State of Louisiana

Coastal Protection and Restoration Authority of Louisiana

2011 Operations, Maintenance, Monitoring and Rehabilitation Plan

for

East Marsh Island Marsh Creation (TV-21)

State Project Number TV-21
Priority Project List 14

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Iberia Parish

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OPERATION, MAINTENANCE, MONITORING AND REHABILITATION PLAN FOR THE EAST MARSH ISLAND MARSH CREATION PROJECT (TV-21)

The Coastal Protection and Restoration Authority (CPRA) and the United States Department of Agriculture / Natural Resources Conservation Service (NRCS) 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 in accordance with the Cost Sharing Agreement NRCS CWPPRA-09-001/DNR No. 2511-09-06 dated May 4, 2009. (Attachment I). The Environmental Protection Agency (EPA) will also be included as part of the OM&M Rehabilitation Plan as a reviewing federal sponsor.

The project features covered by this plan are inclusive of and are identified as the East Marsh Island Marsh Creation Project (TV-21). The intention of the provisions of this plan is to maintain this project in a condition that will generally provide the anticipated benefits that the project was based on. In addition 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 and recommendations made to adaptively manage the project. There is no requirement that this project function to any standard beyond the twenty-year (20 year) economic life; except that it is not left as a hazard to navigation or a detriment to the environment.

Construction of the East Marsh Island Marsh Creation Project 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 fourteenth (14^{th}) Priority Project List.

The construction components associated with this project are located entirely on land owned by the Louisiana State Wildlife Refuge.

1. PROJECT DESCRIPTION, PURPOSE, LOCATION, AND GOALS

The East Marsh Island Marsh Creation Project consists of approximately 1159 acres of marsh creation and nourishment in the Teche/Vemilion Basin. There are approximately 362 acres of levee contained marsh and 797 acres of uncontained marsh within the project boundary. The proposed location of the project is on the east end of Marsh Island Wildlife Refuge and within the Marsh Island Hydrologic Restoration (TV-14) project southeast of Lake Sand in Iberia Parish. (Attachment II) (figure 1).

The project is to restore brackish marsh habitat in the areas converted to open water primarily by hurricane damage. Created and nourished marsh generally has a reduced land loss rate due to the addition of sediment. Typically, that reduced land loss rate is anticipated to be 50% of the existing loss rate. In addition, the project would aid in prevention of land loss by reinforcing the tip of the island to avoid excess tidal exchange through existing oil and gas canals and the shoreline, and to prevent changes in circulatory patterns between the Gulf of Mexico and the Vermilion Bays complex. The created areas will be planted with vegetative transplants of appropriate species as needed to accelerate the development and maintenance of vegetative cover and diversity throughout the project life.

The project has a twenty-year (20 year) economic life, which began in July 2011.

The project goals and objectives are:

1. To create approximately 362 acres of emergent marsh in shallow water and mud flats.
2. To create/nourish an additional 797 acres of brackish marsh with unconfined dredged sediment.
3. Reduce the future loss rate of new and existing marsh in the project area by 50%.

2. CONSTRUCTION COMPLETION

The East Marsh Island Marsh Creation completion report is included in the Attachment III of this plan and "As Built" drawings are included in Attachment IV. Within this completion report is a summary of information and significant events including: project personnel; final as-built project features and benefited acres; final dimensions/bathymetry of the borrow site; construction cost and CWPPRA project estimates; construction oversight costs; construction activities and change orders; pipeline and utility crossing owner information; and other significant milestone dates and comments.

The project "As-Built" construction drawings are updated with all field changes and modifications that occurred.

3. PROJECT PERMITS

Project permit applications were completed and submitted to appropriate agencies and permits were received prior to construction. These permits and permit applications, as well as permit modifications, are included in Attachment V. Provisions for renewal of certain Federal and State Permits may be required.

4. ITEMS REQUIRING MAINTENANCE AND REHABILITATION

The following completed structural components and project features jointly accepted by CPRA and NRCS will require operation, maintenance, repair, and/or rehabilitation throughout the twenty (20) year life of the project.

A. **Marsh Creation:** Approximately 3,836,209 cubic yards of earthen material dredged from the East Cote Blanche Bay used to create 362 acres of marsh within containment dikes and create/nourish 797 acres of marsh outside containment.

B. **Containment Dike:** Approximately 14,000 linear feet of containment dikes to be degraded one year after construction.

