MONITORING PLAN

PROJECT NO. TV-11b (XTV-27) FRESHWATER BAYOU BANK STABILIZATION - BELLE ISLE CANAL TO LOCK

ORIGINAL DATE: February 3, 2005

Project Description

The Freshwater Bayou Bank Stabilization - Belle Isle Canal to Lock project was proposed on the 9th Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) list in order to prevent further shoreline erosion on the east bank of Freshwater Bayou Canal in Vermilion Parish, Louisiana. Between 1968 and 1992, the Freshwater Bayou Canal shoreline eroded at an average rate of 12.5 feet per year (4 m/yr) (Brown and Root 1992). Monitoring data, collected from shoreline reference stations as part of the Freshwater Bayou Wetland Protections (ME-04) project indicated that the shoreline eroded at an average of 6.69 feet per year (2 m/yr) between 1995 and 1996, and 11.15 feet per year (3.5 m/yr) between 1996 and 1998 (Vincent et al. 2000a). Ongoing LDNR monitoring efforts have indicated that from 1995 to 1998 the eastern shoreline of Freshwater Bayou Canal eroded at an average rate of 9.17 feet per year (2.8 m/yr) (Vincent et al. 2000a). Continued shoreline erosion, caused by vessel-induced wakes, has in some cases breached the spoil bank, subjecting interior marshes to increased water salinities, wave energies, and tidal scour. Tidal scour has eroded organic soils of interior marshes, resulting in emergent vegetation loss within the marshes adjacent to Freshwater Bayou (Vincent et al. 2000b).

The Freshwater Bayou Canal, constructed between 1965 and 1967, provides major shipping access from the Gulf of Mexico to Intracoastal City on the Gulf Intracoastal Waterway (GIWW). In 1968, a lock was built at the southern most end of the inland reach of the navigation channel near the Gulf of Mexico to control the intrusion of saltwater into Freshwater Bayou Canal. It is opened only to allow access for shipping traffic and to alleviate elevated water levels caused by periodic heavy rains. Between 1979 and 1986, approximately 300,000 tons of cargo were transported along the Freshwater Bayou Canal (United State Army Corps of Engineers (USACE) 1989), demonstrating the importance of this highly accessed channel.

The Freshwater Bayou Canal Shoreline Protection, Belle Isle Canal to Lock project involves the construction of a foreshore rock dike along the east bank of Freshwater Bayou Canal. The project encompasses 11,000 acres (4500 ha) and extends approximately 39,330 feet (11,988 m) from the Freshwater Bayou Lock north to Belle Isle Canal (Figure 1). It is anticipated that this strategy will stop the rate of erosion in this area, and reduce deterioration of interior marshes.

Project Goals and Objectives/Coast 2050 Strategies Addressed

Coast 2050, Louisiana's guiding document for the restoration of a sustainable coastal ecosystem, identifies the stabilization of major navigation channels as both a "Coastwide Common Strategy" and a "Regional Ecosystem Strategy" which will restore the hydrology of adjacent marshes (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands

