



State of Louisiana

**Coastal Protection and Restoration
Authority of Louisiana**

2021 Monitoring Plan

for

Rockefeller Gulf Shoreline Stabilization (ME-0018)

State Project Number ME-0018
Priority Project List 10

September 2021
Cameron Parish

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**MONITORING PLAN
ROCKEFELLER GULF SHORELINE STABILIZATION PROJECT
(ME-0018)**

The Coastal Protection and Restoration Authority (CPRA) and the National Oceanic and Atmospheric Administration / National Marine Fisheries Service (NMFS) agree to carry out the terms of this Operation, Maintenance, Monitoring and Rehabilitation Plan (hereinafter referred to as the “Plan”) of the accepted, completed project features.

The project features covered by this plan are inclusive of and are identified as the Rockefeller Gulf Shoreline Stabilization Project (ME-0018). This plan outlines the provisions 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 that assess elevation changes of the constructed features and effects on shoreline erosion not to exceed the 20 year economic life.

Construction of ME-0018 was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended. This project was approved on the 10th Priority Project List.

The construction components associated with this project are located entirely on state water bottoms of the Gulf of Mexico adjacent to Rockefeller Wildlife Refuge in Cameron Parish, Louisiana. Topographic elevation surveys will be on land owned by Rockefeller Wildlife Refuge.

PROJECT DESCRIPTION, PURPOSE, LOCATION, AND GOALS

Shoreline erosion is a significant cause of marsh loss throughout coastal Louisiana. There are many successful shoreline protection projects that employ the use of rock and other traditional protection systems. However, there are many locations in coastal Louisiana where factors such as unstable soil conditions, subsurface obstructions, and accessibility problems severely limit the alternatives of shoreline protection. The purpose of the project is to install and monitor a reef breakwater with a light weight aggregate core (LWAC) armored with limestone on the Gulf of Mexico shoreline along Rockefeller Wildlife Refuge in Cameron Parish, Louisiana west of Joseph’s Harbor (Figure 1). A small section of the LWAC breakwater was tested as successful for attenuating waves in this location (HDR Engineering, Inc. 2011). Planned as a three (3) mile alignment, ME-0018 was extended to 3.85 miles as a semi-continuous breakwater (Figure 1). Fisheries and water exchange gaps in the breakwater were designed to stop prevailing waves from easily passing through to the shoreline. The previously constructed ME-0018 CIAP test sections and the LA-0008 Bioengineered Oyster Reef Demonstration project were incorporated into the alignment; the western ME-0018 test section (rock rip-rap) was removed and used to cover the ME-0018 LWAC. Structure construction was conducted from April 2018 through May 2020.

The goal of ME-0018 is to halt shoreline retreat and direct marsh loss to protect marsh habitat for wildlife and fisheries habitat and storm surge protection.



