PROJECT NO. ME-12
SW WHITE LAKE SHORE PROTECTION DEMONSTRATION PROJECT

ORIGINAL DATE: February 13, 1995
REVISED DATE: July 23, 1998

Preface

Pursuant to a CWPPRA Task Force decision on April 14, 1998, the original monitoring plan was reduced in scope due to budgetary constraints. Specifically, the project monitoring was reduced to a five year effort to be consistent with other demonstration projects. Based on monitoring results to date, the project was deemed ineffective and all monitoring will conclude in year 1998.

Project Description

The SW White Lake Shoreline Stabilization Demonstration project area consists of approximately 25 ac (10 ha) of fresh to intermediate marsh. The project is located in the Lake's sub-basin on the southwest shore of White Lake at the Vermilion/Cameron parish line and lies approximately 2 mi (3.2 km) north of LA Highway 82 (figure 1). The shoreline plant community is comprised mainly of *Phragmites australis* (roseau), *Colocasia antiquorum* (elephant ear), *Scirpus californicus* (giant bulrush), and *Sagittaria lancifolia* (bulltongue).

The erosion rate for the White Lake area is estimated at 10.00 ft/yr (3.05 m/yr)(Louisiana Department of Transportation and Development 1978) as a result of increased wave action generated by the long fetch across White Lake. Due to the undercutting from wind-generated waves, water depths average 2.0 to 3.0 ft (0.6 - 0.9 m) adjacent to the vegetated marsh edge. The planting site, which is located 25 ft (7.6 m) from the vegetated marsh edge and is not influenced by wave deterioration, lies in approximately 1.0 to 1.5 ft (0.3 - 0.45 m) of water. Water depths adjacent to the vegetated marsh edge make the utilization of *S. californicus* plantings, as a wave damping technique, very favorable for the project site.

Project features will include the planting of *S. californicus* on the southwest shoreline of White Lake from the northern end of Alligator Lake and continuing 1 mi (1.6 km) northward. Three rows will be planted approximately 25 ft (7.6 m) from the cutbank in 1.0 to 1.5 ft (0.3 - 0.45 m) of water. The plantings will be spaced approximately 3 to 5 ft (0.9 - 1.5 m) apart and the rows will be spaced 5 ft apart. Approximately 3,200 plants will be planted in the project area. A total of 25 ac (10 ha) of fragile, fresh marsh are expected to benefit.

