



**State of Louisiana
Coastal Protection and Restoration Authority**

2019 Annual Inspection Report

for

Bayou Bonfouca Marsh Creation Project

State Project Number PO-0104
Priority Project List 20

January 2020
St. Tammany Parish

Prepared by:

Taylor M. Daigle, P.E.
Coastal Protection and Restoration Authority
New Orleans Field Office
CERM, Suite 309
2045 Lakeshore Drive
New Orleans, LA 70122



Table of Contents

I. Introduction.....	1
II. Inspection Purpose and Procedures	1
III. Project Description and History.....	1
IV. Summary of Past Operations and Maintenance Projects	2
V. Inspection Results	3
VI. Conclusions and Recommendations	3

Appendices

Appendix A	Project Features Map
Appendix B	Three Year Operations & Maintenance Budget Projection
Appendix C	Photographs
Appendix D	Field Inspection Check Sheet



I. Introduction

The Bayou Bonfouca Marsh Creation Project (PO-0104) is located in the Lake Pontchartrain Basin along the northeastern corner of Lake Pontchartrain as shown in Appendix A. The Louisiana Coastal Wetlands Planning, Protection and Restoration Task Force designated PO-0104 as a part of the 20th Priority Project List. The federal sponsor for the project is the US Fish and Wildlife Service (USFWS). The non-federal sponsor for the project is the Coastal Protection and Restoration Authority (CPRA).

II. Inspection Purpose and Procedures

The purpose of an annual inspection is to evaluate the constructed project features, identify any deficiencies, and prepare a report detailing the condition of project features and recommending any corrective actions needed. Should it be determined that corrective actions are needed, CPRA shall provide a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects (Section IV – Summary of Past Operations and Maintenance Projects) and an estimated projected budget (Appendix B - Three Year Operations & Maintenance Budget Projection) for the upcoming three (3) years for operation, maintenance and rehabilitation.

This annual inspection was performed on October 28, 2019. Weather consisted of sunny skies, a temperature of approximately 70°F, and winds out of the north at around 3 MPH. At the time of the inspection, the nearby Bayou Liberty gauge read +1.9 feet NAVD 88. Taking part in the inspection were Bryan Gossman and Taylor Daigle of CPRA; Robert Dubois and Danny Breaux of USFWS; and Cliff Penick and Wheeler Penick, landowners for a large portion of Marsh Creation Area 2. The inspection was made using an airboat furnished by USFWS. Photographs of the inspection are included in Appendix C of this report.

III. Project Description and History

The goal of the Bayou Bonfouca Marsh Creation Project was to re-create and nourish low salinity brackish marsh in open waters adjacent to Bayou Bonfouca using sediment dredged from Lake Pontchartrain.

The poor condition of marsh in the project area was due to a combination of subsidence, hurricane-caused interior ponding, and shoreline erosion. Although shoreline erosion rates were relatively low, only a narrow strip of shoreline existed between Lake Pontchartrain and the interior ponds. Several breaches existed along the shoreline. Should shoreline breaching and enlargement of tidal channels have been allowed to extend, high tidal energy would have intruded into the interior ponds of the project area. This would have caused the interior marshes to experience accelerated loss rates. Restoration of the marsh adjacent to Lake Pontchartrain provides vital protection to the interior marsh to the north.



The project features include four marsh creation areas contained by approximately 58,000 linear feet of earthen containment dikes. Marsh Creation Area 1 and Marsh Creation Area 2 contain ponds that were constructed 1 foot below the surrounding marsh creation elevations. Outside of the earthen containment dikes, an additional 281 acres of marsh were created, and an additional 570 acres of marsh were nourished.

