5	SI
BSD	5	10	10	LI

StartClass	Salinity	Salval	Salchange	TSS	TSSval	TSSchange	Exp	Expval	Expchange	NetSAVClass	Weight	EstSAVCoverChange	salrange	turbrange	exprange
FIS	Large Increase	-1	1	Large Increase	-2	15	Large Increase	-2	50	Large Decrease	-1.75	-17.5	4	4	4
FIS	Large Decrease	0	-1	Large Increase	-2	15	Large Increase	-2	50	Large Decrease	-1.5	-15	0	4	4
FIS	Large Increase	-1	1	Small Increase	-1	8	Large Increase	-2	50	Large Decrease	-1.5	-15	4	3	4
FIS	No Change	0	0	Large Increase	-2	15	Large Increase	-2	50	Large Decrease	-1.5	-15	2	4	4
FIS	Small Decrease	0	-0.1	Large Increase	-2	15	Large Increase	-2	50	Large Decrease	-1.5	-15	1	4	4
FIS	Small Increase	0	0.1	Large Increase	-2	15	Large Increase	-2	50	Large Decrease	-1.5	-15	3	4	4
FIS	Large Decrease	0	-1	Small Increase	-1	8	Large Increase	-2	50	Large Decrease	-1.25	-12.5	0	3	4
FIS	Large Increase	-1	1	No Change	0	0	Large Increase	-2	50	Large Decrease	-1.25	-12.5	4	2	4
FIS	Large Increase	-1	1	Large Increase	-2	15	Small Increase	-1	25	Large Decrease	-1.25	-12.5	4	4	3
FIS	No Change	0	0	Small Increase	-1	8	Large Increase	-2	50	Large Decrease	-1.25	-12.5	2	3	4
FIS	Small Decrease	0	-0.1	Small Increase	-1	8	Large Increase	-2	50	Large Decrease	-1.25	-12.5	1	3	4
FIS	Small Increase	0	0.1	Small Increase	-1	8	Large Increase	-2	50	Large Decrease	-1.25	-12.5	3	3	4
FIS	Large Decrease	0	-1	No Change	0	0	Large Increase	-2	50	Large Decrease	-1	-10	0	2	4
FIS	Large Decrease	0	-1	Large Increase	-2	15	Small Increase	-1	25	Large Decrease	-1	-10	0	4	3
FIS	Large Increase	-1	1	Small Decrease	1	-8	Large Increase	-2	50	Large Decrease	-1	-10	4	1	4
FIS	Large Increase	-1	1	Small Increase	-1	8	Small Increase	-1	25	Large Decrease	-1	-10	4	3	3
FIS	No Change	0	0	No Change	0	0	Large Increase	-2	50	Large Decrease	-1	-10	2	2	4
FIS	No Change	0	0	Large Increase	-2	15	Small Increase	-1	25	Large Decrease	-1	-10	2	4	3
FIS	Small Decrease	0	-0.1	No Change	0	0	Large Increase	-2	50	Large Decrease	-1	-10	1	2	4
FIS	Small Decrease	0	-0.1	Large Increase	-2	15	Small Increase	-1	25	Large Decrease	-1	-10	1	4	3
FIS	Small Increase	0	0.1	No Change	0	0	Large Increase	-2	50	Large Decrease	-1	-10	3	2	4
FIS	Small Increase	0	0.1	Large Increase	-2	15	Small Increase	-1	25	Large Decrease	-1	-10	3	4	3
FIS	Large Decrease	0	-1	Small Decrease	1	-8	Large Increase	-2	50	Small Decrease	-0.75	-7.5	0	1	4

“Expert Opinion on SAV Change -5 and 3classes_2_Variablesvalued.xlsx”

DECADAL ALIGNMENT DIAGRAM



Evaluate the ***change in hydro conditions*** to determine incremental SAV change and add to previous to get new SAV state

