



Coastal Protection and  
Restoration Authority of Louisiana

State of Louisiana

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of Louisiana

## Monitoring Plan

for

### Northwest Turtle Bay Marsh Creation (BA-0125)

State Project Number BA-0125  
Priority Project List 21

March 17, 2022  
Jefferson Parish



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The Coastal Protection and Restoration Authority (CPRA) and the United States Department of Interior/Fish and Wildlife Service (FWS) agree to carry out the terms of this Monitoring Plan (hereinafter referred to as the “Plan”) of the accepted, completed project features in accordance with the amended Cost Sharing Agreement CPRA No. 2511-12-11 dated April 13th, 2017. The USFWS will be included as part of the Plan as a reviewing federal sponsor. The Plan will be available on the CPRA Document Referencing System (<https://cims.coastal.la.gov/DocLibrary/DocumentSearch.aspx?Root=0&Folder=0>) accessible through the CPRA website.

The project features covered by this plan are inclusive of and are identified as the Northwest Turtle Bay Marsh Creation Project (BA-0125). The intention of the provisions of this plan is to monitor the project using standardized data collection techniques and to analyze that data to determine whether the project is achieving the anticipated benefits. Reports will be generated and recommendations made to adaptively manage the project. There are no requirements that this project function to any standard beyond the economic life, except that it is not left as a hazard to navigation or a detriment to the environment.

Construction of the Northwest Turtle Bay Marsh Creation Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended. This project was approved on the twenty-first (21<sup>st</sup>) Priority Project List.

## 1. **PROJECT DESCRIPTION, PURPOSE, GOALS, and FEATURES**

### **Description**

The Northwest Turtle Bay Marsh Creation (BA-0125) project area is located in the Barataria Basin on the northern rim of Little Lake in Jefferson Parish, LA (Figure 1). It encompasses a 1,093 ac (327 ha) area which includes a mix of intermediate marsh and open water habitat. Centered in the Barataria Basin Landbridge, it is bounded on the south by Turtle bay and on the north by Bayous Perot and Rigolets. It is bisected by the Harvey Cutoff, a man-made canal.

The BA-0125 project area is part of a critical landbridge which has historically functioned as a partial barrier between the fresh to intermediate marshes and swamps to the north and the tidally influenced brackish to saline marshes and estuaries to the south. Due to natural and anthropogenic factors, the interior marshes have deteriorated. The channelization of the Mississippi River with levees in the 1930’s and the closure of Bayou Lafourche at Donaldsonville in 1904 cut off sediment flow to the Barataria Basin (Gagliano and Wicker 2002). The creation of the Barataria Waterway to the east, and the Harvey Cutoff down





Figure 1. Location map for the Northwest Turtle Bay Marsh Creation (BA-0125) project.

the middle of the project area has allowed for excess tidal exchange and saltwater intrusion from the south. Additionally, this area of the basin has experienced increased wave action resulting in shoreline erosion due to marsh loss around Little Lake as well as in the area between Bayous Perot and Rigolettes. Based on a hyper-temporal analysis conducted by USGS for an extended project boundary, loss rates in the area were estimated to be -0.83% per year for the period 1984 to 2015. Also, the USGS 1998-2010 shoreline analysis indicated erosion was approximately 4 feet per year (USFWS 2016).

The constructed project consists of four marsh creation areas (MCA) totaling approximately 1,093 ac (442 ha), which utilized approximately 4,501,000 cubic yards of hydraulically dredged sediment from Turtle Bay. Marsh Creation Area 1 (MCA 1) is on the west side of the Harvey Cutoff and has an area of 437 ac (177 ha). On the opposite side of the Harvey Cutoff, MCA 2 has an area of 357 ac (145 ha), MCA 3 has 68 ac (28 ha), and MCA 4 has 234 ac (95 ha). The existing marsh inside of each MCA which received dredged sediment will be considered marsh nourishment and the existing open water which received dredged sediment will be considered marsh creation.