C. **Wetland Vegetative Community Cover on Marsh Creation/Nourishment Areas:** The project areas will be planted with appropriate vegetative species as needed to accelerate the development of wetland vegetative cover and diversity. To be maintained by two additional phases of vegetative plantings to address critical need or unvegetated areas, if determined necessary.

D. **Earthen Plug:** Approximately 820 linear feet of earthen plug at the south end of the oilfield canal.

5. ITEMS REQUIRING ENGINEERING MONITORING

Two project specific CRMS-like monitoring sites will be installed in the project area, one in containment cell area 1 and one in nourishment area 2 (figure 1). Data from these sites will be compared to reference sites CRMS0522, CRMS0523, and CRMS0524 or additional CRMS sites located outside the project area (figure 1). The following monitoring strategies will provide the information necessary to evaluate the specific project goals**.**

A. Aerial photography of the entire project area will be obtained post construction at year 3 (2013) and at year 10 (2020) to evaluate land/water ratios. At each CRMS site, aerial photography will be collected every three years to determine land/water ratios within the 1 km^2 area of each site.

B. Salinity readings will be recorded hourly using continuous recorders located at each CRMS site. Discrete porewater salinity will be collected when sondes are serviced and during vegetation monitoring.

C. Water level readings will be recorded hourly at each CRMS site to determine frequency, and depth and duration of flooding.

D. Vegetation sampling will follow the Braun-Blanquet methodology and will consist of ten replicate 2m x 2m stations located within a 200m x 200m square of each CRMS site. Data will be collected annually in late summer.

E. Soil cores will be collected at each CRMS site upon establishment at year 1 (2011). Analysis of soil properties will include soil pH, salinity (EC), bulk density, moisture, percent organic matter, wet/dry volume and texture (Particle Size Distribution) analysis.

F. Rod Surface Elevation Tables (RSET) will be used to measure changes in sediment elevation over time relative to a fixed datum at each CRMS site. Data will be collected biannually in the spring and fall.

G. Accretion plots will be used to measure surface accretion (i.e. sediment deposition) near the RSET station at each CRMS 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 semi-annually in spring and fall.

H. Submerged Aquatic Vegetation (SAV) will be monitored to document changes in the frequency of occurrence of SAV in the two ponds adjacent to the project area using the modified rake method (figure 2). The breech into the easternmost pond adjacent to the project area may have affected SAV's. Three transects will be monitored in each of the two ponds adjacent to the project area. Each transect will have a minimum of 20 sampling stations. At each station, aquatic vegetation will be sampled by dragging a garden rake on the pond bottom for about one second. The presence of vegetation will be recorded to determine the frequency of aquatic plant occurrence (frequency = number of occurrences/number of stations x 100). When vegetation is present, the species present will be recorded in order to determine the frequencies of individual species. SAV abundance will be sampled in the fall at years 1, 3, and 5 (2011, 2013, and 2015). Ancillary discrete salinity samples and water depth will be collected at the starting, center, and end point of each transect.

I. Project specific soil cores will be collected at 6 sites, one within each contained site and 4 in the surrounding uncontained deposition sites upon establishment at year 1, 5, 10, and 20 (2011, 2015, 2020, and 2030). Analysis of soil properties will include but not necessarily be limited to soil pH, salinity (EC), bulk density, moisture, percent organic matter, wet/dry volume, and texture (Particle Size Distribution) analysis.

J. Bathymetric, side-scan sonar, and high resolution seismic surveys in the East Cote Blanche Bay borrow area will determine approximate refill rates to aid in the

design of future projects utilizing dredged sediment. Survey transects shall be spaced 500 ft past the limit of cut. All bathymetric surveys must be corrected for tidal fluctuations and wave action to the NAVD88 vertical datum. All surveys shall be performed to CPRA standards in years 5, 10, and 20 (2015, 2020, and 2030).

K. To monitor the settlement of the underlying soils, five settlement plates will be placed in the marsh creation areas during construction at locations where geotechnical soil borings were collected pre-construction. Settlement plates shall be resurveyed at years 1, 3, and 5 (2011, 2013, and 2015). Additionally, surveys will be performed along the same transects as the As-Built surveys for consistency.