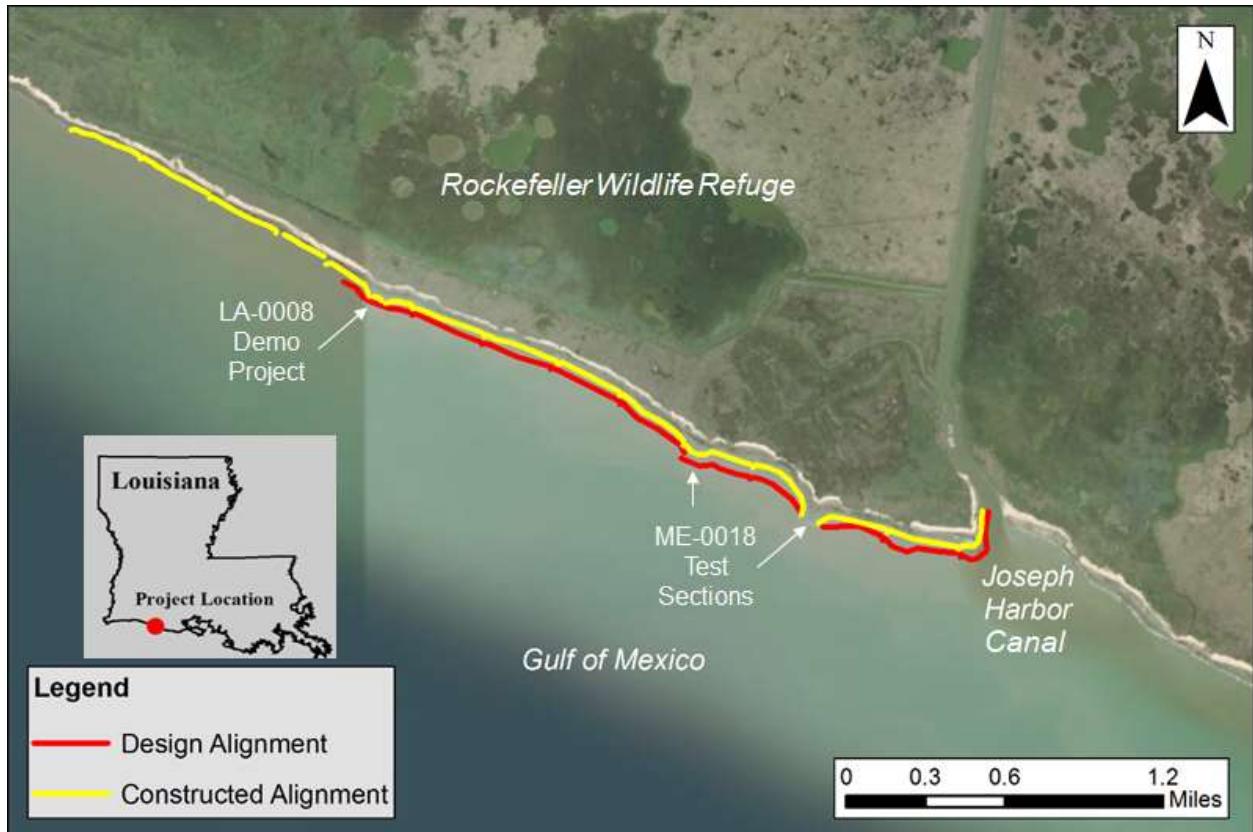


Figure 1. Location of designed and constructed Rockefeller Gulf Shoreline Stabilization project (ME-0018) alignment along the Gulf of Mexico shoreline for Rockefeller Wildlife Refuge in Cameron Parish, Louisiana. The alignment was adjusted northward because of erosion between the time of planning and construction; the structure alignment was also extended northwest for about a mile from what was originally planned.

Starting less than a month after ME-0018 construction ended, Louisiana had a very intensive 2020 tropical storm season as five named tropical systems made landfall from June 7 – October 29, and four additional storms made landfall elsewhere along the US Gulf of Mexico coast. The ME-0018 area was heavily impacted by Hurricane Laura (Category 4) on August 27 and Hurricane Delta (Category 2) on October 9 which both made landfall in western Cameron Parish. In response, a ME-0018 Hurricane Assessment was conducted which included repeating the as-built topographic/bathymetric elevation survey (January – March 2021) and a shoreline position assessment from NOAA post storm imagery taken on October 10, 2020 (HDR Engineering, Inc. 2021). The hurricane assessment elevation survey transects extended further into the protected marsh and included a reference area. Because the hurricane damages occurred soon after construction and had quality improvements over the as-built elevation survey, the post hurricane elevation survey was considered a Construction phase activity and will be used as the new baseline for future monitoring efforts. The monitoring plan was revised to reflect these changes.

