State of Louisiana

Coastal Protection and Restoration Authority of Louisiana

Monitoring Plan

for

Lake Hermitage Marsh Creation (BA-42)

State Project Number BA-42
Priority Project List 15

July 2016

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Monitoring Plan for Lake Hermitage Marsh Creation (BA-42)
Priority Project List 15

The Coastal Protection and Restoration Authority of Louisiana (CPRA) and the United States Fish and Wildlife Service (USFWS) agree to carry out the terms of this monitoring plan for the Lake Hermitage Marsh Creation project (BA-42), in accordance with the Cost Sharing Agreement No. 2511-06-08, Amendment No. 3, dated May 11, 2016.

As outlined in this plan, monitoring data will be collected using standardized data collection techniques and will be analyzed to determine whether the project is achieving the anticipated benefits. Operations, Maintenance and Monitoring (OM&M) reports will be written to document the condition of project features, present and interpret monitoring data, and if needed, make recommendations for adaptive management of the project. Operations, Maintenance and Monitoring reports, as well as additional documents pertaining to BA-42, will be accessible through CPRA's Coastal Information Management System website at *http://cims.coastal.louisiana.gov.*

Construction of the Lake Hermitage 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.

1. PROJECT DESCRIPTION, GOALS, and FEATURES

Description

The Lake Hermitage Marsh Creation project (BA-42) created marsh and restored an eroding lake shoreline by using sediment that was hydraulically dredged from the Mississippi River and delivered to the project area via sediment pipeline. The BA-42 project area is located on the west bank of the Mississippi River in Plaquemines Parish, Louisiana, approximately 4 miles west of the town of Magnolia. The marsh creation areas were constructed directly north of Jefferson Canal and southeast of Lake Hermitage; the shoreline restoration berm was built along the eastern rim of the lake (Figure 1). The earthen berm was designed to reinforce the structural integrity of the eastern lake shoreline, and along with the marsh creation areas, provide increased protection for the interior marsh from erosive tidal action. The West Pointe a la Hache siphons (BA-04), located to the east of BA-42, deliver an influx of fresh water from the Mississippi River to locally moderate salinity intrusion from the Gulf of Mexico.

The BA-42 project area is located in the Barataria basin, a region of significant marsh deterioration that lost land at a rate of -4.76 ± 0.97 mi^2/yr between 1985 and 2010 (Couvillion et al. 2011). Prior to construction, the BA-42 project area was categorized as primarily open water habitat, punctuated by patches of intermediate to brackish marsh. The deteriorated condition of marsh habitat in the basin is due to a combination of factors including subsidence and a lack of riverine sediment input from leveeing of the Mississippi River (Gagliano et al. 1981). Additional factors that have contributed to localized landloss include the alteration of hydrology resulting from the dredging of oil and gas canals (Day et al. 2000), and the impacts of relative sea level rise (Day and Templet 1989).

