

APPENDIX H

Monitoring and Adaptive Management

Section 2039 of the Water Resources Development Act (WRDA) of 2007 and Implementation guidance for Section 2039, in the form of a CECW-PB Memorandum dated 31 August 2009, require ecosystem restoration projects develop a plan for monitoring the success of the ecosystem restoration and develop an Adaptive Management Plan (contingency plan) should the project monitoring show that the project is not performing as expected.

1. BUDMAT Program

Each BUDMAT Program project is specifically designed for a one-time beneficial use of dredged material from a specific maintenance dredging activity of a federally maintained navigation channel. Consequently, there is no opportunity to adjust the Project once it has been completed. As discussed below, due to the intent of the BUDMAT Program, adaptive management is not considered viable for BUDMAT projects. Hence, performance criteria for BUDMAT projects is simply defined as a positive gain in subaerial land.

1.1 Restoration Objective

The objective of this project is to beneficially use maintenance dredged material from the federally maintained Tiger Pass navigation channel to restore the natural coastal landscape through creation of marsh habitat in Plaquemines Parish.

1.2 Adaptive Management

There is no opportunity to adjust this BUDMAT Project once it has been completed. This BUDMAT Project, like all previous BUDMAT Projects, is not a good candidate for adaptive management because there are no actions that could be taken in response to monitoring results for the purposes of adaptive management as it would relate to the intent of the LCA BUDMAT Program. Although some activities could be conducted to adjust Project performance, those actions would have to be part of a separate ecosystem restoration or beneficial use of dredged material project.

Although there is no opportunity for adaptive management, the BUDMAT Program will document lessons learned and provide information and or recommendations to future BUDMAT projects or similar projects. Monitoring results from the Project will help refine modeling, design, and predictions of physical and ecological processes that will in turn inform design of future restoration and beneficial use projects.

1.3 Monitoring and Data Collection

Monitoring will be conducted to ensure project designs were correctly implemented and to evaluate project effectiveness. This monitoring plan will be implemented by the USACE, the non-federal sponsor or their contractor and will be cost shared. Data collection will begin with pre-construction and will continue post-construction for a duration up to ten years unless project success has been achieved earlier.

Proposed monitoring and data parameters include:

- Aerial Photography Collection & Analysis- Data will be collected by the USACE Beneficial Use Monitoring Program (or BUMP) aerial photography taken annually as part of the New Orleans District (CEMVN) Federal navigation channel operation and maintenance program. The BUMP program monitors land gain or loss for those navigation projects where dredged material is used beneficially. Total land losses or gains would be reported in acres.
 - Frequency- Annually before and after construction
 - Reporting- BUMP aerial photography is typically acquired in November or December of each calendar year and is available by March or April of the following year. The digital photography is geo-referenced into a suitable format for the use in GIS from which land loss or gain can be calculated. Brief reports based on land loss or gain data using BUMP aerial photography should be released annually prior to 1 June of each calendar year.

- Physical Elevation Surveys- Surveys of the Project site should be carried out pre- and post-construction of this project. Elevation, Bathymetric and As Built Surveys will be conducted by the USACE and/or the local Sponsor (or their designees) before and after construction and will be used to calculate benefits (land acres created) attributed to this project.
 - Frequency- Before and after construction/as built
 - Reporting- From the survey, a brief report describing the land gain or land loss since will be developed. Total land losses or gains would be reported in acres.

- Field surveys – Site visits will be conducted post construction for *in situ* verification of ridge and marsh settlement, vegetative recruitment, and constructed land loss or gain. Field surveys will be conducted by the USACE or the local Sponsor (or their designees)
 - Frequency- Post construction after the initial settlement period

- Data from other projects or programs will be leveraged and used when possible
 - Coastwide Reference Monitoring System (CRMS) Program
 - Annual data from CRMS2608 and CRMS0163 can be used to report on the seasonal variations of salinity, water quality, tide, etc., in the general vicinity of the project area.
 - Annual coastwide aerial imagery is collected that covers this Project area.
 - Annual land water analysis is conducted for the hydrologic monitoring using satellite imagery

1.4 Reporting

Annually all applicable and available data will be compiled, assessed, summarized and archived. The USACE Environmental Management and the non-federal sponsor or its designee will document each of the performed assessments and communicate the results of its deliberations to the managers and decision-makers for the Project. An Annual Project Report will be developed by September 30 of each year to document lessons learned based on assessment results.

The annual reports will compile lessons learned, best practices and experiences relevant to implementation and beneficial use of dredged material for restoration, technical and organizational challenges, and monitoring approaches. Adaptive management is not considered justifiable for this Project. However, lessons and experiences will be clearly documented with recommendations so that they can be easily applied to future projects. Documenting the lessons learned ultimately aims to reduce recurring, technical or programmatic issues that negatively impact cost, schedule, restoration project performance and success.

1.5 Costs

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| Aerial Photography Collection & Analysis | No additional cost. Study area covered by the existing annual BUMP collections |
| Elevation Surveys | No additional cost. These surveys are already being conducted under the Construction contract and or Engineering design. |
| Field Surveys | No additional cost. These surveys are already being conducted under the Construction contract and or Engineering design. |
| CRMS Data Collection | No additional cost. |
| Adaptive Management | N/A |
| Management/Evaluation/Assessment/Decision Making/Report/Data Management | \$10,000 annually |