

Coast 2050 Region 4

SW SHORE, WHITE LAKE PROTECTION (ME-12) DEMONSTRATION ME-12-MSPR-0697-2 PROGRESS REPORT No. 2 for the period June 7, 1996 to June 9, 1997

Project Status

The following data collection and analysis activities have been conducted since the previous progress report.

Vegetation Plantings: In December 1996, the vegetation plantings of *Scirpus californicus* (C. Meyer) Steud. (California bulrush) were inspected to measure the percent survival and lateral spread. These samples were taken at the 6-mo interval of the project life.

Shoreline Retreat: In December 1996, direct measurements from the 4-in. x 4-in. post to the vegetated edge were taken to determine shoreline retreat. The measurements taken at the 1-mo sampling interval are being used as baseline data for additional data sets. Data collected in December 1996, the 6-mo sampling interval, were used to calculate change in distance from the baseline data.

Project Description

The SW Shore, White Lake Protection (ME-12) demonstration project area consists of approximately 25 acres of fresh and intermediate marsh and is located on the southwest shore of White Lake at the Vermilion/Cameron Parish line, approximately 1 mi south of the Old Intracoastal Waterway (figure 1). The shoreline plant community is dominated by *Phragmites australis* (Cav.) Trin. Ex Steud. (roseau cane); *Colocasia esculenta* (L.) Schott (elephant ear); *S. californicus*; and *Sagittaria lancifolia* L. (bulltongue).

High wave energy generated across the long fetch of White Lake has caused severe shoreline erosion in the project area. The shoreline erosion rate for the SW White Lake area averaged 11.9 ft/yr between 1974 and 1990 (Brown and Root 1992). This wave-induced erosion has led to the formation of a pronounced cutbank along the project area's vegetated marsh edge. Water depth immediately adjacent to the shoreline ranges from 2.0 to 3.0 ft; whereas the water depth within the planting area, 25 ft lakeward of the shoreline, ranges from 1.0 to 1.5 ft. If wave erosion persists along the natural

lake shoreline, the continued encroachment of White Lake into the adjacent wetlands is inevitable.

The design of the project is to use vegetative plantings to protect a portion of the SW shore of White Lake. On June 7, 1996, approximately 2,650 *S. californicus* plantings were installed. The plantings were spaced on 6-ft centers, in 3 rows approximately 10 ft apart, between the 1.0-ft and 1.5-ft contours. The first planting row is located approximately 25 ft from the lake shoreline, the second row is located approximately 35–40 ft from the lake shoreline, and the third planting row is located approximately 50 ft from the lake shoreline (figure 1). The objectives of the project are to evaluate the effectiveness of *S. californicus* plantings as a wave-damping technique, and to prevent the encroachment of White Lake into the adjacent interior marsh by reducing the rate of shoreline erosion.

Monitoring Design

Near-vertical, color-infrared aerial photography (1:12,000 scale) will be taken once preconstruction, and once postconstruction. The photography will be used to determine changes in land-to-water ratios, marsh loss rates, and shoreline movement within the project and reference areas over the project life.

Eighteen vegetation markers and twelve shoreline markers, consisting of single 4-in. x 4-in. x 8-ft wooden posts, will be placed at 1,000-ft intervals within each row of the plantings and adjacent to the shoreline at the vegetated marsh edge in the project and reference areas. The vegetation markers are being used as reference points to determine lateral spread and percent survival of the plantings. The shoreline markers are designated as reference points to take direct measurements of shoreline position. The reference area, which includes six of the shoreline marker posts, is being monitored for shoreline position only. Vegetation and shoreline data will be collected 1 mo and 6 mo postconstruction, as well as years 1, 3, 5, and 10 postconstruction.

Percent survival will be determined at 6 randomly selected plots of 15 plants (5 plants on each of 3 rows), defined by the vegetation marker posts, by recording the presence or absence of the original plantings. Percent survival from the six plots will be used to determine the mean percent survival for the project area. Lateral spread of the transplants will be determined by taking measurements east (lakeside) and west (shoreline) of the vegetation marker posts within the six plots. The distance of lateral spread on each row will be recorded, and used to determine plant vigor when future data sets are collected. Lateral spread of the plantings in the center row will be recorded until the tillerings of the plantings become intermixed and indistinguishable with the first and third rows of plantings.

PVC marker poles will be placed 20 ft west of the existing markers, and a compass bearing will be recorded to assure that the original wooden marker posts could be reestablished if lost or stolen. The shoreline markers, within the project and reference areas, will be used to document shoreline movement by taking direct measurements from the back side of the marker posts toward the vegetated marsh edge using the PVC marker pole as a guide for consistency. Should survey funds

become available, a global positioning system (GPS) will also be used to document shoreline and vegetation marker locations, and shoreline position.

