**BOSTON CANAL /VERMILION BAY SHORELINE PROTECTION (T/V-09)**
**T/V-09-MSPR-0496-2**
**PROGRESS REPORT NO. 2**
for the period
December 4, 1994 to April 1, 1996

## Project Status

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

Initial vegetation data were collected December 4-6, 1995. Continuous differential GPS coordinates were established at the mean high water line along the existing shoreline adjacent to vegetative plantings in the project area and at a reference site on October 5, 1995.

## Project Description

The Boston Canal/Vermilion Bay Shoreline Stabilization Project was designed to evaluate the ability of a rock bulkhead and vegetative plantings to abate wind-driven wave erosion along Vermilion Bay and at the mouth of Boston Canal, located in Vermilion Parish (figure 1). In December 1994, rock bulkheads were constructed parallel to the banks of Boston Canal, extending into Vermilion Bay and then turning 90 degrees to follow the bay shoreline. Behind the bulkheads, sediment fences designed to capture sediment during overwash were installed. In October 1995, approximately 34,000 trade gallon-size plantings of smooth cordgrass (*Spartina alterniflora*) were planted along approximately 14 mi of bay shoreline from Mud Point on the western end, to Oaks Canal on the eastern end (figure 1).

The project objectives are to maintain the integrity of approximately 466 acres of wetlands between Mud Point and Oaks Canal, to stabilize 14.3 mi of the Vermilion Bay shoreline, and to prevent further regression of the banks at the mouth of Boston Canal. The specific goals are (1) to decrease the rate of shoreline erosion at the confluence of Boston Canal and Vermilion Bay by armoring the mouth of the canal with rock bulkheads, (2) to increase the deposition of sediment adjacent to sediment fences behind the bulkhead, and (3) establish *Spartina alterniflora* along the shoreline to decrease the rate of shoreline erosion and maintain the integrity of approximately 466 acres of shoreline and interior marsh on the northern edge of Vermilion Bay.

## Monitoring Design

Sediment deposition behind the bulkhead was monitored along 5 east-west transects and 6 north-south transects once during preconstruction and will be monitored at yr 8 and yr 16 to document the accumulation or erosion of sediments in the vicinity of the sediment-trapping fences. To document planting success, the planting area was divided into four (4) land types, based on topography. Land type 1 is a straight mineral shoreline with a gradual slope. The shoreline of land type 2 is deeply scalloped consisting of cutbanks and gently sloped inlets with high organic content. Land type 3 is a gently scalloped shoreline with a mineral soil. Land type 4 is gently scalloped with a mineral soil, but is recognized as a different land type due to its north-south orientation and the protection it receives from Tigre Lagoon. A 3% sample of the vegetative plantings in each land type, consisting of 64 randomly selected plots of 16 plants each, was monitored for percent survival, species composition, and percent cover at 6 mo, and will be monitored at yr 1, 3, 8, and 16. Continuous differential GPS coordinates were established at the mean high water line along the existing shoreline adjacent to vegetative plantings in the project area and at a reference site located east of Oaks Canal once during preconstruction and will be monitored at yr 3 and 16 to document changes in shoreline position over time. A one-way analysis of variance (ANOVA) was performed on planting survival and coverage to detect the differences among the land types.

## Results/Discussion

Rock bulkhead: In October 1994, preconstruction elevational transects were surveyed across the rock bulkhead (figure 2). Comparison of the data with a survey conducted in May 1995 revealed that up to 4.5 ft of sediment has been deposited between the bulkhead and the existing shoreline. Figures 3, 4 and 5 illustrate three of the eleven transects surveyed. The exposed mudflats are being colonized by Walter's millet (*Echinochloa walterii)* and Coast water hyssop (*Bacopa monnieri).* Observations to date suggest that the rock bulkhead has been highly effective in promoting and retaining sediment deposition at the mouth of Boston Canal.