L. Dissolved oxygen level monitoring in the East Cote Blanche Bay borrow area and a reference area (located within one-quarter to one-half mile of the borrow site and between the borrow site and the east end of Marsh Island) will be performed at three events post-construction in years 1, 3, and 5 (2011, 2013, and 2015) unless prior refill of the borrow area occurs. The ratio of the dissolved oxygen content (ppm) to the potential capacity (ppm) will give the percent saturation, which is an indicator of water quality. An event shall consist of systematic monitoring of the borrow and reference areas for hypoxia (dissolved oxygen <2 mg l-1) in bottom waters for 60 days in the summer from July 1st through August 30th. This will be accomplished by installing a continuous recorder adjacent to a buoy in the borrow area and in a nearby reference area

6. OPERATION, MAINTENANCE, AND MONITORING BUDGET

The cost associated with the Operations, Maintenance, Monitoring and Rehabilitation of the features outlined in Section 4 & 5 of this plan for the twenty (20) year project life is included and summarized in Attachment VI.

7. OPERATION OF STRUCTURES

There are no operations associated with this project.

8. RESPONSIBILITIES – MAINTENANCE, MONITORING AND REHABILITATION

A: CPRA will:

1. In accordance with the Cost Sharing Agreement outlined in Attachment I, assume all responsibilities for maintenance and rehabilitation of the accepted completed project features identified in Section 4, with the exception of wetland vegetative community cover as referenced above in Item 4.c.

2. Conduct joint site inspections with NRCS of the project site at least annually and after major storm events if determined to be necessary by CPRA and/or NRCS. CPRA will submit to NRCS, a report detailing the condition of the project features for which CPRA is responsible and recommendations for any corrective action. If CPRA recommends that corrective actions are needed, the report will include the entire estimate of costs for engineering and design, supervision and inspection, construction, contingencies, and urgency of such actions.

3. Perform or have performed any corrective actions needed, if such corrective actions have been approved by CPRA and NRCS. NRCS will participate with CPRA, or its appointed representative, in the engineering and design phases of the corrective actions for the project features for which CPRA is responsible. Oversight of engineering and construction of the corrective actions for said project features will be the responsibility of CPRA or its appointed representative. At least thirty (30) calendar days prior to the date of formal request for construction bids, CPRA or its appointed representative shall provide final copies of all corrective action designs and specifications for review and concurrence by NRCS. CPRA shall approve the final design and specifications prior to proceeding with bid solicitations on all project corrective action construction contracts in coordination with NRCS. Any plan and/or specification change both before and after award of construction contracts shall be approved by CPRA in coordination with NRCS.

4. The representatives appointed above shall meet as necessary during the period of construction for corrective actions and shall make such recommendations, as they deem necessary.

5. Provide a total contribution equal to the amount outlined in the Cost Sharing Agreement for the maintenance and rehabilitation cost needed for the twenty (20) year life of the project.

6. Coordinate and oversee all scientific data collection.

7. Ensure that all data goes through quality control procedures and is entered into the public database.

8. Analyze the data and report on the status of the project every three years. Should the data indicate that the project is not meeting the goals and objectives, adaptive management recommendations will be made to improve the response. This may include pumping additional sediment if elevation is below target levels and or planting adaptable vegetation should the newly created marsh within each unit become sparse or unhealthy.

9. The federal and state representatives appointed above shall meet as necessary to review the reports and discuss the project status.

B. NRCS will:

1. Assume all responsibilities for maintenance and rehabilitation of the wetland vegetative community cover, as identified above in Section 4.c.

2. Conduct joint site inspections with CPRA of the project site at least annually and after major storm events if determined to be necessary by CPRA or NRCS. NRCS will submit to CPRA recommendations for any action in regard to the necessity for the second and third phase of vegetative plantings. If NRCS recommends that corrective actions are needed, NRCS will submit to CPRA a report detailing the condition of the vegetative plantings and developed cover along with specific recommendations for the corrective action. The report will include the entire estimate of costs for design, supervision and inspection, planting, contingencies, and urgency of such actions.

3. Review preliminary design of any operation and maintenance project, with the exception of the 2nd and 3rd Phase plantings, and provide concurrence prior to formal request for construction bids on any corrective actions for the project.

4. Design and develop the plans and specifications of the second and third phases of vegetative plantings, if determined necessary by CPRA and NRCS. Oversight of the installation of the plantings for the project will be the responsibility of NRCS or its appointed representative. At least thirty (30) calendar days prior to the date of formal request for bids on the planting contract, NRCS or its appointed representative shall provide final copies of all plans and specifications for review and concurrence by CPRA. NRCS shall approve the final plans and specifications in coordination with CPRA prior to proceeding with bid solicitations on all planting contracts. Any plan and/or specification change both before and after award of construction contracts shall be approved by NRCS in coordination with CPRA.