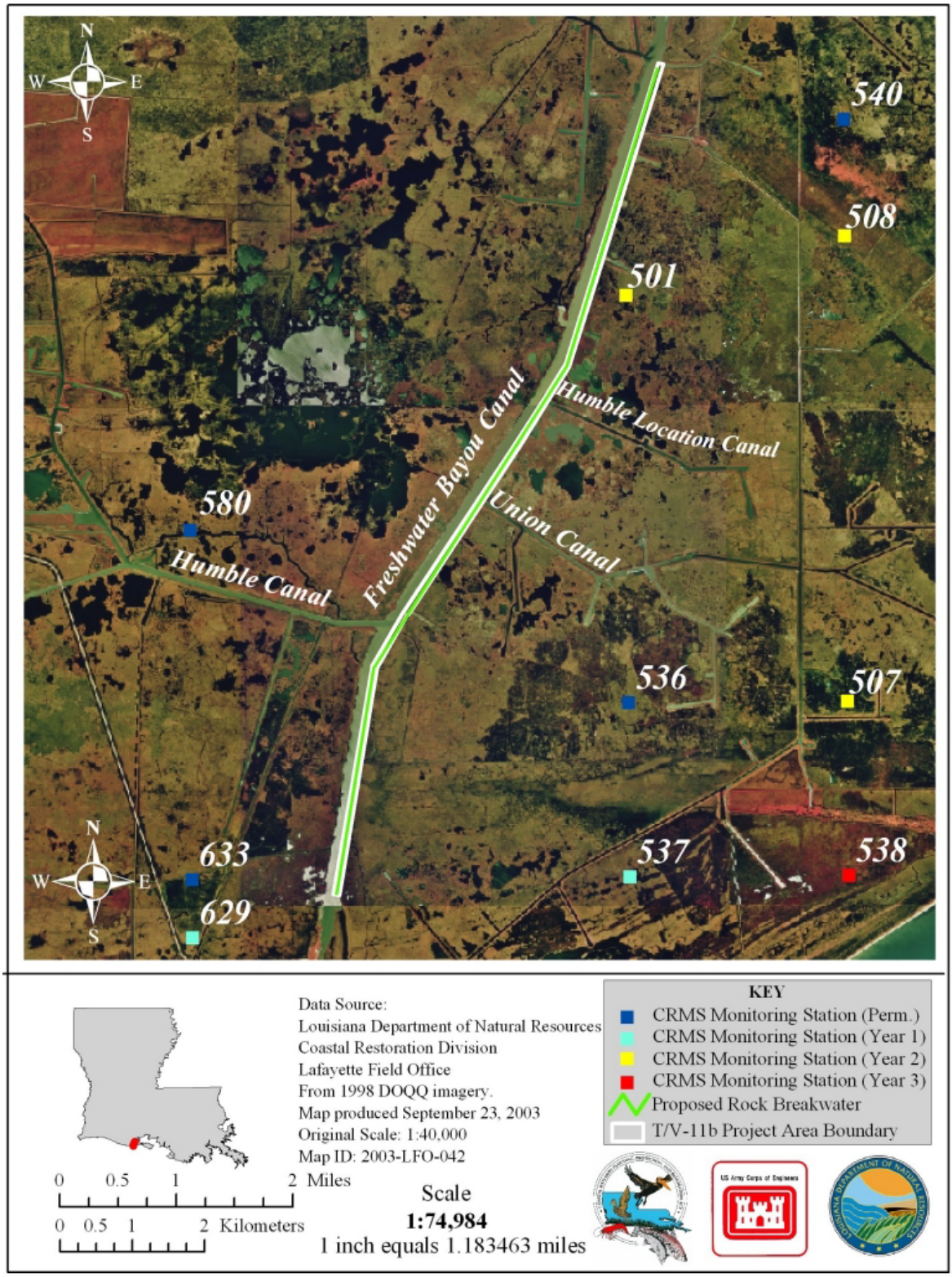

Figure 1. Freshwater Bayou Shoreline Protection, Belle Isle to Lock project area and *CRMS-Wetland* stations within the general area.

Conservation and Restoration Authority 1998). Project goals and strategies are provided to LDNR by the sponsoring federal agency through the Environmental Assessment (EA) and/or Wetland Value Assessment (WVA) for the project. The following goals and strategies for the Freshwater Bayou shoreline protection project were provided by the USACE.

Project Goal:

> The goal of this project is to stop shoreline erosion along the east bank of Freshwater Bayou Canal from the Freshwater Bayou Lock to Belle Isle Canal.

Project Strategy:

> The project goal will be achieved through the construction of a foreshore rock dike along a 39,330 foot (11,988 m) stretch of Freshwater Bayou from Belle Isle Canal to Freshwater Bayou Lock.

Project Features

All of the rock structures will be underlain by geotextile fabric and built to an elevation of 3.5 feet (NAVD88) (1.1 m) with crown widths of 5 feet (1.5 m) and will run along the approximate 2-foot (0.6 m) contour. A total of 13 proposed pipeline and canal openings along the rock dike's length will also serve as fisheries access points. The gaps at pipeline crossings are 100 feet (30.5 m) wide (50 feet (15.2 m) on each side of the pipeline). Gaps at canals and natural creeks vary in width depending on the site.

Monitoring Goals

As authorized by the CWPPRA Task Force, CWPPRA projects authorized for construction after April 16, 2003 will be monitored only with CRMS-*Wetlands* stations, other existing data collection, and any additional data-collection specifically added to the project and funded separately from the normal monitoring. As the TV-llb Freshwater Bayou Bank Stabilization project is a shoreline protection project, there are no CRMS-*Wetlands* monitoring stations available in the project area, however coastwide aerial photography and satellite imagery collected as a part of CRMS-*Wetlands* will be available to assist in evaluating this project.

Priorities:

The Freshwater Bayou Bank Stabilization (TV-11b) project is classified as a shoreline protection project. The construction of a foreshore rock dike is expected to restore the integrity of the Freshwater Bayou Canal bank which has continued to erode and breach into the marsh to the east of the project area. The proposed permeable barrier will dissipate wave energy, and effectively halt shoreline erosion. Sediment is expected to collect behind the rock dike and prograde as in other shoreline protection projects along Freshwater Bayou Canal including ME-04, (Raynie and Visser 2002) and ME-13 (Vincent 2003). Aerial photography and/or satellite imagery will be utilized to monitor the effects of the shoreline project on land loss and gain.