An analysis of variance (ANOVA) and multiple comparison tests will be performed on shoreline marker data to compare shoreline changes within the project and reference areas. Descriptive and summary statistics will be used to evaluate the success of the vegetative plantings.

Results/Discussion

Color-infrared aerial photography for the preconstruction phase of the project was flown on December 26, 1994. The aerial photography has been georectified using control markers by the NWRC. Wetland gain/loss rates within the project area will be determined once the first set of postconstruction photography is obtained.

Vegetation Plantings: Vegetation data was collected in July 1996 and December 1996 at the 1-mo and 6-mo sampling periods, respectively. Percent survival was calculated by dividing the number of live plants by the total number of plantings and multiplying that by 100. Mean percent survival of the vegetation plantings was determined to be 98.8 % at the 1-mo sampling interval and 76.6 % at the 6-mo sampling interval (figure 2).

The plot with the most drastic change is plot 4. This plot was noticed to be smothered by a large raft of *Eichornia crassipes* (Mart.) Solms (water hyacinth), which drastically affected the mean percent survival. Mean lateral spread of the vegetation plantings was determined to be 11.6 in. at the 1-mo sampling interval and 13.6 in. at the 6-mo sampling interval. Even though mean percent survival declined from 1-mo to 6-mo, mean lateral spread increased (figure 2). Additional samples will be taken at years 1, 3, 5, and 10 to document the success of the plantings.

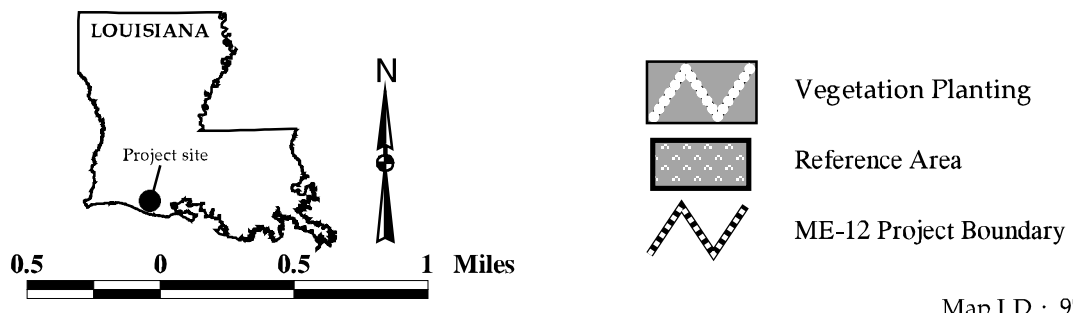
Shoreline Retreat: Initial measurements were taken in July 1996 at the 1-mo sampling interval and will be used as baseline data since the 4-in. x 4-in. posts were not placed directly on the vegetated marsh edge. Shoreline retreat was determined by subtracting measurements taken at 1-mo and at the 6-mo measurement taken in December 1996. Mean shoreline retreat within the project and reference areas was determined to be -1.8 ft and -0.8 ft, respectively (table 1). These data indicate that shoreline retreat was higher in the project area than the reference area. Additional data sets will be required before a full analysis can be performed. Direct measurements are scheduled for years 1, 3, 5, and 10.

Reference

Brown & Root, Inc. 1992. Feasibility report for White Lake Shore Protection. Unpublished report prepared for the Louisiana Department of Natural Resources/Coastal Restoration Division. Belle Chasse, La: Brown & Root, Inc. 27 pp.

Prepared on May 21,1997, by Chad Courville.

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Construction Start:	June 4, 1996	
Construction End:	June 7, 1996	



Map I.D.: 97-5-072

Figure 1. SW Shore, White Lake Protection (ME-12) demonstration project area, reference area boundaries, and vegetation planting locations.