5. Provide a total contribution equal to the amount outlined in the Cost Sharing Agreement for the maintenance and rehabilitation cost needed for the twenty (20) year life of the project.

6. Review the reports and provide concurrence on any corrective action or operational changes for the project.

The undersigned parties, acting on behalf of their respective agencies, agree to operate, maintain, and rehabilitate the East Marsh Island Marsh Creation Project (TV-21) according to this document, referenced Cooperative Agreement, plans, and all applicable permits and laws.

NATURAL RESOURCES CONSERVATION SERVICE

By: _____ Date: _____

Title: _____

COASTAL PROTECTION AND RESTORATION AUTHORITY

By: _____ Date: _____

Title: _____

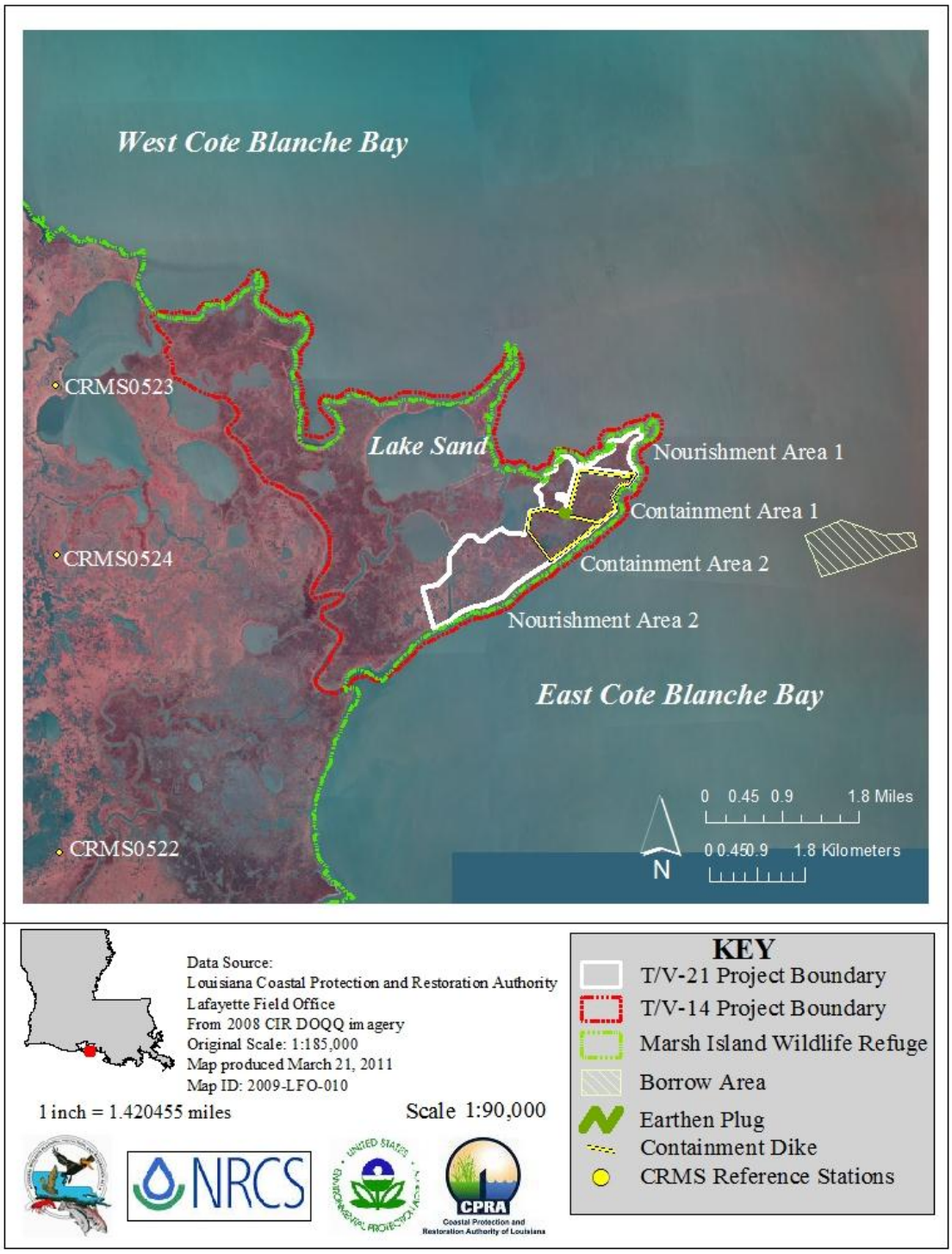

Figure 1. East Marsh Island Marsh Creation (TV-21) project area and location of borrow area.