**Purpose:**

The purpose of the BA-0125 project is to re-create marsh habitat in shallow open water and nourish existing marsh within the project area in order to prevent land loss and avoid excess tidal exchange through existing bayous, cuts and the shoreline.

**Goals:**

The specific project goal is:

- To create and nourish marsh inside a combined area of 1,093 ac (442 ha) using sediment dredged from Turtle Bay to an initial constructed elevation of +1.5 ft NAVD88, so that it will remain within an optimal intermediate marsh inundation range of 20% - 80% for the maximum time of the 20-year project life.

**Features:**

MCA 1 and MCA 4 (Figure 2) were constructed in a semi-confined manner to an initial elevation of +1.5 ft NAVD88. Existing marsh vegetation will be used to contain the hydraulically dredged material, except in locations where there is a direct hydrologic connection to surrounding water bodies or where the marsh vegetation is low and/or sparse. There will be exceptions to this approach, such as where earthen gap closures will close off tidal gaps and cuts, and along the southern perimeter of MCA 1 where an earthen dike will be used to relift an existing spoil bank to protect pipeline canals (McClain et al. 2016). Also, in MCA 1 one sheet pile closure will be used for deep gaps with large tidal prisms. The initial fill elevation will allow for an average total of 1.3 ft settlement over the life of the project.