Project Objectives

1.   Determine the effectiveness of California bulrush as a wave damping technique along a one-mile section of the southwest shoreline of White Lake.
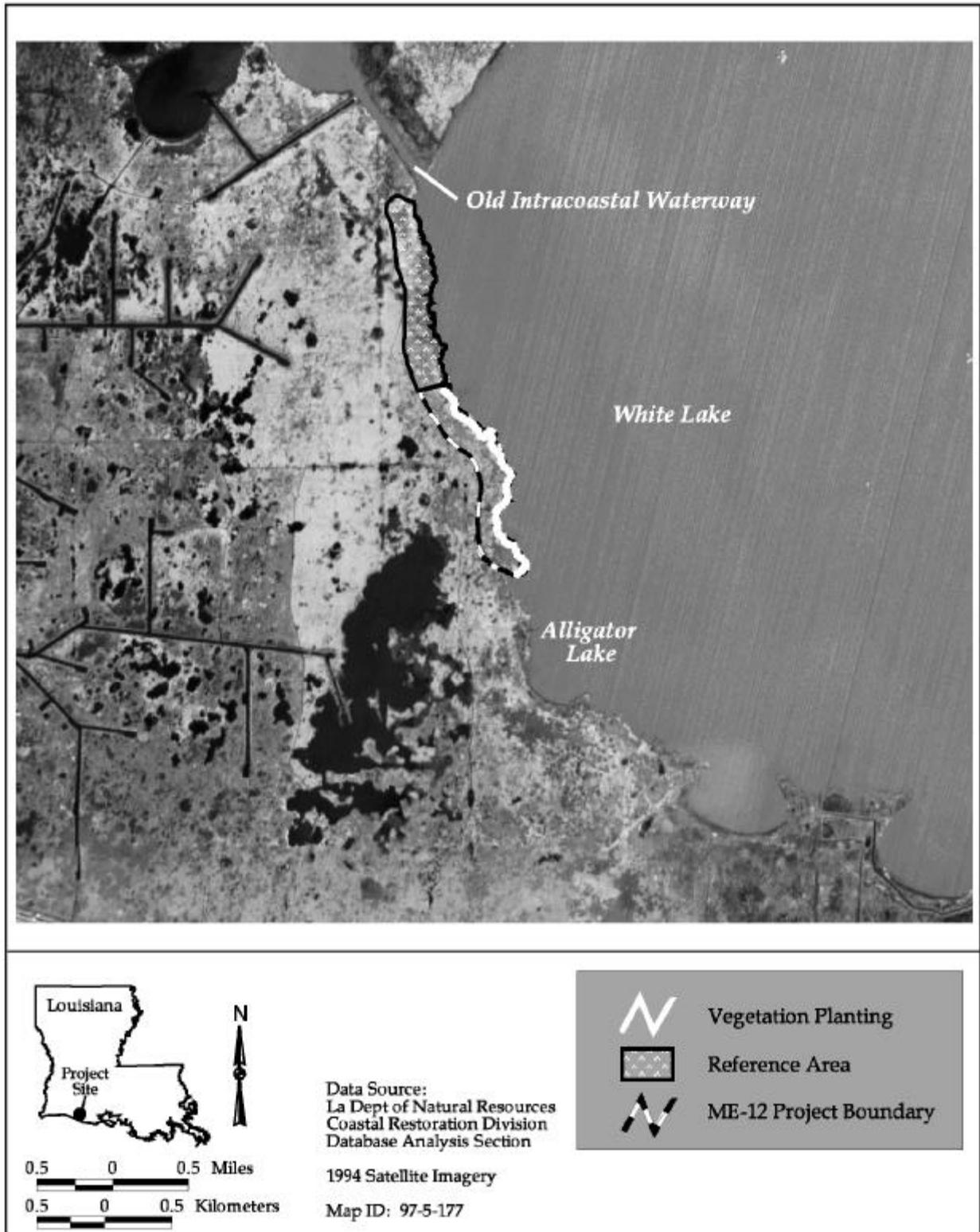
Figure 1.   SW Shore, White Lake Protection Demonstration (ME-12) project and reference area boundaries and vegetation planting locations.

2. Prevent the encroachment of White Lake into the interior fresh water vegetation and the shallow water areas of Deep Lake.

Specific Goal

The following goal will contribute to the evaluation of the above objectives:

1. Decrease the rate of shoreline erosion along the southwest shoreline of White Lake.

Monitoring Elements

The following monitoring elements will provide the information necessary to evaluate the specific goal listed above:

1. Habitat Mapping   To document land and water areas, marsh loss rates, and interannual shoreline movement within the ME-12 project and reference areas, near-vertical color infrared aerial photography (1:12,000 scale, with ground controls) will be obtained. The photography will be obtained in 1994 prior to construction and in 2001 post-construction. The photography will be georectified, photointerpreted, mapped, and analyzed with GIS by National Wetlands Research Center (NWRC) personnel using standard operating procedures described in Steyer et al. (1995). The photography will include an area of 1 mi (1.6 km) behind the shoreline for referencing interior marsh changes over time. Ground truthing of aerial photographs will be used to monitor changes in vegetation types along a 200 ft wide by 2 mi long (61 m x 3.2 km) band of freshwater marsh adjacent to the project and reference areas. Because of the ineffectiveness of the plantings, no post-construction photography will be obtained, nor will detailed photointerpretation of the pre-construction photography be conducted.

