MONITORING PLAN

PROJECT NO. ME-8 DEWITT-ROLLOVER

DATE: 12 September 1994

Project Description

The project area is located along the Gulf of Mexico shoreline between Dewitt Canal and Rollover Bayou, approximately 6 miles south of Pecan Island in Vermilion Parish, Louisiana. Geologically the area comprises the transition between the western portion of the Mississippi River deltaic plain and the eastern portion of the marginal deltaic or chenier plain (USDA/SCS, 1992). Between 1950-1980, the shoreline erosion rate in this area averaged 30 ft/yr, based on planimetry of aerial photography.

The project area may be subdivided into three specific environments: beach, mudflats, and near-shore marine. A well-defined beach rim vegetated with marsh elder (*Iva frutescens*), roseau (*Phragmites australis*), and marshhay cordgrass (*Spartina patens*) is present along the high water line between the beach and a back marsh of predominantly marshhay cordgrass, smooth cordgrass (*S. alterniflora*), and leafy three-square (*Scirpus robustus*). Presently, much of the beach is prograding in response to the accumulation of sediment being carried westward from the Atchafalaya Delta region, and the formation of semifluid to consolidated mudflats along the beach. However, there are also pockets of retreating beach where previously deposited sediments are being eroded. The near-shore marine environment provides a reservoir of sediment that is being reworked along the shoreline and also introduced from the shelf region.

The purpose of this project is to investigate the ability of vegetation plantings to:

a) colonize the newly accreted mudflat environment with suitable vegetation to enhance sediment trapping.
b) establish a vegetative buffer to protect the beach environment from erosion.

The project features include:

a) 6,000 plantings of smooth cordgrass, planted on 5-foot centers in varying numbers of rows along approximately 1.5 miles of mudflat/beach.
b) 1,350 feet of barbed-wire fence along the east side of Dewitt Canal extending to the water's edge of the mudflat to prevent cattle from entering the project area.

Project Objectives:

1) Restore wetland productivity through planning, designing and implementing vegetative projects that protect and enhance coastal and inland wetlands.

2) Establish a vegetative buffer (using smooth cordgrass) between the Gulf of Mexico and coastal wetlands to reduce wave energy and trap sediments.

Measure effectiveness with data from monitoring element #

Specific Goals

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

1, 2 1) Decrease the rate of shoreline erosion along 1.5 miles of Gulf of Mexico shoreline.

1, 3 2) Increase vegetative cover between the Gulf of Mexico and adjacent coastal wetlands.

Monitoring Elements

1) Aerial photography- To document vegetated and non-vegetated areas and to document annual shoreline movement, color infrared aerial photography (1:12,000 scale, with ground controls) will be obtained. The photography will be georectified by NBS and digitized for measurements of shoreline movement using NBS Standard Operating Procedures, but detailed photo interpretation, mapping and GIS analysis is not currently planned. Aerial photography will be interpreted for wetlands according to the Cowardian classification system (Cowardin et al., 1979). The project area will be flown prior to planting and three times after planting.

2) Shoreline markers- To document annual shoreline movement, shoreline markers will be placed at the mean high water line at 17 points along the existing shoreline adjacent to the vegetative plantings at approximately 500 foot intervals. Five control markers will be similarly placed along the existing adjacent shoreline west of the planting area and two will be placed east of the planting area. In addition, three of the control markers placed on the west end of the originally proposed project area located near Dewitt Canal will be sampled to provide adequate control on the east end of the project. Position of the shoreline relative to the shoreline markers will be documented a minimum of once per year by direct measurement. Aerial photography (1:12,000 scale) and differential GPS will also be used to document shoreline movement and provide a template for mapping shoreline position and shoreline changes over time. Shoreline positions will be compared to historical data sets available in digitized format for 1956, 1978, and 1988 shorelines.

3) Vegetative

Plantings - The general condition of the plants will be documented using a generally accepted methodology similar to Mendelssohn and Hester (1988), Coastal Vegetation Project, Timbalier Island : % survival and % cover will be measured. These criteria will be monitored using a stratified block design. Within each block, 5% of the planted vegetation will be randomly sampled to document the establishment of the vegetative plantings. Data will be collected at 1 month, 6 months, and 1 year after planting and at 3 year intervals thereafter or until original plants are indistinguishable.