Vegetative Plantings: Installation of smooth cordgrass, *Spartina alterniflora,* plantings was initiated June 26, 1995 and completed September 28, 1995. The 6-month postplanting monitoring of the 64 sampling plots, conducted on December 6, 1995, revealed that 87.9% of the original plantings had survived (table 1). The average percent cover of smooth cordgrass in a plot of 16 plants was 28.1% at six months. Results of ANOVA indicated significant differences among four land types for both survival and coverage ($P<0.05$). Highest survival and coverage were found in land type two with high organic content. Low percent coverages were recorded in land types 1 and 4 where plantings were interspersed with existing stands of Roseau cane (*Phragmites australis*), due to competition with the taller species for light and nutrients. The preliminary results suggest that smooth cordgrass plantings can be established in this environment. Their effectiveness in minimizing shoreline erosion will be determined after all subsequent shoreline surveys are conducted.

Prepared on March 27, 1996, by Dona Weifenbach.

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| **Federal Sponsor** | NRCS/Cindy Steyer | (318) 896-8503 |
| **Construction Start:** | July 1, 1994 | |
| **Construction End:** | October 4, 1995 | |

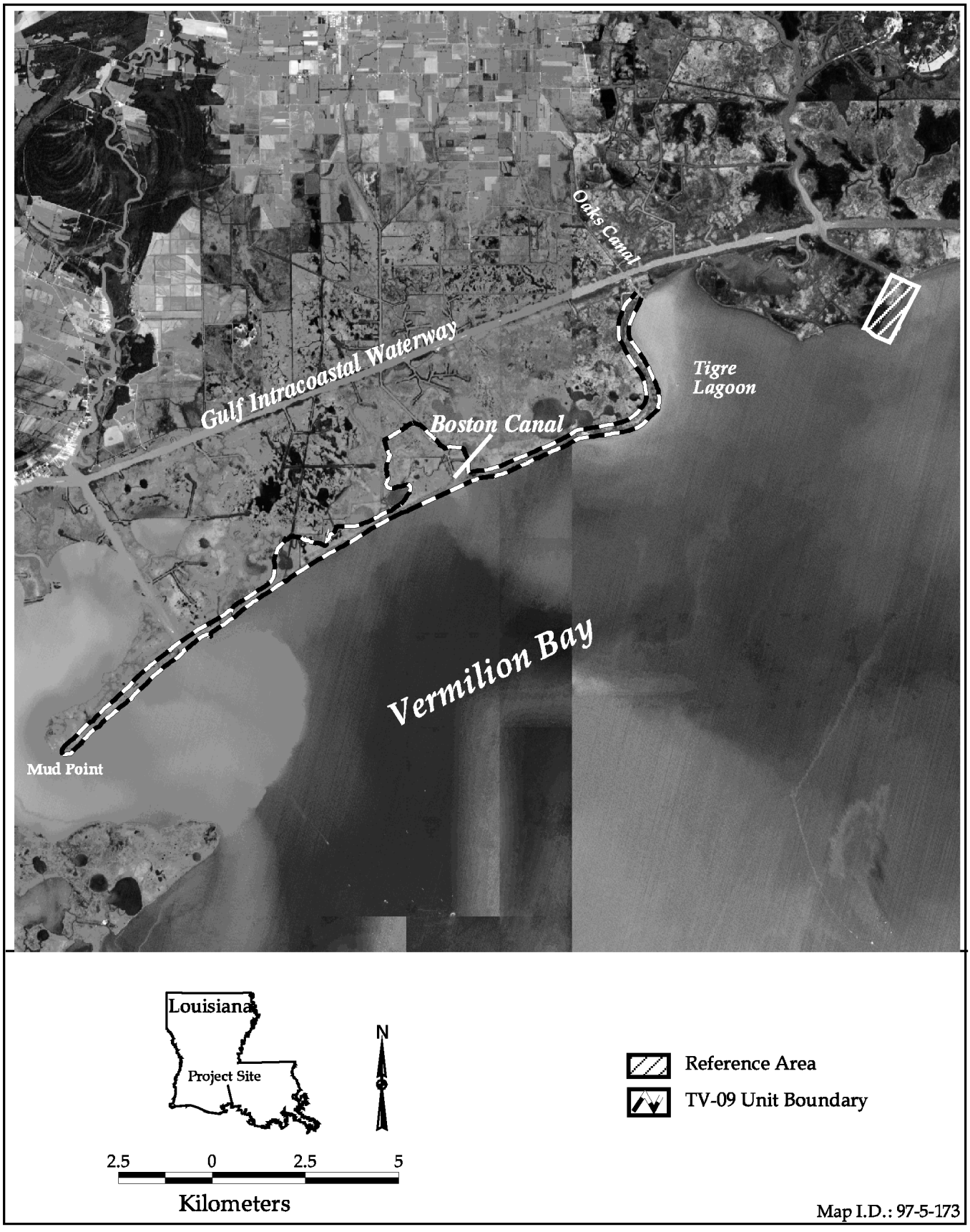


**Figure 1.** Boston Canal / Vermilion Bay Shoreline Protection (TV-09) project area.

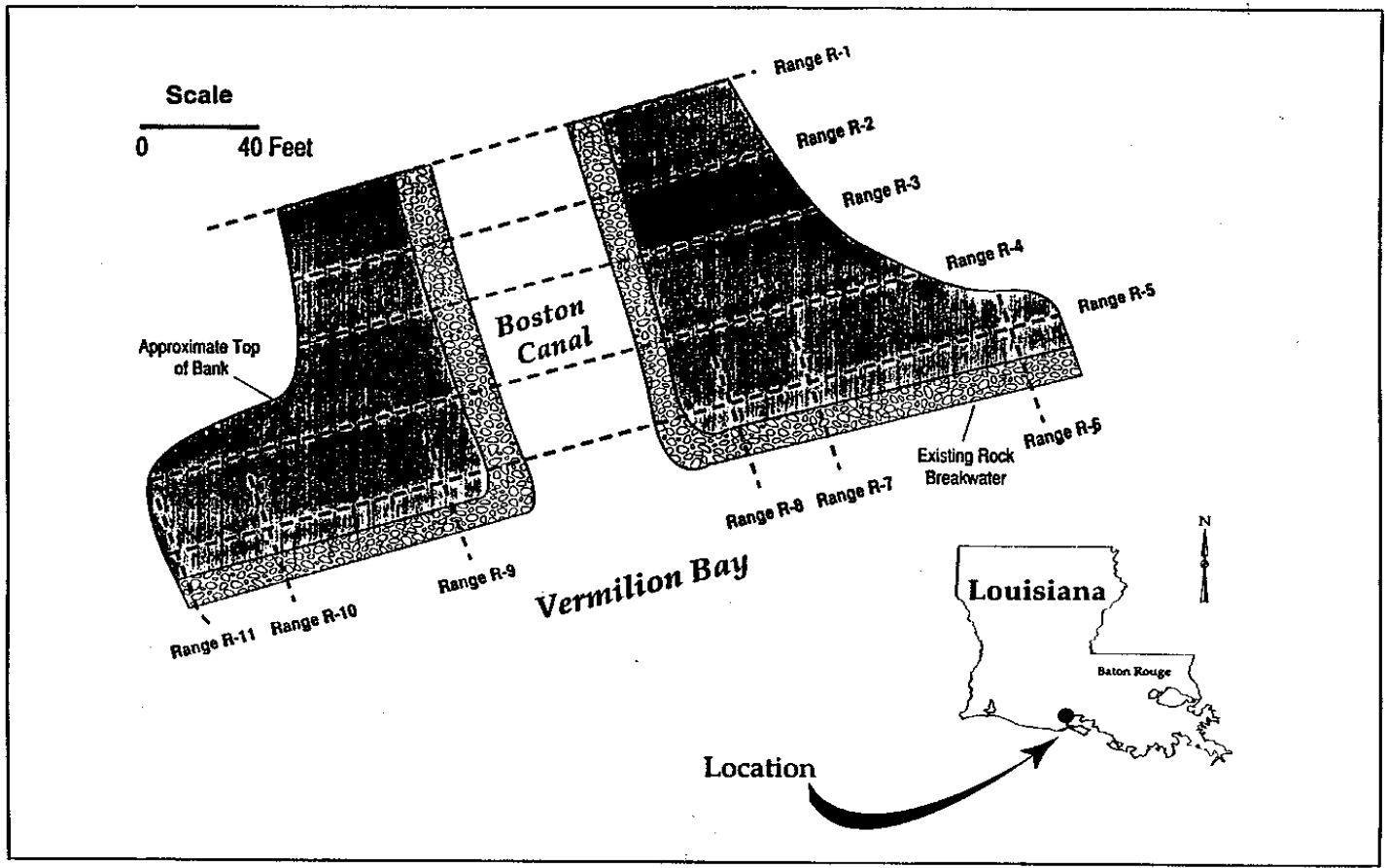


Figure 2. Boston Canal/Vermilion Bay Shoreline Protection (T/V-09) cross section of the mouth of Boston Canal labeling elevational transects.