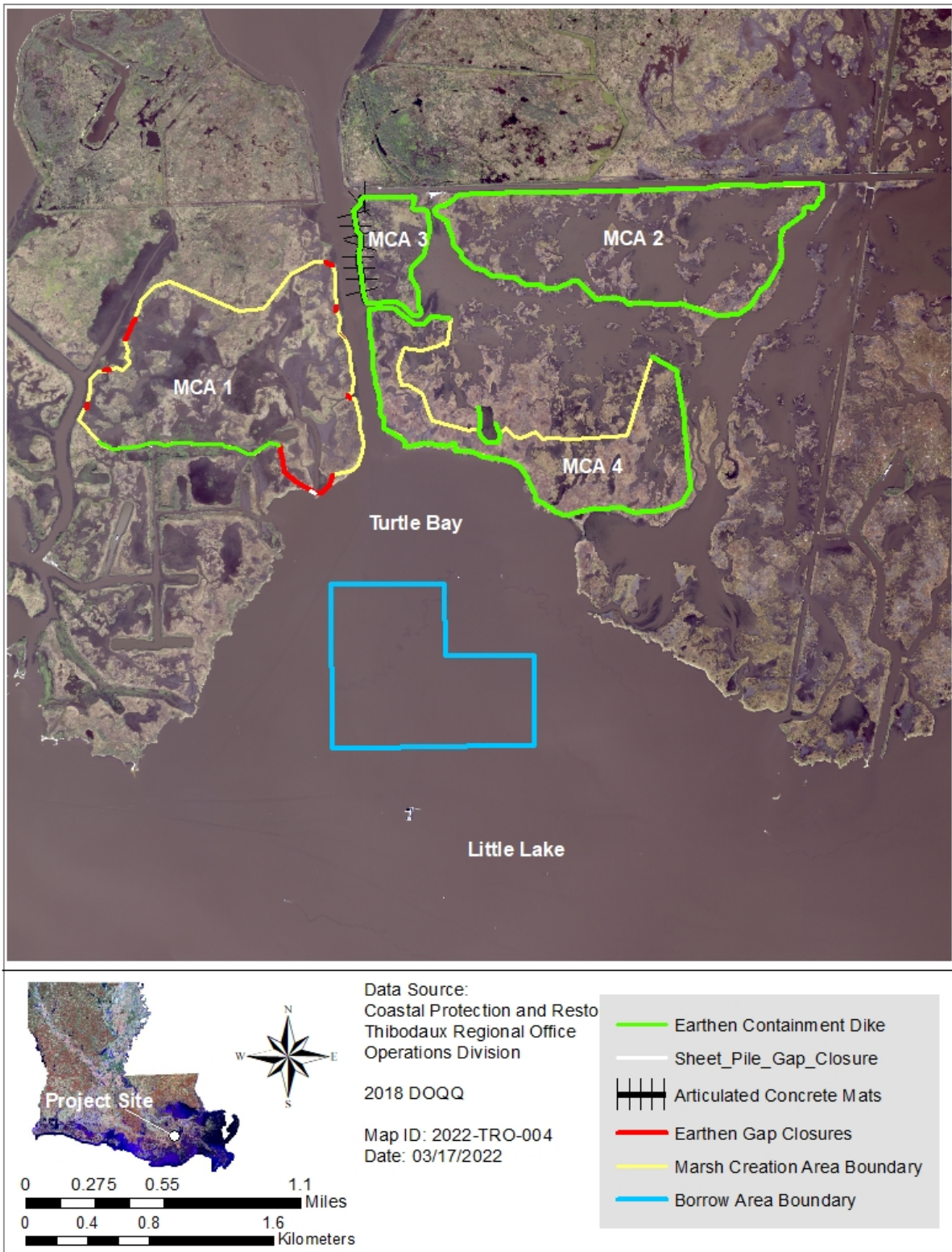


Figure 2. Northwest Turtle Bay Marsh Creation (BA-0125) location of features and borrow area.

Due to the severely deteriorated marsh on the southern boundary, MCA 2 (Figure 2) will be constructed utilizing the traditional fully-confined technique with earthen containment dikes to contain the hydraulically dredged material. This area will be constructed to an initial fill elevation of +1.5 ft NAVD88 to allow for an average settlement of 1.1 ft over the project life.

MCA 3 will also be fully contained due to the deteriorated marsh. Articulated Concrete Mats (ACM) will be placed on the west side of the MCA along the Harvey Cutoff Canal to provide erosion control. There will be 3 gaps in this creation area and it will also be constructed to an initial fill elevation of +1.5 ft NAVD88 to allow for an average settlement of 1.1 ft over the project life.

It is anticipated that elevations will be met for 60% of the area inside the MCA cells. Given the manner of construction, there will be dredge outfall locations higher than +1.5 ft NAVD88 and marsh fringes where the elevations will be lower therefore, the marsh platform will not be uniform.

Though not considered part of the constructed project features, the 265.5 ac (107.4 ha) borrow area will be located due south of the project area in alignment with the Harvey Cutoff channel (Figure 2). It will be approximately 0.5 miles (0.8 km) from MCA 1 and approximately 1.75 miles (2.8 km) from the MCA 2. The maximum bottom elevation is -20.0 ft NAVD88.

Project construction completion was on July 6, 2021. Project life is estimated to be 20 years. Annual project inspections are planned.

## 2. **ITEMS REQUIRING MONITORING**

### **Project-Specific Monitoring**

Project-specific monitoring for BA-0125 includes 45 long-term vegetation monitoring stations randomly selected and established along several east-west transects divided between the two creation/nourishment areas (Figure 3). These stations will allow for comparison to CRMS-*Wetlands* stations outside the project area. Additionally, CRMS-*Wetlands* coastwide flights will be utilized to estimate project-specific land/water changes over time.

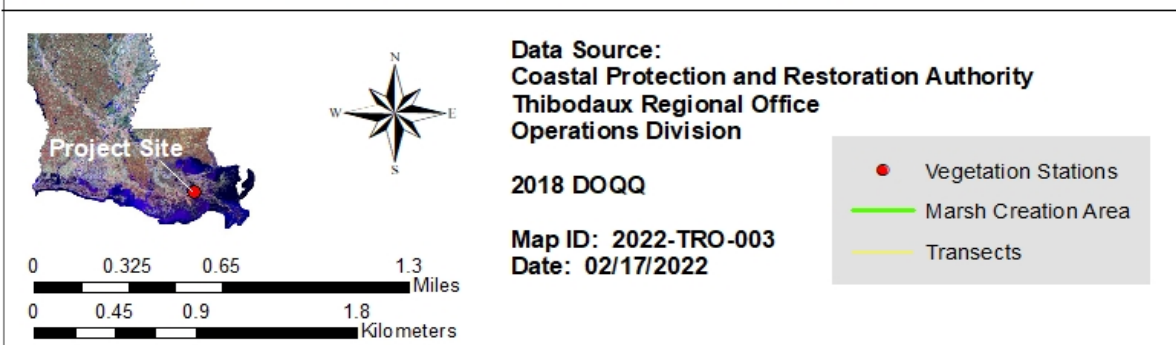


Figure 3. Project-specific vegetation monitoring stations for the Northwest Turtle Bay Marsh Creation (BA-0125) project.