2. Shoreline Change   To document annual shoreline movement, differential GPS will be used at specific points along the shoreline. The shoreline along the project area and reference area will be divided into two types: shoreline coves, with a gradual sloping shoreline and shoreline points, with a near vertical slope or cutbank adjacent to the shoreline. Once the land types are delineated, differential GPS will be used as described in Steyer et al. (1995) to take readings at specific points along the shoreline within each land type for both the project and reference areas. Intervals between points will be determined based on shoreline configuration. It is recommended that at least 25 points be used, when possible, within a land type. Differentially corrected GPS

data sets will be obtained prior to construction in 1996, and in 1999 and 2001 post-construction. GPS data will be taken during the fall of each monitoring year so as to minimize errors associated with taking data at different times of the year, not accounting for seasonal changes that might occur to the shoreline. Because of the ineffectiveness of the plantings, monitoring will end in 1998.

3.   Vegetation   The general condition of the plantings will be documented using a generally accepted methodology similar to Mendelssohn and Hester (1988). Percent survival will be used by counting live plants (green) divided by the number of plantings and multiplied by 100. Permanent marker poles will be set along the center line of each row of the plantings every 1000 ft (305 m). Direct measurements will be taken east and west of the poles to measure lateral spread of the vegetation. Visual estimates of submerged aquatic vegetation (SAV) will be documented every 1000 ft between existing vegetative markers and corresponding shoreline marker. The documentation will note presence and absence of SAV and plant species. These criteria will be documented at 1 month and 6 months post-planting (1996) and in 1997, 1999, and 2001 post-construction. Because of lack of survival of the plantings, monitoring will end in 1998.

Anticipated Statistical Analyses and Hypotheses

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

1, 2.   ANOVAs and multiple comparison tests will be used to compare measured rates of shoreline movement within land types for the experimental area and the reference area.

Goal: Decrease the rate of shoreline erosion along the southwest shoreline of White Lake for each land type within the project area.

Hypotheses:

H_0:   shoreline erosion within experimental area at time point (j) will not be significantly less than shoreline erosion rates at time point (i).

H_a: shoreline erosion within experimental area at time point (j) will be significantly less than shoreline erosion rates at time point (i).

H_0:   Shoreline erosion at time point (i) within experimental area will not be significantly less than shoreline erosion within reference area.

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H_a: Shoreline erosion at time point (i) within experimental area will be significantly less than shoreline erosion within reference area.

3.   Descriptive and summary statistics will be used to evaluate the success of the vegetative plantings. If sufficient historical information is available, regression analyses will be done to examine changes in slope between pre- and post- conditions. If we fail to reject the null hypothesis, then we will investigate for negative effects.

Note: Available ecological data, including both descriptive and quantitative data, will be evaluated in concert with the statistical analyses to aid in determination of overall project success. This includes ancillary data collected in this monitoring project but not used directly in statistical analyses, as well as data available from other sources (USACE, USFWS, DNR, LSU, etc.).

Notes

1.   Implementation: Start plantings   June 4, 1996
                                        End plantings   June 7, 1996

2.   NRCS Point of Contact: Cindy Steyer   (504) 389-0334

3.   DNR Project Manager: Melvin Guidry   (318) 893-7947
      DNR Monitoring Manager: Chad Courville   (318) 898-1151
      DNR DAS Assistant: Mary Horton   (504) 342-4122

4.   The five year monitoring plan development and implementation budget for this project is $41,282. Progress reports will be available in December 1996 and June 1997, and a comprehensive report will be available in June 1998. These reports will describe the status and effectiveness of the project.

5.   References:

Louisiana Department of Transportation and Development 1978. Shoreline Erosion in Coastal Louisiana: Inventory and Assessment. 79-92pp.

Mendelssohn, I. A., and M. W. Hester 1988. Coastal Vegetation Project, Timbalier Island. Baton Rouge, La. 244pp.

Steyer, G. D., D. Fuller, R. C. Raynie, D. L. Steller, and E. Swenson 1995. Quality Management Plan for Coastal Wetlands Planning, Protection, and Restoration Act Monitoring Program. Open-file series no. 95-01. Baton Rouge: Louisiana Department of Natural Resources, Coastal Restoration Division. 98 pp. with appendices.

U.S.D.A. Soil Conservation Service and State of Louisiana 1993. Candidate Project Information Sheet for Wetland Value Assessment, White Lake South Shoreline Protection. Baton Rouge: Coastal Restoration Division. 13pp.

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