State:
Bathy: e.g. WL30-Bed30…
Just 4 D/S class

*Exp: from bed 20, 30…
This is why I need land20

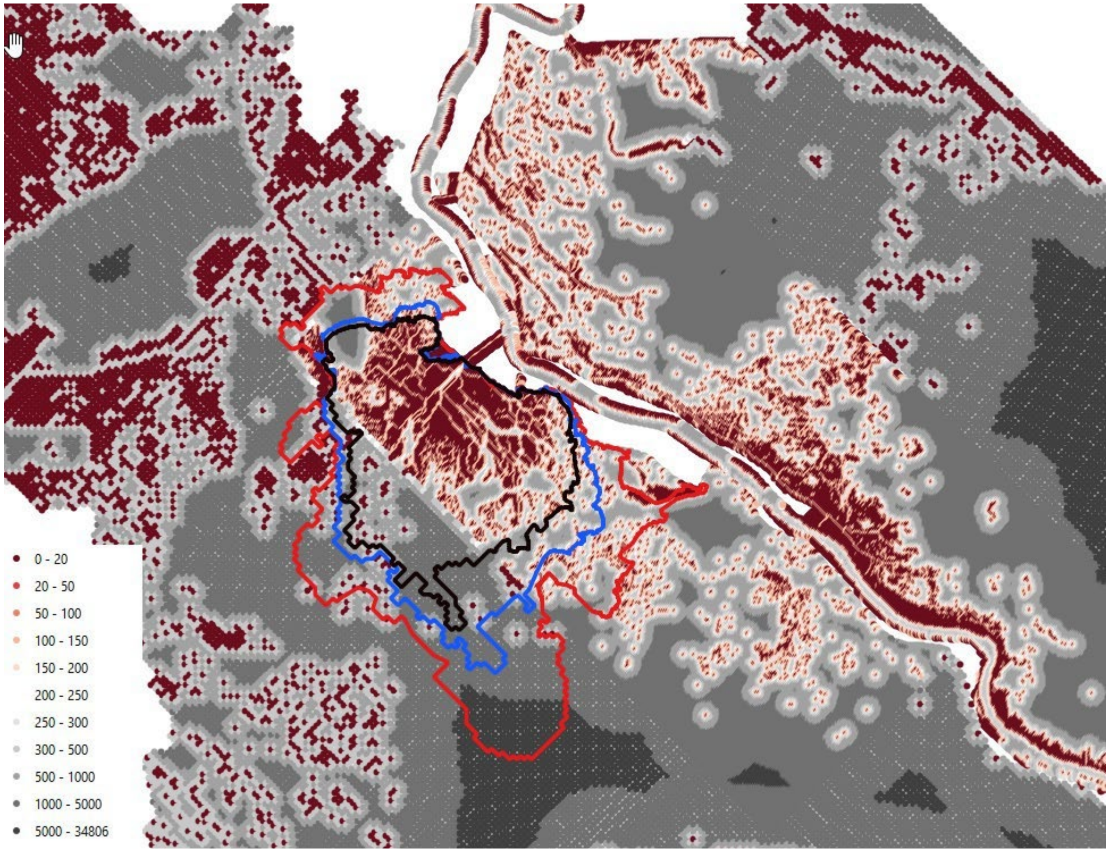
Change Calcs:
Sal,TSS,Exp: 10, 21, 32, 43, 54

UNADDRESSED ISSUES WITH EXPOSURE CALCULATIONS

Example:
Exposure values (m) from PR6 Cycle 3

Issue #1
- cell size artifact at modeling cell size change

Issue #2
- Change in exposure impact thresholds in table (max 50m) are much smaller than model cell size (min 123m)