ITEMS REQUIRING MONITORING

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

- A. **Topographic and bathymetric surveys** intersecting the shoreline will track elevation changes of the LWAC breakwater, marsh, and water bottoms both landward and gulfward of the structure. Elevation data with minimum horizontal spacing of 10 ft for topography and 25 ft for bathymetry or closer if necessary to define distinct morphologic features such as the end of continuous vegetation, steep changes in slope, shoreline face, sand bars, scour holes, and distinct changes in structure profile (shoreward toe, shoreward crest, center crest, gulfward crest, and gulfward toe). Survey transect endpoints will be approximately 200 ft landward from the structure (at least 25 feet into the continuous marsh vegetation) and extend 200 ft into the Gulf of Mexico from the centerline of the breakwater. Survey transects will bisect the four (4) mile long project area; transects will be located at the ends of the structure, near the ends and in the middle of fish gaps, between gaps on about 500 ft spacing and collocated with the settlement plates (spaced approximately 1000' apart), and crossing each existing structure from the CIAP test sections (1 structures = 3 transects) and LA-08 (1 at each structure and the gap = 3 transects). In addition to elevation collected from each settlement plate, the distance from the top of the settlement plate pole to the rocks will be measured to interpret differences between structure and subsurface settlement as long as the settlement plate poles are viable. Complimenting elevation surveys conducted during planning, construction (As-built), and Post 2020 Hurricanes Assessment, monitoring surveys will be conducted 3, 8, and 15 years following construction. Transect locations from the Post 2020 Hurricanes Assessment will be available to select a subset of transects.
- B. **Shoreline mapping** will be conducted along the project area and along the reference area southeast of Joseph Harbor Canal in conjunction with the elevation surveys. The gulfward edge of continuous vegetation will be mapped with a differential Global Positioning System (dGPS). Shoreline movement rates will be calculated between time increments of interest. Aerial imagery can also be used for shoreline change analyses.
- C. **Monitoring reports** will be included in comprehensive Operation, Maintenance, and Monitoring Reports in years 4, 9, and 16 following construction as new data is available.

MONITORING BUDGET

The cost associated with the Monitoring of the features outlined above in this plan for the 20 year project life is \$608,114 (see Appendix A).

RESPONSIBILITIES – MONITORING

A: CPRA will:

1. Conduct joint site inspections with NMFS after major storm events if determined to be necessary by CPRA and/or NMFS. CPRA will submit to NMFS a report detailing the condition of the project features.
2. Provide a total contribution of CPRA's share of the 20 year life of the project.
3. Coordinate and oversee all monitoring data collection.
4. Ensure that all data goes through quality control procedures.
5. Analyze the data and report on the status of the project.
6. The federal and state representatives appointed above shall meet as necessary to review the reports and discuss the project status.

B. NMFS will:

1. Conduct joint site inspections with CPRA after major storm events if determined to be necessary by CPRA or NMFS.
2. Provide a total contribution of NMFS's share of the 20 year life of the project.
3. Review reports submitted by CPRA and provide comments.

NOTES

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|----|---|------------------------------------|---------------|
| A. | Implementation | Start Construction: | November 2017 |
| | | End Construction: | May 2020 |
| B. | Monitoring | Initiated: | January 2022 |
| C. | NOAA Project Manager | Donna Rogers, Ph.D. | 225-636-2095 |
| D. | CPRA Project Manager | Bevin Barringer | 225-342-4525 |
| E. | CPRA Project Engineer | Julia Wall | 225-342-4485 |
| F. | CPRA Monitoring Manager | Tommy McGinnis | 337-482-0665 |
| G. | CPRA Operations Manager | Dion Broussard | 337-482-0686 |
| H. | Landowner | LDWF – Rockefeller Wildlife Refuge | 337-538-2276 |
| I. | The Monitoring Plan is subject to change to fit adaptations made during construction. | | |

REFERENCE

- HDR Engineering, Inc. 2011. Rockefeller Refuge Gulf Shoreline Stabilization Demonstration Project (ME-18), Post Construction Monitoring Report. Prepared for the Louisiana CPRA, HDR Project No. 16337 (PW69815), 41 pp. plus appendices.
- HDR Engineering, Inc. 2014. Rockefeller Refuge Gulf Shoreline Stabilization (ME-18), 30% Design Report. Prepared for the Louisiana Coastal Protection and Restoration Authority. 33 pp. plus appendices.
- HDR Engineering, Inc. 2021. Rockefeller Refuge Gulf Shoreline Stabilization Project (ME-18), Post Hurricane Monitoring Report. Prepared for the Louisiana Coastal Protection and Restoration Authority. 26 pp. plus appendices.