Table 1: Project Feature Areas and Target Fill Elevations

Feature	Acreage	Target Fill Elevation
Marsh Creation Area 1	335	+2.7' NAVD 88
Marsh Creation Area 2	152	+2.7' NAVD 88
Marsh Creation Area 3	29	+2.7' NAVD 88
Marsh Creation Area 4	92	+2.7' NAVD 88
Pond B	4	+1.7' NAVD 88
Pond C	4	+1.7' NAVD 88
Pond D	4	+1.7' NAVD 88
Uncontained Marsh Creation	281	N/A
Marsh Nourishment Area	570	N/A
Total	1,471	-

Following acceptance of the marsh creation areas, all earthen containment dikes were either degraded to design elevation, degraded to marsh platform elevation, or gapped to the same elevation of the marsh platform. Approximately 1,560 linear feet of the earthen containment dikes that were vulnerable to erosion due to their location adjacent to Lake Pontchartrain were fortified using articulated concrete mats. These areas were covered with sediment from the degradation of the earthen containment dikes to foster the filling of the voids within the mats and to encourage voluntary plant recruitment.

The project was designed to meet a final target marsh elevation of +1.1 feet NAVD 88 over the 20 year project life. According to the settlement curve developed for the project, it was expected for the marsh to settle to the final target marsh elevation during the first year after construction and remain roughly constant at that elevation throughout the project's economic life. The project has a 20 year economic life, which began at project completion in 2018.

IV. Summary of Past Operations and Maintenance Projects

There are no operable structures in the project.

The only maintenance events that have been conducted in the project area have been vegetative plantings. There have been three of these events.

- In October 2018, 86,862 native coastal plants were planted.
- In February 2019, 3,000 trees were planted in Marsh Creation Area 1, and 4,000 trees were planted in Marsh Creation Area 4.
- In May through October 2019, marsh grass was planted (approximately 75,000 plants) in Marsh Creation Area 1, Marsh Creation Area 3, the marsh nourishment

area southeast of Marsh Creation Area 1, and the marsh nourishment area north of Marsh Creation Area 4.

V. Inspection Results

The project's marsh creation areas appear to be healthy with a very successful establishment of natural vegetation. Most areas observed were not inundated at the time of the inspection. Marsh Creation Area 3 was the only area that was mostly inundated, but due to the shallow water depth, it appears that the area has not settled below the target elevation. Some high points were observed, mostly along the alignment of the earthen containment dikes. Observations and remarks for each of the four marsh creation areas are provided on the Field Inspection Check Sheet included in Appendix D.

VI. Conclusions and Recommendations

The objective for this project was to recreate marsh habitat in open water behind the existing shoreline. Based on findings from this inspection, the Bayou Bonfouca Marsh Creation Project appears to be achieving project objectives. From visual observations, the marsh does not appear to have settled below the final design target elevation (+1.1 feet NAVD 88).