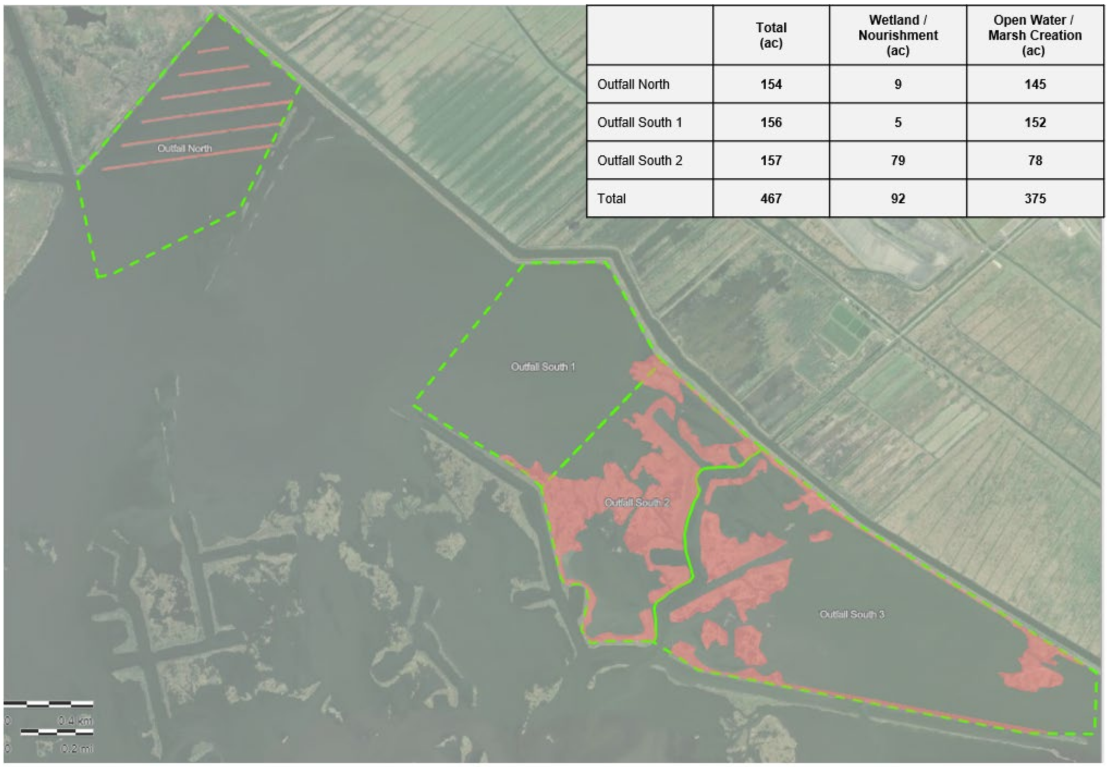


WETLAND VALUE ASSESSMENT (WVA)

FOR THE BENEFICIAL USE AREA OF

THE MID-BARATARIA SEDIMENT DIVERSION PROJECT

The following are the assumptions for assessing the beneficial use areas associated with construction activities of the Mid-Barataria Sediment Diversion Project (Figure 1 and Table 1). Figure 2 shows the diversion structure footprint with the adjacent beneficial use areas. Refer to Figures 1 and 2 to see the relative juxtaposition of the diversion outfall to the beneficial use areas. Wetlands within the proposed beneficial use areas were delineated based on 2019 aerial imagery by CPRA and later approved by USACE. CPRA estimates that approximately 375 ac of emergent marsh would be created, and an additional 92 ac of existing marsh and terrace habitat would be nourished with 1.7 MCY of excess dredged material generated during Project construction. The Outfall South BU cells were re-designed (multiple cells with containment) to improve sediment retention and phasing of wetland creation and nourishment. The sequence of filling would begin at the Outfall North cell, then proceed to Outfall South cells 1 and 2. The Outfall South cell 3 is intended to allow for additional wetland area should excess dredged material during construction exceed 1.7 MCY and serve as a location for future placement of material dredged during outfall maintenance. Existing natural or artificial features (e.g., canal spoil banks, marsh edge) would be used to retain pumped sediments. The construction of containment dikes, from in-situ water bottom sediments, would be necessary to limit sediment loss. Upon completion of filling, dikes may be gapped to maintain tidal exchange (described in the updated BMP document).