The project area is divided into five blocks based on a combination of soil and beach morphology characteristics. The number of plants in each block will be determined using as-built drawings prepared by SCS. An appropriate number of 16-plant sampling plots will be randomly selected within each of the five blocks to achieve a 5% sample within each block, based on the following formula.

(total plants per block x 0.05)/16 = sampling plots per block

Moving north to south along columns and east to west along rows of plantings within each block, the random numbers chosen will be assigned to the appropriate plant(s) within each block, and these plants will be staked with a 10' PVC pole. The selected plants will serve as the northeast corner plant within each 16-plant plot, unless the selected plant falls on the southernmost row of plantings, in which case it will serve as the southeast corner plant in the 16-plant plot. The 16-plant plots will run westward from the corner plant, unless the plant falls on the west end of the block, in which case the 16-plant plot will run eastward from the corner plant. The vegetation within each sampling plot will be sampled according to the approved sampling protocol identified in the Monitoring Program Document (Steyer & Stewart, 1992).

Anticipated Statistical Tests and Hypotheses

The following hypotheses correspond with the monitoring elements (above) and will be used to evaluate the accomplishments of the project goal.

ANOVA's and multiple comparisons tests will be used to compare measured rates of shoreline movement with recent historical values for the area (from direct measurements of shoreline position relative to shoreline markers, and from digitized coastal zone maps for 1956, 1978, and 1988). After several sets of data are acquired, ANOVA's will be used to, a) compare site-specific shoreline movement within the project area, and b) compare shoreline movement between the project area and the control areas east and west of the project area.

The success of the vegetative plantings will be determined by analyses of the various monitoring elements described above. These elements will be examined utilizing ANOVA's to monitor the success or failure of the plantings. If monitoring results fail to reject the null hypothesis, project effects will be investigated.

Goal: Decrease the rate of shoreline erosion along 1.5 miles of Gulf of Mexico shoreline.

1, 2) *Hypothesis:* H_o: $SR^{(i)}_{post} \geq SR^{(i-1)}_{pre}$
H_a: $SR^{(i)}_{post} < SR^{(i-1)}_{pre}$ i = 1, 2, 3, ... 20.

where: $SR^{(i)}_{post}$ = shoreline retreat **post**-project implementation, at timepoint i.
$SR^{(i-1)}_{pre}$ = shoreline retreat **pre**-project implementation, at timepoint i-1.

H_o: Shoreline retreat rate post-construction WILL NOT be significantly less than the shoreline retreat rate in previous years.

H_a: Shoreline retreat rate post-construction WILL be significantly less than the shoreline retreat rate in previous years.

1, 3) *Goal:* Increase vegetative cover between the Gulf of Mexico and adjacent coastal wetlands.

Hypothesis: H_o: $VC^{(i+1)}_{post} \leq VC_{post}^{(i)}$
H_a: $VC^{(i+1)}_{post} > VC_{post}^{(i)}$

i = 0, 1, 2, 3, 4 ...

where: $VC^{(i+1)}_{post}$ = vegetative cover along the shoreline post planting, at timepoint i + 1.

$VC_{post}^{(i)}$ = vegetative cover along the shoreline post planting at timepoint i.

H_o: Post planting vegetative cover along the shoreline at timepoint i + 1 WILL NOT be more than vegetative cover at time i.

H_a: Post planting vegetative cover along the shoreline at timepoint i + 1 WILL be more than vegetative cover at time i.

Notes

1)	Planned Implementation:	Start plantings	18 July 1994
		End plantings	31 July 1994
2)	SCS Point of Contact:	Cindy Schexnayder	(318) 896-8503
3)	DNR Project Manager:	Karl Vincent	(318) 893-3643
	DNR Monitoring Manager:	Karl Vincent	(318) 893-3643

4) Shoreline position was documented with GPS equipment on April 29, 1994.

5) Near-vertical color-infrared aerial photographs were taken of the project area on 7 May 1992 (LDNR/CRD) and on 1 November 1993 (NBS) at 1:12,000 scale.

6) Rates of shoreline retreat will also be compared to "future with project" conditions estimated in the Wetland Value Assessment (WVA).

7) References:

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31. 131 pp.

Mendelssohn, I.A. and M.W. Hester. 1988. Coastal vegetation project: Timbalier Island. Final Report submitted to Texaco, USA, New Orleans Division, New Orleans, LA. Agreement No. RC-84-01. 244 pp.