The following monitoring strategies will provide the information necessary to evaluate the specific project goals.

- A. Vegetation - Vegetation data collection will occur at each of the 45 long-term project-specific monitoring stations and will follow the Braun-Blanquet methodology (Mueller-Dombois and Ellenberg 1974). The stations will consist of randomly selected replicate 2m x 2m plots located along several east-west transects divided amongst the four marsh creation areas. Sampling will occur in years 3, 6, and 18 which equates to 2024, 2026, and 2039 and will be conducted in the fall of these years.
- B. Elevation surveys of the marsh creation/nourishment areas will occur in years 1, 3, 5, 10, and 18 which equates to 2022, 2024, 2026, 2031, and 2039 in order to assess performance of the project over its 20-year life. Assessment of each area will determine if the project maintained overall target elevations conducive to sustaining healthy marsh. Elevation surveys of the marsh creation/nourishment areas are described in detail in the CRMS-*Wetlands* standard operating procedures document (Folse et al. 2008, revised 2012, 2014).
- C. Aerial photography - In order to evaluate land/water ratios in the project area, land/water data will be obtained from digital imagery (Z/I Imaging digital mapping camera) with 1-meter resolution. Aerial photography will be captured using CRMS coast-wide flights, which will be conducted in project years 0, 12, and 18 which equates to 2021, 2033, 2039. The photography will then be georectified using standard operating procedures described in Steyer et al. (1995, revised 2000), and land/water ratios will be determined.

### **CRMS-*Wetlands* Monitoring**

The Coast-wide Reference Monitoring System (CRMS)-*Wetlands* is a network of 392 monitoring sites distributed throughout the coastal zone of Louisiana. Hydrographic, vertical accretion, elevation change, vegetation, soils, and aerial photography data are collected at each CRMS-*Wetlands* site. CRMS4218 is located approximately one mile west of the project area (Figure 4). Data from this site will be used as a reference to the project area data.





Figure 4. Location map of CRMS-Wetlands monitoring site west of the Northwest Turtle Bay Marsh Creation (BA-0125) project.

The following CRMS-*Wetlands* data will provide the reference information necessary to evaluate the specific project goals.

- A. Vegetation sampling at CRMS-*Wetlands* sites will utilize the Braun-Blanquet methodology described for project specific monitoring. Monitoring will consist of ten replicate 2m x 2m stations located within the 200m x 200m square of each CRMS-*Wetlands* site. Vegetation data will be collected annually in late summer through fall.
- B. Salinity - Salinity readings will be recorded hourly using continuous recorders located at each CRMS-*Wetlands* site. Discrete porewater salinity will be collected when sondes are serviced and during vegetation monitoring.
- C. Water Level - Water level readings will be recorded hourly at each CRMS-*Wetlands* site to determine frequency, depth, and duration of flooding.
- D. Soil Properties - Soil cores were collected at each CRMS-*Wetlands* site. The first cores were collected during the establishment of CRMS in 2006/07 and again in 2018. Soils are collected and analyzed approximately every 10 years. Analysis of soil properties will include bulk density and percent organic matter content.
- E. Sediment Elevation - Rod Surface Elevation Tables (RSET) will be used to measure changes in sediment elevation over time relative to a fixed datum at each CRMS-*Wetlands* site. Data will be collected annually in the spring.
- F. Surface Accretion - Accretion plots will be used to measure surface accretion (i.e. sediment deposition) near the RSET station at each CRMS-*Wetlands* site. Vertical accretion is to be used in conjunction with the RSET to provide information on below ground processes that influence surface elevation change. Data will be collected annually in the spring.