	Total (ac)	Wetland / Nourishment (ac)	Open Water / Marsh Creation (ac)
Outfall North	154	9	145
Outfall South 1	156	5	152
Outfall South 2	157	79	78
Total	467	92	375

Figure 1. Beneficial use areas for the MBSD project.

Figure 2. Diversion structure in yellow outline and beneficial use sites in green outline.

Table 1. Summary of land and water acres for Beneficial Use (BU) areas for the MBSD project.

BU Label	Total Unit Acres	Emergent Wetland Acres*	Water Acres
Outfall North	154.4	9.1	145.3
Outfall South 1	156.9	4.7	152.2
Outfall South 2	156.9	78.7	78.2
Outfall South 3	324.2	67.2	257.0
TOTAL	**792.4**	**159.7**	**632.7**

*Note: delineation of emergent wetland based on 2019 aerial imagery. Submerged wetlands or any other wetland not visible from aerial imagery are not included in this table.

FRESH/INTERMEDIATE MARSH WVA

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 baseline habitat is considered to be intermediate marsh and will remain so for the period of analysis of the No Action Alternative (NAA). Once the diversion is operational the beneficial use area will shift to a fresh marsh habitat. The WVA accounted for that habitat shift.

Land Loss/ Sea Level Rise Effects
Land loss rates estimated by the Service were adjusted by the projected effects of the medium relative sea level rise (RSLR) scenario for these analyses. The estimations were calculated using the USACE's Sea-Level Calculator. The land loss rate for the Lake Laurier (USGS Polygon 195, figure 3) region was used (-0.31% per year for the period 1985-2016) for the project outfall area background loss rate.

An average accretion rate of 6.5 mm/year was used for this site (6.5 mm/yr from Barataria Basin accretion measurements, Jarvis et al. 2010 an ERDC publication).

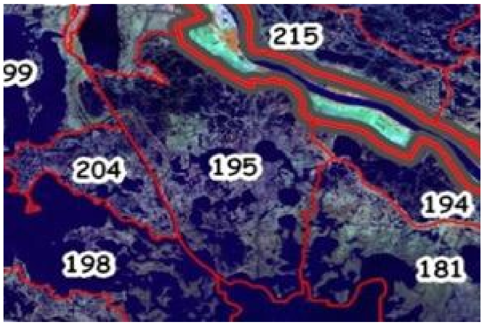


Figure 3. USGS polygon key for land loss rate data from 1985 to 2016

An estimated subsidence rate of 5.3 mm/yr was used based on the average subsidence rates of the outfall area used in Delft 3d modeling which was based on the 2012 Coastal Master Plan subsidence values (MRHDM Project Delivery Team. 2015). This rate is consistent with the closest long-term gage station to proposed sites (Bayou Barataria at Barataria guage (82750), 5.3mm/yr). Projected acres were determined by the Marsh Impact Mitigation (MIM) spreadsheet (Tables 2-4).

Baseline Year and Project Start Year

The baseline year (TY0) is 2022 and construction (TY1) starts in 2023. Marsh and water acres were estimated using 2019 aerial imagery (Table 1). RSLR was applied to the 2019 acres and projected forward to determine TY0, TY1, TY5, TY44 and TY50 marsh and water acres with and without beneficial use of Outfall North, Outfall South 1, and Outfall South 2. See tables 2 through 4.

Target year 5 was added to account for when marsh is considered fully functional with the Applicants Preferred Alternative (APA).

Target year 44 represents RSLR impacts for the NAA.

In the APA we keep TY44 for consistency. However, accretion should be increased, such that RSLR effects would be delayed or avoided all together. Therefore, the HET does not expect to see RSLR effects with the continuous source of sediment and nutrients from the diversion during the period of analysis.

The HET assumed the beneficial use areas would be developed within the first construction year though in reality is may span multiple years.

Variable V_1 – 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. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0). In each coastal marsh model, this variable is weighted the highest and thus influences project benefits the most.