Steyer, G.D., and R.E. Stewart, Jr. 1992. Monitoring Program for Coastal Wetlands Planning, Protection, and Restoration Act Projects. U.S. Fish and Wildlife Service, National Wetlands Research Center Open File Report 93-01. 85 pp.

USDA, Soil Conservation Service. 1992. Selective vegetative plantings in the Dewitt Canal area: potential for shoreline stabilization and marsh progradation. Coastal Wetlands Planning, Protection, & Restoration Act. Soil Conservation Service. Alexandria, Louisiana.

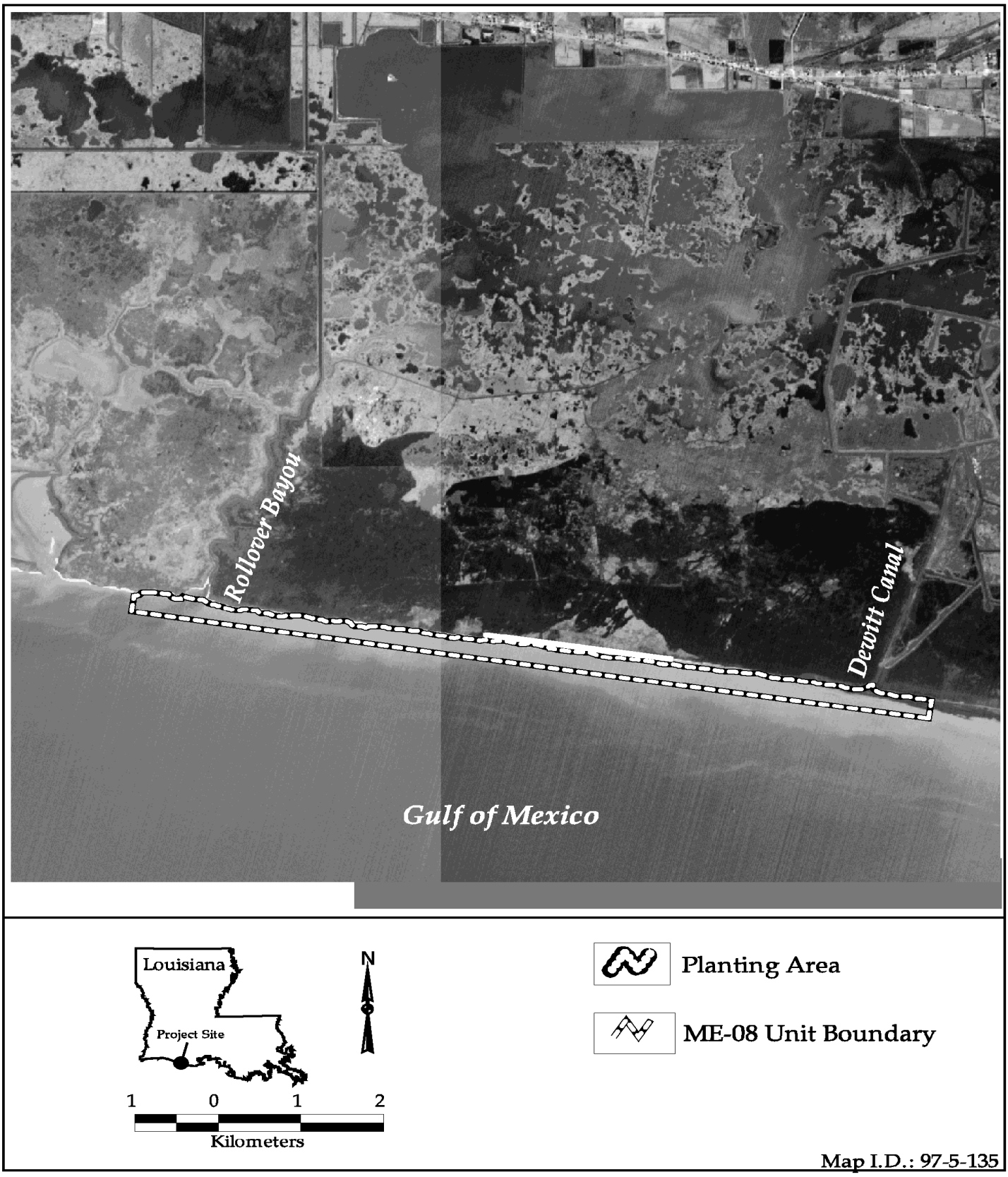

Figure 1. Dewitt-Rollover Plantings (ME-08) project area showing smooth cordgrass planting area.