### 3. **MONITORING BUDGET**

The cost associated with project-specific monitoring variables outlined in Section 2 of this plan for the twenty (20) year project life is included and summarized in Attachment 1. Funding for monitoring was approved by the CWPPRA Task Force on January 12, 2017 for a fully funded amount of \$1,076,788.

#### 4. **RESPONSIBILITIES**

A. CPRA will:

1. Coordinate and oversee all scientific data collection.
2. Ensure that all data goes through quality control procedures and is entered into the public database.
3. Analyze the data and report on the status of the project after data collection events. Should the data indicate that the project is not meeting the goals and objectives, adaptive management recommendations will be made to improve the response.
4. Review the monitoring plan and budget annually with the USFWS to determine that the data being collected adequately evaluates the project.

B. USFWS will:

1. Review the monitoring plan and budget annually with the CPRA to determine that the data being collected adequately evaluates the project.

## References

- Folse, T. M., J. L. West, M. K. Hymel, J. P. Troutman, L. A. Sharp D. Weifenbach, T. McGinnis, and L. B. Rodrigue. 2008, (revised 2012, 2014). A Standard Operating Procedures Manual for the Coast-wide Reference Monitoring System-Wetlands: Methods for Site Establishment, Data Collection, and Quality Assurance/Quality Control. Louisiana Coastal Protection and Restoration Authority. Office of Coastal Protection and Restoration. Baton Rouge, LA. 191 pp.
- Gagliano, S. M. and K. M. Wicker. April, 2002. Geological Characterization of Potential Receiving areas for the Central and Eastern Terrebonne Basin Freshwater Delivery Project. DNR Contract No. 2509-01-02. Report prepared for Louisiana Department of Natural Resources. Baton Rouge, LA. 57 pp. plus appendices.
- McClain, T., T. Fitzgerald, D. Kar, and K. Roy. 2016. Northwest Turtle Bay Marsh Creation Project (BA-0125). 95% design report prepared for Coastal Protection and Restoration Authority. Baton Rouge, LA. 55 pp.
- Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and Methods of Vegetation Ecology. J. Wiley and Sons, New York, NY. 547 pp.
- Steyer, G. D., R. C. Raynie, D. L. Stellar, D. Fuller, and E. Swenson. 1995, (revised 2000). Quality Management Plan for Coastal Wetlands Planning, Protection, and Restoration Act Monitoring Program. Open-file series no. 95-01. Baton Rouge: Louisiana Department of Natural Resources, Coastal Restoration Division. 97 pp.
- United States Fish and Wildlife Service (USFWS). 2016. Northwest Turtle Bay Marsh Creation - Final Phase 2 Project Information Sheet for Wetland Value Assessment. Lafayette, Louisiana. 19 pp.



# Attachment 1

## Monitoring Budget

<b>BA-125 Northwest Turtle Bay Marsh Creation</b>																						
<b>Fully Funded Monitoring Budget: \$1,076,788</b>																						
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Totals
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	
Administration		15,965	8,142	8,305	8,471	8,640	8,813	8,989	9,169	9,353	9,540	9,730	9,925	10,124	10,326	10,533	10,743	10,958	11,177	11,401	23,258	\$213,562
Surveys		79,824	0	83,049	0	86,404	0	0	0	0	95,397	0	0	0	0	0	0	0	111,773	0	0	\$456,446
Vegetation Sampling		0	0	11,073	0	11,521	0	0	0	0	0	0	0	0	0	0	0	0	14,903	0	0	\$37,497
Land-water Analysis		5,764	0	0	0	0	0	0	0	0	6,888	0	0	0	0	0	0	0	0	8,232	0	\$20,883
Report		0	0	0	40,661	0	42,303	0	0	0	0	46,706	0	0	0	0	0	0	0	0	55,818	\$185,489
Monitoring Management (task management, field trips, etc.)		9,579	3,257	24,915	3,388	25,921	3,525	3,596	3,668	3,741	3,816	3,892	3,970	4,049	4,130	4,213	4,297	4,383	4,471	4,560	39,538	\$162,911