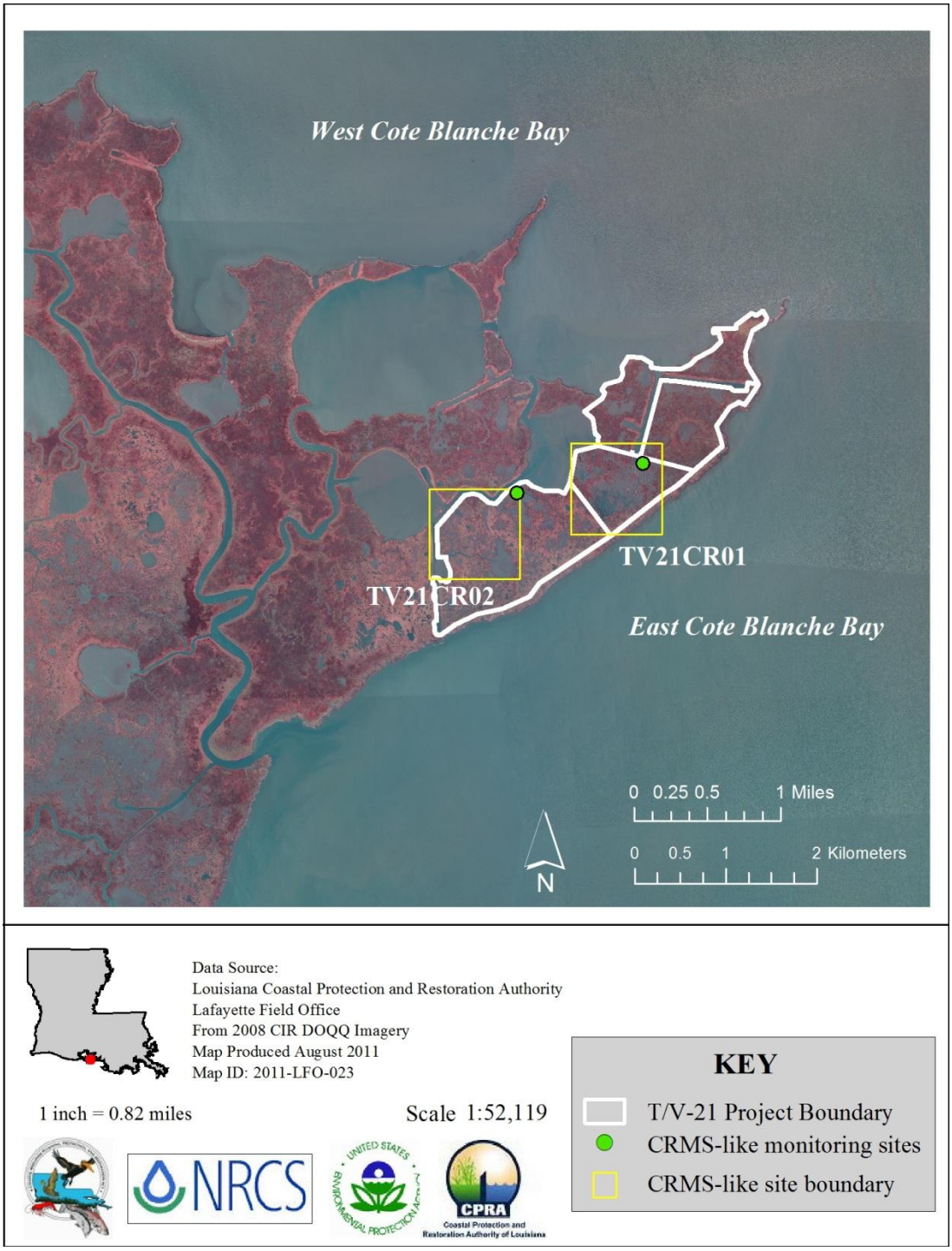

Figure 2. East Marsh Island Marsh Creation (TV-21) project CRMS like monitoring station locations.