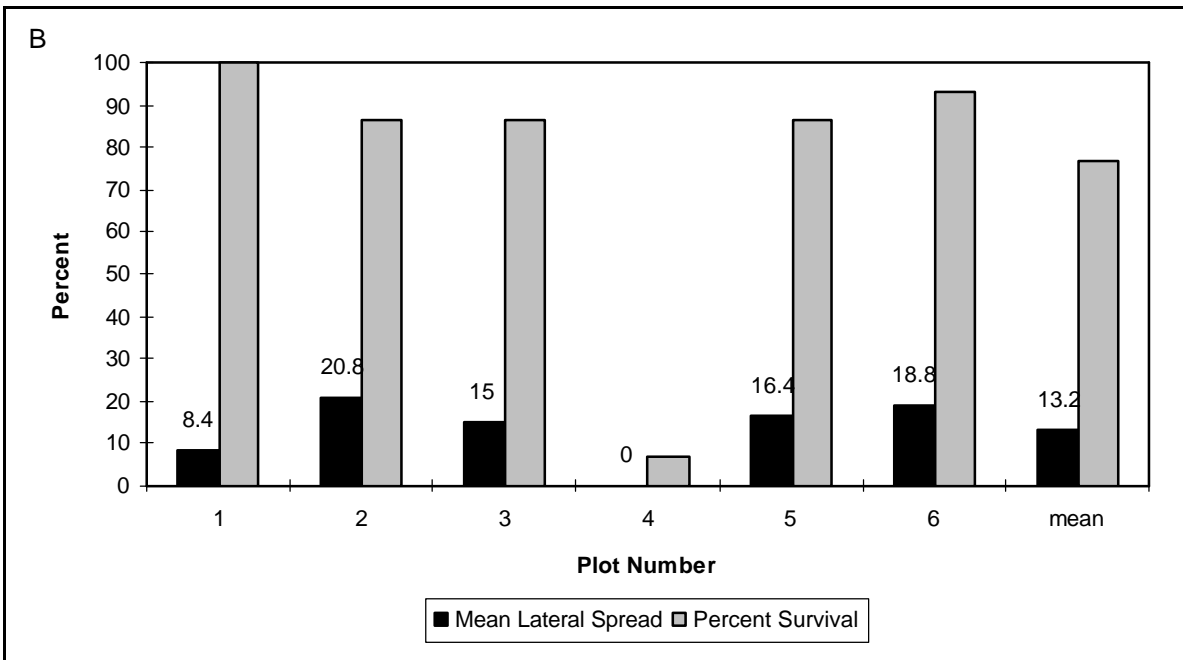
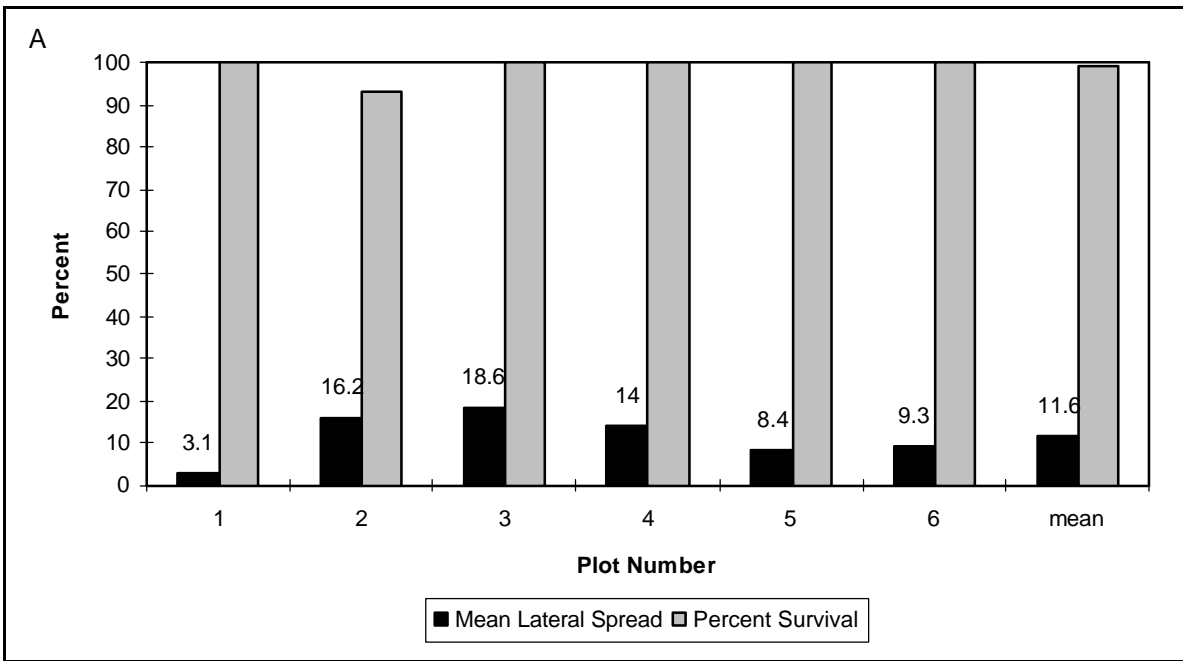


Figure 2. Mean lateral spread (inches) and percent survival of *S. californicus* along the SW Shore White Lake Protection (ME-12) demonstration project, Vermillion Parish, Louisiana. Graph A represents sampling at 1-mo (July 2, 1996) and graph B represents sampling at 6-mo (December 3, 1996).

Table 1. Shoreline changes at the SW Shore White Lake Protection (ME-12) demonstration project project area monitoring sites from July 2, 1996, to December 3, 1996.

Plot No.	Change in Distance (ft)
1	-1.9
2	-2.7
3	-1.7
4	-0.8
5	-0.6
6	-3.6
Mean:	-1.8
R-1	-0.2
R-2	-1.1
R-3	-0.4
R-4	-3.0
R-5	-0.5
R-6	-0.1
Mean:	-0.8