NAA – A predetermined land loss rate of -0.56% (see above) was applied to the existing marsh acreage in each BU cell and projected through the period of analysis (50 years) using the MIM spreadsheet. See Tables 2 through 4 for marsh and water acres for each BU site.

APA - For marsh creation, the APA loss rate is usually half of the NAA rate. However, land loss is expected to be negated with a diversion in place to nourish the created marsh (figures 1 and 2). Thus the marsh acres will remain the same as TY5 once becoming a fully functional marsh for the remainder of the period of analysis. During the first 5 years the land loss rate was applied to account for settling and the fact that the created marsh would not likely be 100% marsh.

Table 2. Outfall North Site No Action Alternative (NAA) and Applicant's Preferred Alternative (APA) marsh and water acres and percent Emergent Vegetation by Target Year.

Outfall North - Marsh Creation and Nourishment			
	NAA Water (acres)	NAA Marsh (acres)	NAA Percent Marsh
TY0	145.6	8.8	5.7%
TY1	145.6	8.8	5.7%
TY5	145.8	8.6	5.5%
TY44	148.3	6.1	3.9%
TY50	148.8	5.6	3.6%

Outfall North - Marsh Creation and Nourishment			
	APA Water (acres)	APA Total Marsh (acres)	APA Percent Marsh
TY0	145.6	8.8	5.7%
TY1	0.8	23.2	15.1%
TY5	1.9	152.5	98.7%
TY44	1.9	152.5	98.7%
TY50	1.9	152.5	98.7%

Table 3. Outfall South 1 Site No Action Alternative (NAA) and Applicant's Preferred Alternative (APA) marsh and water acres and percent Emergent Vegetation by Target Year.

Outfall South 1 Marsh Creation and Nourishment			
	NAA Water (acres)	NAA Marsh (acres)	NAA Percent Marsh
TY0	152.3	4.6	2.9%
TY1	152.4	4.5	2.9%
TY5	152.5	4.4	2.8%
TY44	153.8	3.1	2.0%
TY50	154.0	2.9	1.9%

Outfall South 1 Marsh Creation and Nourishment			
	APA Water (acres)	APA Total Marsh (acres)	APA Percent Marsh
TY0	152.3	4.6	2.9%
TY1	0.7	19.7	12.6%
TY5	1.8	155.1	98.9%
TY44	1.8	155.1	98.9%
TY50	1.8	155.1	98.9%

Table 4. Outfall South 2 Site No Action Alternative (NAA) and Applicant's Preferred Alternative (APA) marsh and water acres and percent Emergent Vegetation by Target Year.

Outfall South 2	Marsh Creation and Nourishment		
	NAA Water (acres)	NAA Marsh (acres)	NAA Percent Marsh
TY0	80.6	76.3	48.6%
TY1	81.1	75.8	48.3%
TY5	82.8	74.1	47.2%
TY44	104.2	52.7	33.6%
TY50	108.2	48.7	31.0%

Outfall South 2	Marsh Creation and Nourishment		
	APA Water (acres)	APA Total Marsh (acres)	APA Percent Marsh
TY0	80.6	76.3	48.6%
TY1	3.1	83.6	53.3%
TY5	5.4	151.5	96.6%
TY44	5.4	151.5	96.6%
TY50	5.4	151.5	96.6%

Variable V_2 – Percent of open water covered by aquatic vegetation

The CWPPRA BA-164 project, Bayou Dupont Marsh Creation #3 cell 1 (Figure 4 and Table 5 - highlighted brown) are adjacent to the area we are evaluating. Therefore the HET agreed the observed field data (**5% SAV**) found Bayou Dupont project WVA is the most appropriate data for baseline SAV.

Figure 4. The CWPPRA BA-164 project, Bayou Dupont Sediment Delivery - Marsh Creation and Terrace #3, proposed marsh creation cells.

This is further supported by the review of a variety of other projects in the outfall area (Table 5).

Table 5. Other Projects near the Mid-Barataria Sediment Diversion (MBSD) outfall area.

