State of Louisiana

Coastal Protection and Restoration Authority of Louisiana

Monitoring Plan

for

Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164)

State Project Number BA-0164
Priority Project List 22

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Monitoring Plan for Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164)

Priority Project List 22

The Coastal Protection and Restoration Authority of Louisiana (CPRA) and the United States Environmental Protection Agency (EPA) agree to carry out the terms of this monitoring plan for Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164). 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. This monitoring plan, forthcoming OM&M reports, and additional documents pertaining to BA-0164, can be accessed through CPRA’s Coastal Information Management System (CIMS) website at http://cims.coastal.louisiana.gov.

Construction of BA-0164 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, GOAL, OBJECTIVES and FEATURES**

   **Description**

   The Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164) project used sediment hydraulically dredged from the Anchorage Alliance borrow site in the Mississippi River to build a 144-acre marsh platform in an area of the Barataria Basin that had converted from marsh to shallow open water (Figure 1). The Long Distance Sediment Pipeline (BA-0043-EB) was used to transport the dredged sediment from the river to the project area. The pipeline is supported with Coastal Impact Assistance Program and state funds and is sponsored by local governments and CPRA. One terrace field, containing 14 earthen terraces, was also constructed as part of the BA-0164 project using sediment dredged from within the project area.

   An additional neighboring 128 acres of marsh were constructed with Mississippi River sediment using surplus contingency funds from the BA-0043-EB project (Figure 2). This additional acreage was originally included in the footprint for BA-0164, but the size of the project area was ultimately reduced for construction due to budget constraints. The CPRA intends to monitor this adjacent BA-0043-EB acreage because it was included in the originally-approved monitoring budget. Also funded through the BA-0043-EB project was the construction of a pipeline access corridor for BA-0164 and BA-0043-EB that created 20 acres of marsh (Figure 2). The corridor is not being monitored as part of this plan.

   A combination of factors have resulted in the conversion of healthy marsh habitat to open water and degraded marsh within the project area. Some of the primary influencing factors include subsidence, lack of riverine sediment input, (Baumann et al. 1984), the alteration of hydrology resulting from the dredging of oil and gas canals (Sasser et al. 1986) and sea-level rise (Penland and Ramsey 1990).
Figure 1. Location of Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164), neighboring restoration projects, and the Alliance Anchorage borrow site.
Figure 2. Bayou Dupont Sediment Delivery Marsh Creation #3 and Terracing (BA-0164). The adjacent BA-0043-EB marsh creation cells will also be monitored as part of this plan.
The BA-0164 project area is located on the west bank of the Mississippi River in Jefferson and Plaquemines Parishes, west-northwest of the town of Myrtle Grove, Louisiana (Figure 1). The project area lies between the Plaquemines Parish flood protection levee to the east and Bayou Dupont to the southwest. The northern boundary of the marsh creation and the northwest boundary of the terraces are adjacent to the CWPPRA-funded Mississippi River Sediment Delivery System–Bayou Dupont (BA-0039) marsh creation project, which is also sponsored by the EPA.

The BA-0164 project area is located within the project boundary for Naomi Outfall Management (BA-0003c), another CWPPRA-funded project that is sponsored by the US Natural Resources Conservation Service. Additional restoration projects that include marsh creation, ridge restoration and shoreline protection strategies have been constructed in the vicinity of BA-0164 (Figure 1). Information about these projects is available at http://cims.coastal.louisiana.gov.

Construction of the BA-0164 project began in April 2016 and was completed in August 2016 for the marsh creation platform and in June 2017 for the terraces. Prior to construction of the marsh creation platform, the existing spoil bank along the northern, eastern and southern project boundary was fortified and elevated with in situ sediment to contain the dredged river sediment as it dewatered and consolidated. This containment was designed to a height of +3.5 ft ± 0.5 ft NAVD88 (Geoid03)* with a five-foot wide crown and side slopes of 1(V):5(H) (Moffatt & Nichol 2014). The western boundary of the project area was left uncontained to provide a more natural shoreline and facilitate hydrologic exchange. The marsh creation platform was designed to an elevation of +2.5 ft ± 0.5 ft and it is predicted to settle to approximately +0.8 ft at year 20 (GeoEngineers 2014). Construction of the BA-0043-EB marsh creation area that will be monitored in conjunction with BA-0164 was completed in September 2016 and was designed to the same marsh creation specifications as BA-0164.

The terraces were constructed to a height of +2.5 ft ± 0.5 ft using sediment that was dredged from within the terrace field. The 14 terraces have variable lengths, but are all constructed with a 10-foot wide crest and side slopes of 1(V):5(H) (Moffatt and Nichol 2017a). The terraces are predicted to settle to +1.78 ft at year 20; however, this elevation only takes into account consolidation settlement. Additional settlement from shrinkage due to drying could occur, potentially resulting in an elevation as low as +1.45 ft at year 20. The construction of terraces will not only result in the direct creation of marsh habitat, but may also facilitate marsh building by trapping suspended sediments in the shallow open water areas adjacent to the terraces. The terraces will also reduce erosive wave energy, thereby adding protection for the neighboring Plaquemines Parish flood protection levee and BA-0039 project area. Vegetative plantings of the terraces with Spartina alterniflora (smooth cordgrass) and Paspalum vaginatum (seashore paspalum) are scheduled to occur within the year post-construction to help stabilize the sediment and enhance colonization by native vegetation.