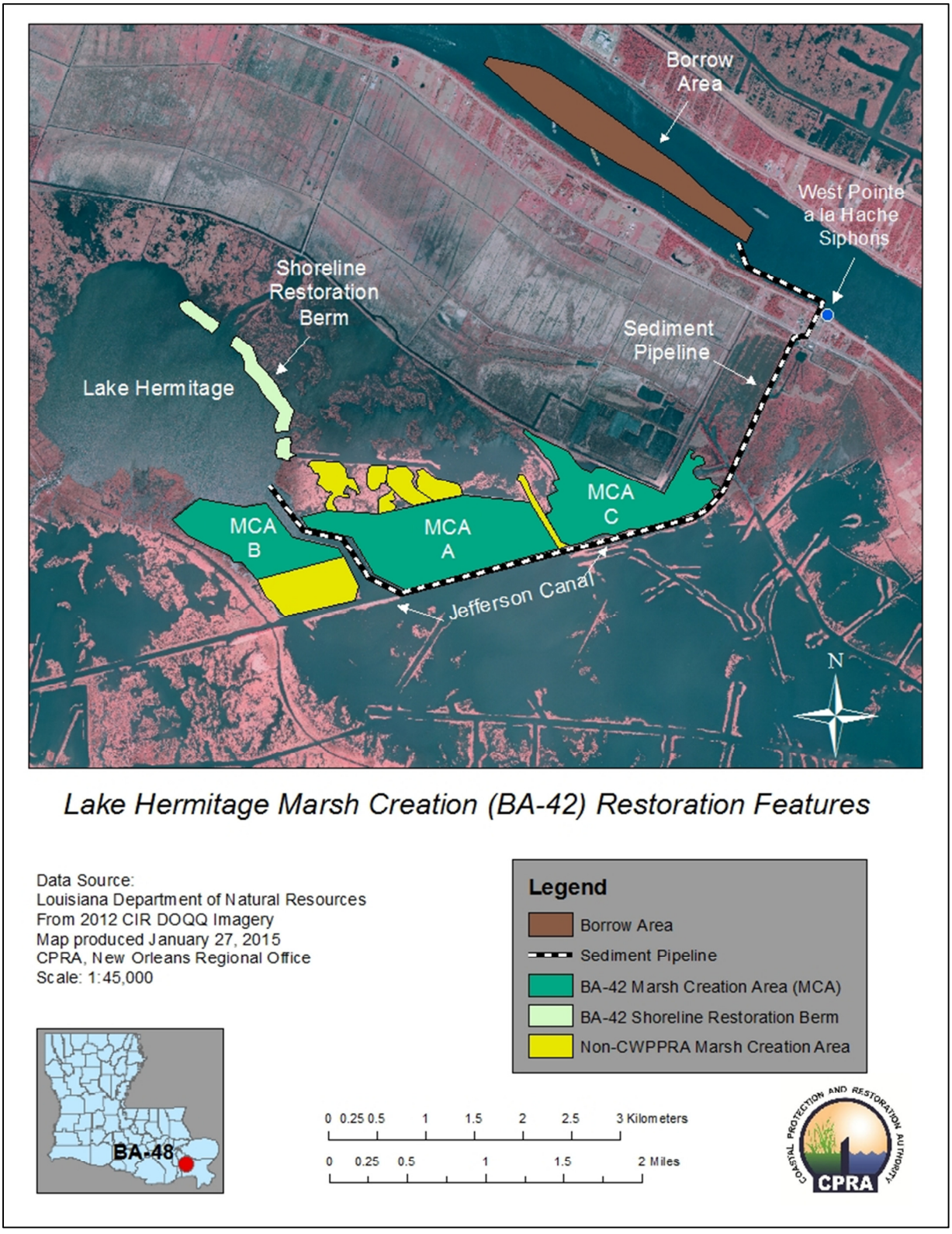

Figure 1. Location of marsh creation and shoreline restoration features constructed as part of, or in conjunction with, the Lake Hermitage Marsh Creation project (BA-42). This monitoring plan covers monitoring solely related to the CWPPRA-funded project areas.

The original footprint of the BA-42 project area was expanded by 239 acres with the addition of two marsh creation cells that were initially proposed as the CWPPRA-funded West Pointe a la Hache Marsh Creation project (BA-47). These areas are combined and labeled as Marsh Creation Area (MCA) C in Figure 1. The Natural Resources Conservation Service was the federal sponsor and CPRA was the state sponsor of this project. Remaining construction contingency funds from BA-42 allowed for these neighboring cells to be annexed into the project area, which resulted in a greater efficiency for marsh creation in the area. The BA-47 project was deauthorized in 2015.

The original design for BA-42 included the construction of earthen terraces in a 104-acre cell located immediately south of MCA B (Figure 1). This restoration strategy was replaced with the creation of 104 acres of marsh in the same boundary through the Lake Hermitage Marsh Creation-Natural Resource Damage Assessment (NRDA) Early Restoration Project. Monitoring in this area is being conducted separately with NRDA funding through the Louisiana Oil Spill Coordinator's Office (LOSCO). Additional smaller marsh creation cells have been filled to the immediate north of MCA A with funding provided through the Louisiana Department of Natural Resources and LOSCO mitigation programs. This monitoring plan does not include monitoring within these non-CWPPRA funded cells.