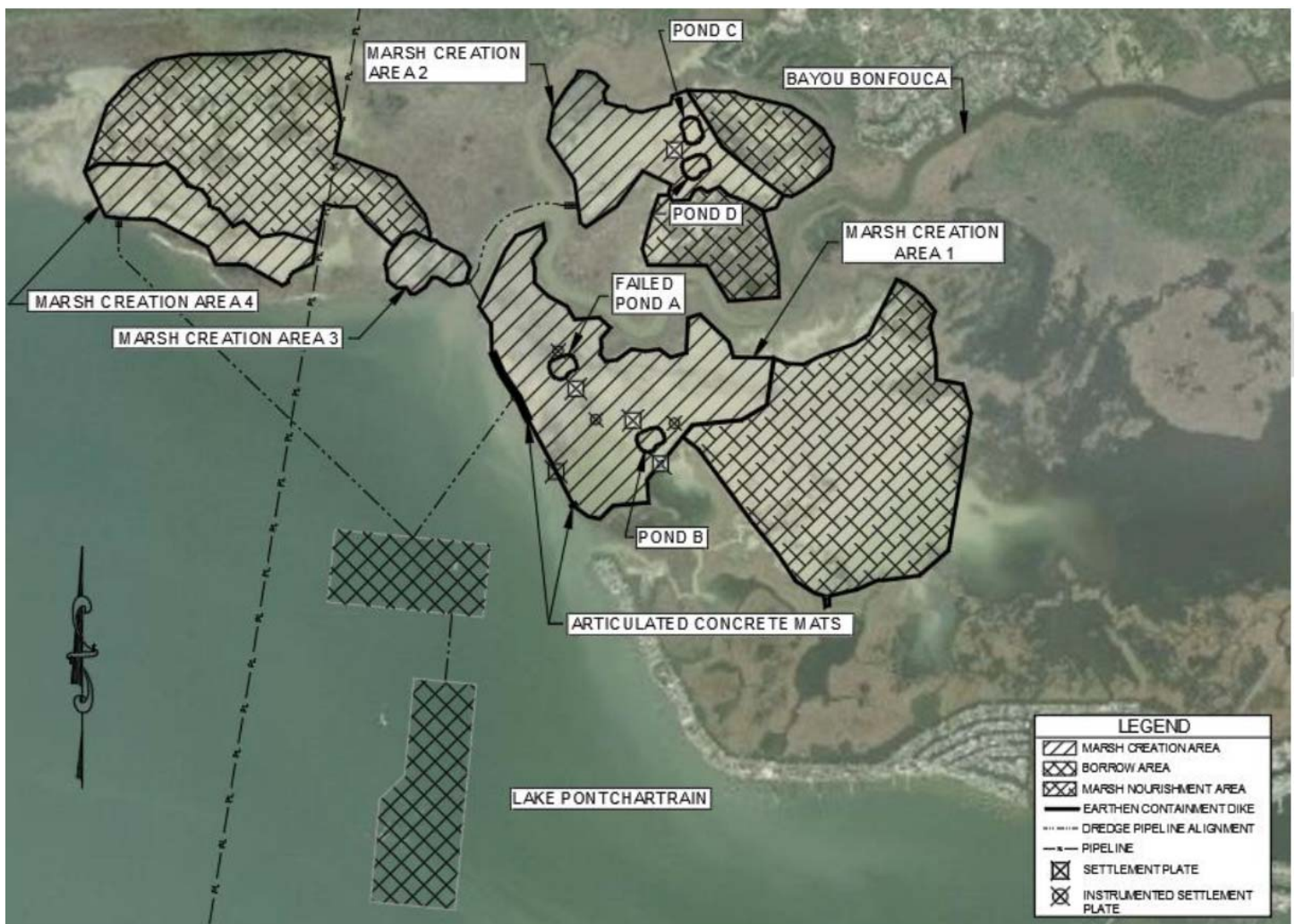
CPRA is currently planning a maintenance event to reestablish hydraulic connectivity throughout the project footprint by excavating tidal creeks in the marsh and additional gaps in the earthen containment dikes.

CPRA plans to inspect project features at a minimum frequency of every five years to document and assess site conditions. CPRA also plans to conduct surveys in the project area at least three times during the economic life of the project.



Appendix A

Project Features Map



Appendix B

Three Year Operations & Maintenance Budget Projection

Note: Budget for the maintenance event that is currently being planned is not included because it is funded under the construction budget for this project, not the O&M budget.

Bayou Bonfouca Marsh Creation (PO-104)
 Federal Sponsor: USFWS
 Construction Completed : 06/14/2018
 PPL 20