*All elevations cited in this plan are NAVD88, Geoid03
Goal and Objectives

The goal of Bayou Dupont Marsh Creation #3 and Terracing (BA-0164) is to create marsh and terraces in an area adjacent to the Mississippi River Sediment Delivery System–Bayou Dupont (BA-0039) project that is composed of primarily open water and degraded marsh habitat. The anticipated benefits provided by the project include the creation of important wetland habitat and a localized reduction in wave energy and coastal erosion. The created marsh and terraces are anticipated to be sustainable and provide ecological and storm-buffering benefits through the project’s 20-year CWPPRA lifespan. The objectives of BA-0164 have been updated to include revisions to the constructed project features and are as follows (LCWCR Task Force 2017):

1) Create and nourish approximately 137 acres of intermediate marsh using pipeline delivery of sediment dredged from the Mississippi River.

2) Create approximately 9,679 linear feet of earthen terraces using sediment dredged from within the project area.

The BA-0164 project is included in Louisiana’s Comprehensive Master Plan for a Sustainable Coast under the Large-Scale Barataria Marsh Creation–Component E, 1st Period Increment (CPRA 2012).

Features

The principal project features covered by this monitoring plan are as follows:

**BA-0164 Marsh Creation** (Moffatt & Nichol 2017a)

- 144 acres
- 1,135,893 cubic yards of river sediment
- +2.5 ft ± 0.5 ft design elevation
- 6,855 linear feet of earthen containment dikes (insitu sediment)

**BA-0164 Earthen Terraces** (Moffatt & Nichol 2017a)

- 14 terraces
- 9,666 total linear feet
- Terrace lengths: 248–1052 linear feet
- +2.5 ft + 0.5 ft design elevation
- 10-foot crest width
- Side slopes of 1(V):5(H)
BA-0043-EB Marsh Creation (Moffatt & Nichol 2017)

- 128 acres (148 acres including access corridor)
- 1,001,697 cubic yards of river sediment (1,140,520 cubic yards including access corridor)
- +2.5 ft ± 0.5 ft design elevation
- 18,900 linear feet of earthen containment dikes (insitu sediment; includes access corridor containment dikes)

2. ITEMS REQUIRING MONITORING

Monitoring for BA-0164 includes the collection and analysis of data that will be utilized to measure project success as based on project goals. Project-specific data will be collected and analyzed over time to document the physical and biotic changes that are occurring in the created marsh and terraces. Data will also be utilized from Coastwide Reference Monitoring System-Wetlands (CRMS-Wetlands) sites surrounding the project area to compare characteristics between the created marsh and local, natural marsh. Operations, Maintenance and Monitoring Reports will be written in years 5, 11, and 20 to summarize and analyze all project-related data. Monitoring years correspond to the federal fiscal year, which runs from October 1 – September 30.

A. Land-Water Analysis

Land-water analysis will be used in conjunction with topographic surveys of the project area to evaluate the project’s success of creating a marsh platform and terraces that are sustainable at least through the project’s 20-year CWPPRA life. Land to water ratios in the project area will be determined using CRMS aerial photography (Z/I Imaging digital mapping camera) with 1-meter resolution. The photography will be georectified using standard operating procedures described in Steyer et al. (2000). Aerial photography is tentatively scheduled for years 3, 9 and 18, based on the scheduling of CRMS coastwide flights.

B. Vegetation

Vegetation surveys will be conducted to assess whether the project area has been successfully colonized by intermediate marsh vegetation. The colonization, transition, and maturation of the vegetative community will be analyzed for the marsh creation areas and the terraces. The vegetation community in the project area will also be compared to that of local, natural marsh and to that of nearby marsh creation projects.

Vegetation monitoring in the marsh creation area and in the terrace field will each consist of a minimum of ten 2 m x 2 m stations. Data collection at vegetation stations will follow CRMS methodology and will include total percent cover, species present, percent cover of each species, percent cover and height of each vegetation layer, and the depth of water on the marsh surface (Folse et al. 2014). In addition to the stations surveyed in the terrace field, a general assessment of cover and species assemblages will be noted for each terrace (14 terraces) to identify any significant differences and
possible causative elements. Porewater salinity, specific conductivity and temperature will also be recorded at each vegetation station at 10 cm and 30 cm depths. Vegetation sampling is scheduled for years 2, 5, 10, and 19.

C. **Topographic Surveys**

Data from topographic surveys are used to determine if project features are constructed to the specified heights and are settling at the predicted rate. The as-built topographic surveys for the marsh creation areas and the terraces were conducted in 2016 and 2017, respectively. A final topographic survey of the marsh and terraces is tentatively scheduled for year 5. The as-built survey costs are included in the construction budget, while the year 5 survey costs are included in the operations and maintenance budget.

3. **MONITORING BUDGET**

The cost associated with monitoring BA-0164 for its twenty-year project life is summarized in the monitoring budget in Appendix I.

4. **RESPONSIBILITIES**

A. CPRA will:

1. Coordinate and oversee all scientific data collection.

2. Ensure that all data go through quality control procedures and 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 EPA to determine that the data being collected adequately evaluate the project and that funding is suitable to fulfill monitoring requirements.

B. EPA 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


APPENDIX 1

BA-0164 Monitoring Budget
Bayou Dupont Sediment Delivery-Marsh Creation 3 and Terracing (BA-0164) Monitoring Plan

PPL 22

Years are federal fiscal years (October 1‒September 30)

Price Level: 2015

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* The monitoring budget includes the originally scheduled years for the Vegetation Surveys. The revised schedule is noted in Section II. B of the monitoring plan.

** The topographic survey cost is included in the operations and maintenance budget and is not factored into the $265,415 total monitoring cost.