Goals

The goals of the BA-42 project are to restore marsh south of Lake Hermitage and protect the integrity of the eastern and southern lake rim to prevent breaching into the interior marsh. The specific objectives of the project are as follows:

1. Create 795 acres of emergent marsh habitat

2. Restore 6300 linear feet of the eastern Lake Hermitage shoreline

The introduction and placement of sediments through the use of dedicated dredging is consistent with the Louisiana's Comprehensive Master Plan for a Sustainable Coast (CPRA 2012), specifically, the Barataria Marsh Creation Component.

Features

The principal BA-42 CWPPRA project features include the following:

1. Approximately 795 acres of marsh creation for Marsh Creation Areas A, B and C

2. Approximately 30,031 linear feet of containment dikes for Marsh Creation Areas A and B

    - The length of the containment dike for Area C was constructed as needed (no established specifications for length).

    - The shoreline restoration berm was constructed without containment dikes (unconfined fill).

3. Approximately 4,981,252 cubic yards of sediment for the marsh creation cells and shoreline restoration berm

   - 4,623,831 cubic yards for Marsh Creation Areas A, B, and C
   - 357,421 cubic yards for the shoreline restoration berm

The constructed target elevation of the marsh creation areas is +2.0′ NAVD88 (Geoid99), with a minimum allowable elevation of +1.5′ NAVD88. The constructed target crown elevation for the shoreline restoration berm is +4.0′ NAVD88. The designed slope for the berm is different above and below mean water level, with a slope of 1(V):35(H) above and 1(V):5(H) below. The constructed target crown elevation for the containment dikes is +3.0′ NAVD88.

The non-CWPPRA project features include an additional 215 acres of marsh creation and 5654 linear feet of containment dikes (cell south of Marsh Creation Area B). The length of containment dikes for the non-CWPPRA fill areas north of Marsh Creation Area A were not specified and the dikes were constructed as needed.

2. ITEMS REQUIRING MONITORING

Monitoring for BA-42 includes land-water analyses, topographic surveys and vegetation surveys of the CWPPRA-funded marsh creation areas and shoreline restoration berm. Coast-wide Reference Monitoring System-*Wetlands* (CRMS-*Wetlands*) stations CRMS0258, CRMS0260 and CRMS0263 will provide data on local hydrographic conditions and the vegetative community. Operations, Maintenance and Monitoring (OM&M) reports are scheduled to be written in 2021 and 2035.

A. Land-Water Analysis

Land-water analysis of aerial photography will be used in conjunction with topographic surveys to evaluate the sustainability of the created marsh platform and earthen shoreline berm through the project's 20-year CWPPRA monitoring life. Land to water ratios in the project area will be determined using 2016, 2024, and 2033 CRMS aerial photography (Z/I Imaging digital mapping camera) with 1-meter resolution. The first aerial photography was originally scheduled for 2015, but complications with photography acquisition required the monitoring to be delayed by one year. Due to the scheduling of aerial flights for late fall (typically November), the 2024 and 2033 calendar years for flights is a year earlier than reported in the budget (Appendix 1), which is developed using federal fiscal years (October 1–September 30).

B. Topographic surveys

Data from topographic surveys will be compared over time to measure if the dredged material is settling at the predicted rate and if the marsh platform and shoreline restoration berm are retaining elevations that promote healthy native marsh habitat. Topographic surveys will be conducted in years 2015 (as-built), 2018, 2020, and 2034.

C. Marsh Vegetation Surveys

Vegetation surveys will be conducted at 15 monitoring stations (2 m x 2 m) in the BA-42 project area. Vegetation data will be used to assess the colonization and transition of vegetation on the created marsh platform and berm and to compare this vegetation to local, natural emergent marsh. Surveys of vegetation will follow CRMS methodology and will include an assessment of total cover, species present, percent cover of each species, average height of each vegetation layer, and the depth of water on the marsh surface. The salinity, specific conductivity and temperature of the soil porewater at 10 cm and 30 cm depth will also be collected in coordination with the vegetation surveys at each marsh plot (Folse et al. 2014). Vegetation surveys are scheduled for years 2018, 2025, and 2034.