Current Approved O&M Budget	Year 1 2019	Year 2 2020	Year 3 2021	Year 4 2022	Year 5 2023	Year 6 2024	Year 7 2025	Year 8 2026	Year 9 2027	Year 10 2028	Year 11 2029	Year 12 2030	Year 13 2031	Year 14 2032	Year 15 2033	Year 16 2034	Year 17 2035	Year 18 2036	Year 19 2037	Year 20 2038	Project Life Budget	Currently Funded
State O&M	\$41,531	\$3,251	\$53,461	\$3,369	\$3,430	\$38,492	\$3,555	\$3,618	\$3,684	\$15,084	\$3,817	\$3,886	\$26,334	\$4,027	\$4,100	\$46,009	\$4,249	\$4,325	\$4,403	\$43,926	\$314,551	
Corps Admin	\$1,262	\$1,285	\$1,308	\$1,331	\$1,355	\$1,380	\$1,405	\$1,430	\$1,456	\$1,482	\$1,509	\$1,536	\$1,563	\$1,591	\$1,620	\$1,649	\$1,679	\$1,709	\$1,740	\$3,246	\$31,535	
Federal S&A	\$6,661	\$3,251	\$6,318	\$3,369	\$3,430	\$5,591	\$3,555	\$3,618	\$3,684	\$6,157	\$3,817	\$3,886	\$5,299	\$4,027	\$4,100	\$6,683	\$4,249	\$4,325	\$4,403	\$38,369	\$124,793	
Total																					\$470,880	\$137,791

Projected O&M Expenditures																				Remaining Project Life	Current 3 Year Request	
Maintenance Inspection						\$18,876						\$20,637								\$22,563	\$62,076	\$0
End of Life Admin																				\$17,974	\$17,974	\$0
Operations (N/A)																					\$0	\$0
State S&A			\$2,777			\$2,930	\$2,983		\$3,147					\$3,440	\$3,502						\$18,778	\$2,777
Topo Surveys			\$45,510				\$48,876		\$51,563					\$56,374							\$202,322	\$45,510
Settlement Plate Surveys			\$15,033			\$15,859									\$18,957						\$49,849	\$15,033
Total	\$0	\$63,320	\$0	\$0	\$0	\$18,789	\$70,735	\$0	\$0	\$54,710	\$0	\$20,637	\$0	\$0	\$59,814	\$22,459	\$22,563	\$0	\$17,974	\$0	\$351,000	\$63,320

O&M Expenditures from COE Report	\$0	Current O&M Budget	\$137,791	Current Project Life Budget less COE Admin	\$439,344
State O&M Expenditures not submitted for in-kind credit	\$0	Estimated O&M Expenditures to-date	\$0	Total Projected Project Life Budget	\$351,000
Federal Sponsor MIPRs (if applicable)	\$0	Remaining Available O&M Budget	\$137,791	Project Life Budget Surplus (Shortfall)	\$88,345
Total Estimated O&M Expenditures (as of Oct 2019)	\$0	Projected 3-Year Budget Expenditures	\$63,320		
		3-Year Budget Surplus (Shortfall Request)	\$74,471		

Appendix C

Photographs

Note: Reference the Project Features Map in Appendix A for features called out in the following photographs.



Photo 1: Marsh Creation Area 1

Location of proposed tidal creek on southern end of MCA 1(near Pond B)



Photo 2: Marsh Creation Area 1

Pond B viewed from the pond containment dike.



Photo 3: Marsh Creation Area 1

Articulated concrete mats at the intersection of the MCA 1 containment dike and Lake Pontchartrain



Photo 4: Marsh Creation Area 1

Existing gap on western side of northern earthen containment dike.



Photo 5: Marsh Creation Area 1
Northwestern corner of MCA 1



Photo 6: Tidal Creek NE of Marsh Creation Area 2
Pilings at the intersection of the proposed tidal creek and the Bayou Liberty Marina



Photo 7: Marsh Creation Area 2

Northeastern corner viewed from earthen containment dike



Photo 8: Access Route South of Marsh Creation Area 2

Southern access to Marsh Creation Area 2 for upcoming maintenance event. This is within the marsh nourishment area.



Photo 9: Marsh Creation Area 2

High point along southern earthen containment dike



Photo 10: Marsh Creation Area 2

Earthen containment dike at the proposed gap location on the west end of MCA 2



Photo 11: Marsh Creation Area 3

From visual observation, this area appeared to be about 6" deep. With the tide reading of +1.9 feet NAVD 88, the elevation here may be approximately +1.4 feet NAVD 88.