SAV		
Year	**Project**	**Data**
2015-2018	MBSD Fr/Int	8.9%
	MBSD Br/Sal	1.3%
	CWPPRA	
2012	BA-164	5%
2002	BA-39	25%[1]
2010	BA-48	0%
2013	Demarco	2%
	Average w/o BA-39	**3%**
	Average All	**7%**

[1] Outlier, influenced by Naomi siphon

The MBSD WVA area of analysis baseline conditions for SAV data (top two lines of Table 6) were determined by using Remotely Sensed SAV predictive modeling data developed by USGS. Both the fresh/intermediate (9% SAV) and the brackish/saline (1.3% SAV) WVA areas are considerably larger than the area of interest for direct impacts. The beneficial use areas are being evaluated as intermediate habitat based on salinity but has characteristics of the adjacent brackish habitat. Additionally wave fetch from the south across the open water area would reduce SAV against the Nonfederal Levee at the outfall. The HET would expect the beneficial use areas SAV to be somewhere between the two MBSD estimates.

All three CWPPRA projects (Figure 5 and Table 5) saw little or no SAV. BA-164 directly overlays diversion channel outfall. BA-39 was thought to be influenced by Naomi, however, would have less influence on the beneficial use areas since it is separated by the creation of BA-39. As mentioned above wave fetch across the open water area would reduce SAV in the direct impact area.

Figure 5. CWPPRA projects near MBSD

The Demarco paper (Demarco et al. 2018) looked at several WVAs and collected data throughout the basin. The 2% SAV were based on the data closest to the beneficial use areas which is from 2 CWPPRA WVAs that were located slightly south in a higher salinity (presumably brackish) habitat (figure 6).

Figure 6. Demarco et. al. 2018 points for CWPPRA WVA data.

Finally all data was averaged to 7% SAV and averaged again by removing the CWPPRA BA-39 data as an outlier influenced by the Naomi siphon to get 3% SAV. For all the reasons above the HET believed the impact area would have a lower % SAV than what is seen is areas further away or in areas that are better protected from wave energy.

All the data review confirmed the use of the marsh creation cell 1 of the BA-164 project for a baseline SAV of 5%. Table 6 shows the baseline and projected percent SAV for the NAA and the APA.

Table 6. Percent SAV by target year for all sites.

% SAV	TY0	TY1	TY5	TY44	TY50
FWOP	5	5	3	0	0
FWP	5	0	25	25	25

NAA

Future projections (TY50) assumed conditions would not be suitable for SAV growth with effects of SLR and saltwater intrusion.

APA

During marsh land platform construction, all existing SAV will be buried with dredged material. Until the created marsh platform settles to marsh elevation, it is assumed that very little open water exists to support SAV growth.

We assumed by TY 5, all diked material has disintegrated and marsh elevations have stabilized allowing for SAV regrowth. All three sites would be adjacent to the diversion outfall and is likely to support SAV growth with added nutrients, freshening from the diversion, and increased shallow open water. However when the diversion operates there would be increased water movement in the area which could reduce SAV growth. Sediments from the diversion are expected to combat increased SLR in the outfall area. 25% was chosen for similarity to what is seen near the Naomi siphon.

Variable V3 – Marsh edge and interspersion

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

NAA for Outfall North and South 1 - <5% marsh is considered a class 5 for all target years See table 7 and figures 7 and 8.

Table 7. Outfall North and Outfall South 1 V3 Interspersion Classes.