APPENDIX A
MONITORING COST ESTIMATE/BUDGET

**Coastal Wetlands Planning, Protection and Restoration Act
Rockefeller Refuge Gulf Shoreline Stabilization ME-18
Project Priority List 10 (ver.052915)**

Fully Funded Costs		Total Fully Funded Costs				Amortized Costs				\$2,334,301	
Year	Fiscal Year	E&D	Land Rights	Federal S&A	LDNR S&A	Corps Admin	Monitoring	S&I	Contingency	Construction Costs	Total First Cost
Phase I											
7	0.961	2013	\$298,133	\$4,300	\$114,667	\$114,667	\$148	\$3,303	\$0	\$0	\$535,217
6	0.978	2014	\$894,400	\$12,900	\$344,000	\$344,000	\$443	\$9,909	\$0	\$0	\$1,605,652
5	0.999	2015	\$149,067	\$2,150	\$57,333	\$57,333	\$74	\$1,651	\$0	\$0	\$267,609
4	1.000	2016	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3	1.014	2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL			\$1,341,600	\$19,350	\$516,000	\$516,000	\$665	\$14,863	\$0	\$0	\$2,408,478
Phase II											
3	1.014	2017	\$0	\$0	\$152,607	\$152,607	\$725	\$0	\$369,936	\$1,060,710	\$7,071,397
2	1.032	2018	\$0	\$0	\$266,321	\$266,321	\$1,265	\$0	\$645,592	\$1,851,090	\$12,340,598
1	1.052	2019	\$0	\$0	\$113,075	\$113,075	\$1,395	\$0	\$274,108	\$785,942	\$5,239,612
0	1.073	2020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
-1	1.094	2021	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL			\$0	\$0	\$532,003	\$532,003	\$3,384	\$0	\$1,289,636	\$3,697,741	\$24,651,608
Total Cost			\$1,341,600	\$19,350	\$1,048,003	\$1,048,003	\$4,049	\$14,863	\$1,289,636	\$3,697,741	\$24,651,608
Year	FY	State Monitoring	State O&M & Insp	Fed Monitoring	Fed O&M & Insp	Corps Admin					
0	1.0729	2020	\$62,985	\$14,079	\$0	\$7,654	\$1,314				
-1	1.0944	2021	\$0	\$10,506	\$0	\$3,721	\$1,341				
-2	1.1162	2022	\$93,435	\$16,322	\$0	\$9,738	\$1,367				
-3	1.1386	2023	\$0	\$10,930	\$0	\$3,871	\$1,395				
-4	1.1613	2024	\$0	\$11,149	\$0	\$3,949	\$1,423				
-5	1.1846	2025	\$37,196	\$13,604	\$0	\$6,393	\$1,451				
-6	1.2083	2026	\$0	\$11,599	\$0	\$4,108	\$1,480				
-7	1.2324	2027	\$84,674	\$61,398	\$0	\$15,722	\$1,510				
-8	1.2571	2028	\$39,472	\$14,436	\$0	\$6,784	\$1,540				
-9	1.2822	2029	\$8,206	\$12,802	\$0	\$4,881	\$1,571				
-10	1.3079	2030	\$0	\$12,555	\$0	\$4,447	\$1,602				
-11	1.3340	2031	\$0	\$12,807	\$0	\$4,536	\$1,634				
-12	1.3607	2032	\$8,708	\$62,702	\$0	\$14,931	\$1,667				
-13	1.3879	2033	\$0	\$13,324	\$0	\$4,719	\$1,700				
-14	1.4157	2034	\$97,264	\$19,426	\$0	\$11,000	\$1,734				
-15	1.4440	2035	\$45,341	\$16,583	\$0	\$7,793	\$1,769				
-16	1.4729	2036	\$0	\$14,140	\$0	\$5,008	\$1,804				
-17	1.5023	2037	\$0	\$14,422	\$0	\$5,108	\$1,840				
-18	1.5324	2038	\$0	\$14,711	\$0	\$5,210	\$1,877				
-19	1.5630	2039	\$130,832	\$22,854	\$0	\$64,106	\$3,509				
Total			\$608,114	\$380,348	\$0	\$193,678	\$33,528				