Photo 12: Marsh Creation Area 3



Photo 13: Marsh Nourishment Area NW of MCA 3



Photo 14: Marsh Creation Area 4

Fragile earthen containment dike location adjacent to Lake Pontchartrain. A breach has previously occurred here.



Photo 15: Marsh Creation Area 4
Earthen containment dike



Photo 16: Marsh Creation Area 4
Healthy marsh viewed from earthen containment dike



Photo 17: Marsh Creation Area 4
Earthen containment dike at the NE corner of MCA 4



Photo 18: Marsh Nourishment Area North of MCA 4



Photo 19: Goose Point / Point Platte Cell E

Location of proposed earthen containment dike gap at NE corner of cell



Photo 20: Southern Natural Gas Pipeline Canal

Canal is wide and deep. Equipment for the upcoming maintenance event can likely be floated across the canal with permission from pipeline operator.

Appendix D

Field Inspection Check Sheet

FIELD INSPECTION CHECK SHEET				
Project No. / Name: Bayou Bonfouca Marsh Creation Project (PO-104)			Date of Inspection: <u>10/28/2019</u> Start Time: <u>10:00 AM</u>	
Structure No.	N/A		Inspector(s): <u>Bryan Gossman (CPRA), Taylor Daigle (CPRA), Robert Dubois (USFWS), Danny Breaux (USFWS), Cliff Penick (landowner), Wheeler Penick (landowner)</u>	
Structure Description:	Marsh Creation Fill Areas		Water Level: <u>+1.9 feet NAVD 88</u>	
Type of Inspection: Annual			Weather Conditions: <u>Sunny, N winds at 3 MPH</u>	
Feature	Condition	Physical Damage	Photo #	Observations and Remarks
MCA 1	Very Good	None	1-5	The previously proposed gap slightly to the east (on the north side) is already open. This gap will be removed from the upcoming maintenance event plans. The previously proposed gap slightly to the west (on the north side) and adjacent proposed creek should also be removed from plans. Need to add creek to southern end of marsh creation area.
MCA 2	Very Good	None	6-7, 9-10	We observed a silted in gap on the southern dike, west of the proposed dike gap location. Dike gaps will be added to planned maintenance event where proposed creeks meet pond dikes. Southernmost proposed creek will be revised to follow interior borrow canal.
MCA 3	Very Good	None	11-12	Much of MCA 3 is a shallow area about 6" deep. USFWS (D. Breaux) said that prior to construction, the area was about 2.5' deep. With the tide at +1.9 feet NAVD 88 at the time of the inspection, MCA 3 is at an approximate elevation of +1.4 feet NAVD 88, which is higher than the target elevation of +1.1 feet NAVD 88. Both previously proposed gaps for this marsh creation area will be removed from the plans because tidal exchange is already occurring at these locations. USFWS (D. Breaux) noted that the eastern gap was previously existing, but when they chose to put a gap there, it was much smaller. Now it allows for sufficient tidal exchange.
MCA 4	Very Good	None	14-17	End of dike degradation on western side appears to be slightly different than the location marked on the as-builts. It appears that the dike continues a couple hundred feet further than marked on the as-builts. End of dike degradation on the eastern side appears to match what is reflected in the as-builts. Previously proposed gap will be removed from plans. Per as-builts, this part of the dike has been degraded. We were not able to access the exact location because the water got too deep to continue on foot, so tidal exchange is already occurring in that area.
Uncontained Marsh Creation (SE of MCA 1)	Very Good	None	N/A	USFWS would like to plan a tidal creek in this area in the future, not as a part of the upcoming maintenance event.
Marsh Nourishment	Very Good	None	8, 13, 18	Appears to be in good condition. We observed the plantings from February which appear to be surviving.