	NAA	APA
TY0	Class 5	
TY1	Class 5	Class 5
TY5	Class 5	Class 1
TY44	Class 5	Class 1
TY50	Class 5	Class 1

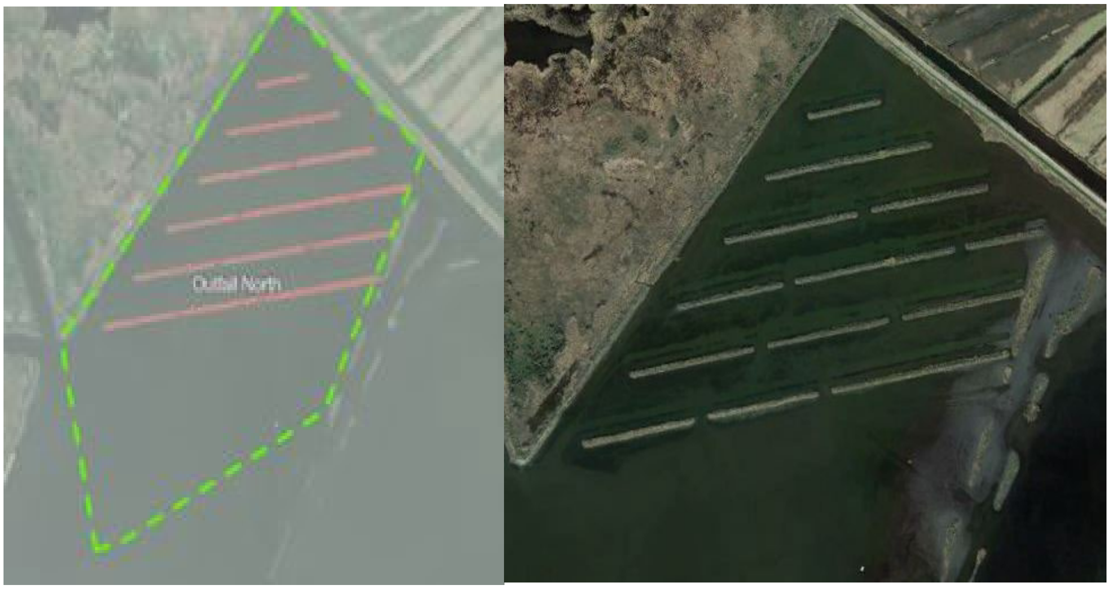


Figure 7. Figure 7. Outfall North site for reference to V3 marsh edge and interspersion variable.

Figure 8. Outfall South 1 site for reference to V3 marsh edge and interspersion variable.

NAA for Outfall South 2 – TY0 has close to 50% marsh and where the marsh exist it is fairly solid. See table 4 and figure 9. With SLR the existing marsh may become more degraded thus dropping in class.

APA – with beneficial use the area will be a carpet marsh in TY1 and estimated to be fully functional by TY5. There would be a class drop due to SLR though with the diversion influence it would be maintained as a class 2.

Table 8. Outfall South 2 V3 Interspersion Classes.

	NAA	APA
TY0	47% Class 2 53% Class 5	
TY1	47% Class 2 53% Class 5	Class 5
TY5	45% Class 2 55% Class 5	Class 1
TY44	24% Class 2 76% Class 5	Class 1
TY50	20% Class 2 80% Class 5	Class 1

Figure 9. Outfall South 2 site for reference to V3 marsh edge and interspersion variable.

Variable V_4 – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

The HET used **7.9%** shallow open water (SOW, Table 8) based on the data for CWPPRA BA-164, cell 1 because the cell and data are adjacent to the beneficial use areas. BA-164 "corrected" the field water depth measurements for long-term average water level using the convention adopted by the CWPPRA Environmental Work Group.

Table 9. Shallow open water.

Percent Shallow Open Water					
	TY0	**TY1**	**TY5**	**TY44**	**TY50**
FWOP	8%	8%	6%	0%	0%
FWP	8%	0%	100%	95%	95%

APA- Once the beneficial use areas become fully functional by TY5 all open water is expected to be shallow and it is expected to mostly remain shallow for the full period of analysis from diversion inputs.

Variable V_5 – Mean high salinity during the growing season (March through November)

Because freshwater from the MBSD ranged over a far greater area than the impact area, the HET reviewed CRMS data in the area (Table 9 and Figure 10). A baseline salinity of **1.7ppt** (Table 9, highlighted brown) was used based on the four CRMS stations mean growing season salinity. In the fresh and intermediate marsh model salinity is based on mean salinity during the growing season (March – November). This is similar to the CWPPRA BA-164 Bayou Dupont marsh creation project that used the mean growing season salinity of 1.5 ppt for CRMS4103 for the period of record (2008-2012).