3. MONITORING BUDGET

The cost associated with monitoring BA-42 for its twenty-year project life is summarized in Appendix 1.

4. RESPONSIBILITIES

A. CPRA will:

1. Coordinate and oversee all scientific data collection.

2. Ensure that all data go through quality control procedures and that all data are entered into the public database.

3. Summarize and analyze project data and publish OM&M reports according to the schedule included in this monitoring plan**.** If the data indicate that the project is not meeting its 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 evaluate the project and that funding is suitable to fulfill monitoring requirements.

B. USFWS will:

1. Review the monitoring plan and budget annually with CPRA to determine that the data being collected adequately evaluate the project and that funding is suitable to fulfill monitoring requirements.

2. Review OM&M reports.

5. REFERENCES

Coastal Protection and Restoration Authority of Louisiana. 2012. *Louisiana's Comprehensive Master Plan for a Sustainable Coast*. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Couvillion, B.R., J.A. Barras, G.D. Steyer, W. Sleavin, M. Fischer, H. Beck, N. Trahan, B. Griffin, and D. Heckman. 2011. Land area change in coastal Louisiana from 1932 to 2010: U.S. Geological Survey Scientific Investigations Map 3164, scale 1:265,000, 12 pp. pamphlet.

Day, J.W., L.D. Britsch, S.R. Hawes, G.P. Shaffer, D.J. Reed, and D. Cahoon. 2000. Pattern and process of land loss in the Mississippi Delta: A spatial and temporal analysis of wetland habitat change. Estuaries 23(4):425–438.

Day, J.W. Jr. and P.H. Templet. 1989. Consequences of sea level rise: Implications from the Mississippi Delta. *Coastal Management* 17:241–257.

Folse, T.M, L.A. Sharp, J.L. West, M.K. Hymel, J.P. Troutman, T.E. McGinnis, D. Weifenbach, L.B. Rodrigue, W.M. Boshart, D.C. Richardi, W.B. Wood, and C.M. Miller. 2008, revised 2014. A Standard Operating Procedures Manual for the Coastwide Reference Monitoring System-*Wetlands*: Methods for Site Establishment, Data Collection, and Quality Assurance/Quality Control. Louisiana Coastal Protection and Restoration Authority. Baton Rouge, LA. 228 pp.

Gagliano, S.M., K.J. Meyer-Arendt, and K.M. Wicker. 1981. Land loss in the Mississippi River Deltaic Plain. *Transactions-Gulf Coast Association of Geological Societies*. 31:295–300.

APPENDIX I

Monitoring Budget for Lake Hermitage Marsh Creation (BA-42)

Lake Hermitage Marsh Creation (BA-42)

Federal Sponsor: United States Fish and Wildlife Service

CWPPRA PPL 15

Schedule is in federal fiscal years (October 1-September 30)

Approved monitoring budget as of October 2015

		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12	YR13	YR14	YR15	YR16	YR17	YR18	YR19	YR20
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
	Rates																				
Elevation Survey	$65,000			$68,103		$70,785														$93,399	
Land/water Analysis	$19,500	$19,754									$23,446									$28,020	
Vegetation Survey	$9,500			$9,953							$11,422									$13,651	
Operations, Maintenance & Monitoring Report (OM&M)	$24,000						$26,659														$35,175
Monitoring Administration	$12,480	$6,321	$3,211	$13,076	$3,331	$13,591	$3,466	$2,121	$2,163	$2,207	$7,503	$3,826	$2,342	$2,389	$2,436	$2,485	$2,535	$2,585	$2,637	$17,933	$4,573
Annual total		$26,075	$3,211	$91,132	$3,331	$84,375	$30,124	$2,121	$2,163	$2,207	$42,370	$3,826	$2,342	$2,389	$2,436	$2,485	$2,535	$2,585	$2,637	$153,002	$39,748
FULLY-FUNDED TOTAL	**$501,094**																				