Specific Monitoring Goal:

1. To document shoreline change along the east shoreline of Freshwater Bayou.

Reference Area:

Collecting monitoring data on both project and reference areas provides a way to achieve statistically valid comparisons and thus a reliable evaluation of project effectiveness. Due to increasing difficulty finding adequate reference areas for CWPPRA projects, one purpose of the CRMS-*Wetlands* was to provide a suite of reference stations to be used for this purpose. CRMS-*Wetlands* will not provide direct information on shoreline erosion, however, we can compare our observations on this project with those on similar projects. There have been several previous shoreline stabilization projects on Freshwater Bayou in the vicinity of the TV-11b Belle Isle Canal to Lock project. These include TV-11 on the eastern shore of Freshwater Bayou and ME-04 and ME-13 on the western shore. The reference area for ME-04 could be utilized for comparison to this shoreline stabilization project.

Monitoring Strategies

The following monitoring element will provide the information necessary to evaluate the specific goal listed above.

CRMS-*Wetlands* Strategies:

1.	Spatial Data	Aerial photography and satellite imagery will be collected for the entire coast through CRMS-*Wetlands*. The aerial photography will only be analyzed for CRMS-*Wetlands* stations, but the photography collected over this project area will be available to document shoreline movement. The satellite imagery will be analyzed to determine land and water areas for the entire coast. This imagery will be subset and used to evaluate changes in land and water areas within the TV-11b project area. Photography and satellite imagery for the Teche/Vermilion Basin will be collected and analyzed for years 2005, 2008, and every 3 years thereafter.

Project Specific Strategies:

1.	Integrity of rock dike and terraces	Annual inspections by LDNR's Field Engineering Section (O&M Section) will be used to evaluate the structural integrity of the rock dike along Freshwater Bayou Canal.

Anticipated Statistical Analyses and Hypotheses

The following hypotheses correspond with the monitoring elements and will be used to evaluate the accomplishment of project goals.

1. Descriptive and summary statistics will be used to compare measured rates of shoreline movement with historical values for the area. This will allow for the analysis and long term documentation of shoreline movement along the Freshwater Bayou project area (goal 1). Data will be obtained from aerial photography and satellite imagery.

   Goal: Decrease the rate of spoil bank erosion along the east bank of Freshwater Bayou Canal from the Freshwater Bayou Lock to Belle Isle Canal.

Notes

1.	Proposed Implementation:	Start Construction	2005
		End Construction	2005
2.	USACE Point of Contact:	Greg Miller	(504) 862-2310
3.	DNR Project Manager:	Ken Duffy	(225) 342-4106
	DNR Construction/O&M Manager:	Melvin Guidry	(337) 482-0682
	DNR Monitoring Manager:	Leigh Anne Sharp	(337) 482-0659
4.	Vermilion Corp. Point of Contact:	W. P. "Judge" Edwards	(337) 893-0268

5. Periodic Operations, Maintenance, and Monitoring reports will describe the status and effectiveness of the project.

6. Monitoring of the rock breakwater will be conducted to determine maintenance needs.

7. References:

Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1998. Coast 2050: Toward a Sustainable Coastal Louisiana. Louisiana Department of Natural Resources. Baton Rouge, Louisiana. 161 pp.

Brown & Root, Inc. 1992. Conceptual Engineering Report for Freshwater Bayou Canal Bank Stabilization, Vermilion Parish, Louisiana. Prepared for the Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 26 pp.

Raynie, R. C., J. M. Visser. 2002. CWPPRA Adaptive Management Review Final

Report. Prepared for CWPPRA Planning and Evaluation Subcommittee, Technical Committee, and Task Force. Baton Rouge, Louisiana. 47 pp. plus appendices.

United States Army Corps of Engineers. 1989. Water Resources Development in Louisiana. U. S. Department of the Army, Lower Mississippi River Valley Division, Corps of Engineers. Vicksburg, Mississippi.

Vincent, K. A., L. T. Aucoin, N. S. Clark. 2000a. Freshwater Bayou Wetlands (ME-04) Phase 1: Progress Report No. 5. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 6 pp.

Vincent, K. A., M. Horton, A. MacInnes. 2000b. Freshwater Bayou Canal Bank Stabilization (ME-13): Progress Report No. 1. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 15 pp.

Vincent, K. A. 2003. ME-13 Freshwater Bayou Bank Stabilization Summary Data and Graphics. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 38 pp.