Table 10. Salinity of CRMS stations near the MBSD Impact area.

CRMS	Mean Salinity (ppt) from 2007(8)- 2020	Mean Growing Season Salinity (ppt) for 2019	Notes on guage location relative to the MBSD impact area
248	3.6	2.4	at BBWW across from outfall
4103	1.7	0.8	closer but slightly north
261	2.0	1.6	midbasin
4218	1.6	1.8	midbasin
	2.2	1.7	Average

Figure 10. Image showing the location of CRMS 4103, 261, 248, and 4218.

Without the diversion future projections are expected to increase by 0.7ppt shifting from 1.7ppt to 2.4ppt. The 0.7ppt shift over 50 years is based on Delft 3d salinity output increase for NAA MBSD (Table 10). Table 11 shows salinity projections for the NAA using 1.7 as TY0 salinities and extrapolating out to TY50 by increasing salinities by 0.7ppt as seen in the Delft modeling results (Table 10). The APA salinities are taken from the Delft 3d 50 year projections for fresh/intermediate habitats. The APA salinities values for TYs 5 and TY44 were extrapolated from Delft outputs which are provided for every 10 years.

Table 11. MBSD Delft 3d modeling results for salinity (ppt) for the No Action Alternative.

Delft Salinity output NAA (ppt)		
	Fr/In	Brackish
Year 1	1.0	3.8
Year 50	1.7	3.8

Table 12. MBSD Delft 3d modeling results for salinity (ppt) for the Applicants Preferred Alternative (APA) and the estimated site specific No Action Alternative (NAA) Salinities.

Delft Salinity output NAA (ppt)		
	NAA	**APA**
TY0	1.7	0.3
TY1	1.7	0.3
TY5	1.8	0.3
TY44	2.4	0.2
TY50	2.4	0.4

Variable V_6 – Aquatic Organisms (% wetland accessible & type of access)
NAA – Fish access would be considered open with no obstructions

APA- Fish access would be considered a solid plug for TY1 due to the containment used for marsh creation. By TY5 through to TY50, it is expected that the containment would be gapped and degraded sufficiently to return to a more natural state of ingress and egress.

RESULTS OF BENEFICIAL USE

See Table 12 for a summary of resulting Annual Average Habitat Unit (AAHUs) and net acres benefited at the end of the period of analysis (year 50) for the three beneficial use areas for the Mid-Barataria Sediment Diversion Project.

Table 13. Mid-Barataria Sediment Diversion Annual Average Habitat Unit (AAHUs) and Net Marsh acres for the Beneficial Use Areas.

Beneficial Use Site	Net Acres	AAHUs
Outfall North	146.8	59.3
Outfall South 1	152.2	60.6
Outfall South 2	102.9	38.5
Total Direct Benefits	**401.9**	**158.4**

See Table 13 for a summary Annual Average Habitat Unit (AAHUs) and net acres of project construction related impacts compared to the benefits of the three beneficial use areas at the end of the period of analysis (year 50) for the Mid-Barataria Sediment Diversion Project.

Table 14. Mid-barataria Sediment Diversion Annual Average Habitat Unit (AAHUs) and Net Marsh acres for the project impacts compared to the benefits of the Beneficial Use Areas.

Wetland Type	Impacts	
	Net Acres	AAHUs
Forested wetlands	21.6	-12.1
Emergent Wetlands (Wet Pasture)	151.0	-102.4
Emergent Wetlands (Marsh/scrub/shrub)	6.2	-21.3
Total Project Impacts	**178.8**	**-135.8**
Beneficial Use Site	**Net Acres**	**AAHUs**
Outfall North	146.8	59.3
Outfall South 1	152.2	60.6
Outfall South 2	102.9	38.5
Total Direct Benefits	**401.9**	**158.4**