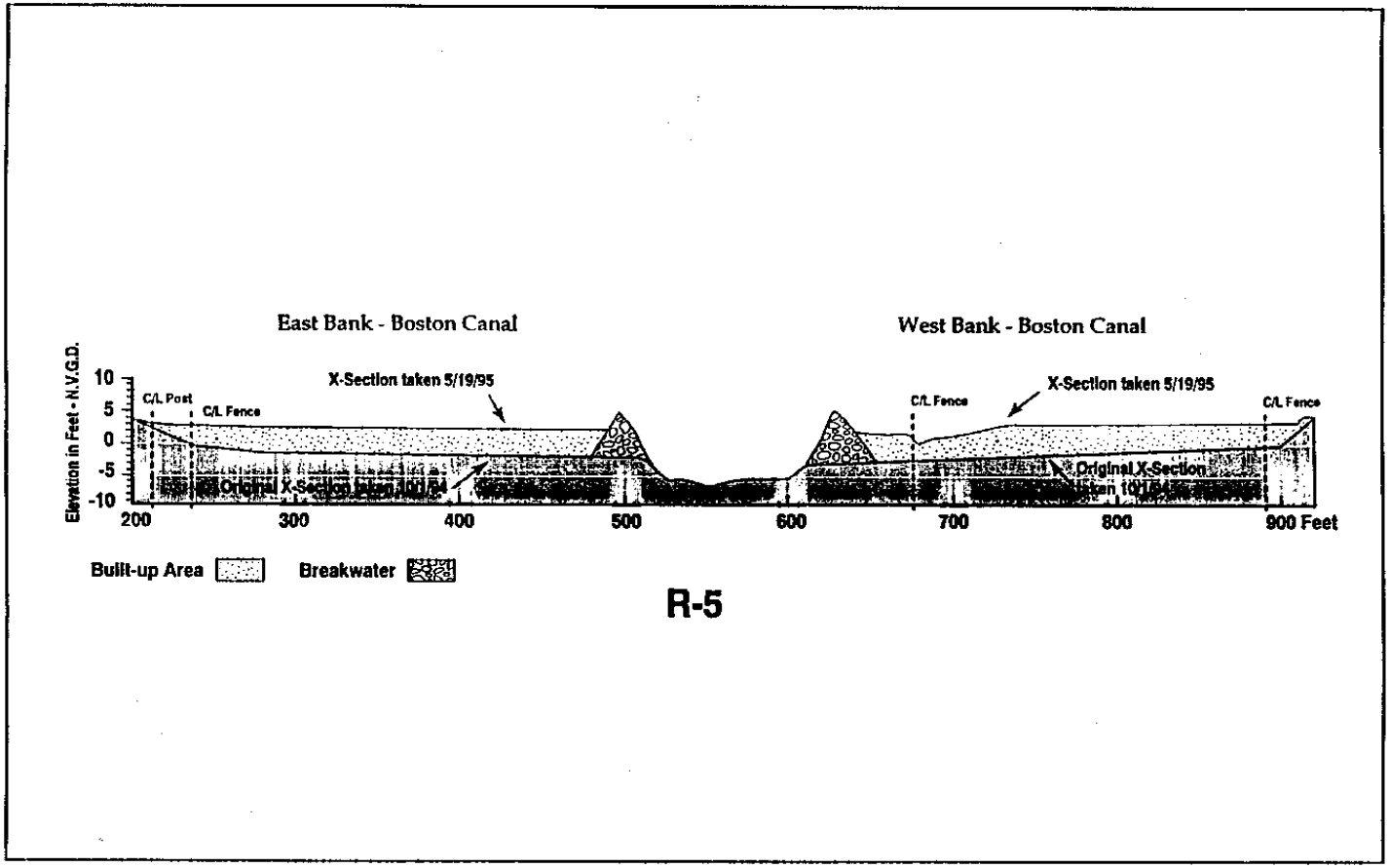


Figure 3. Boston Canal/Vermilion Bay Shoreline Protection (T/V-09) elevational profile of east-west transect R-5 showing accretion.

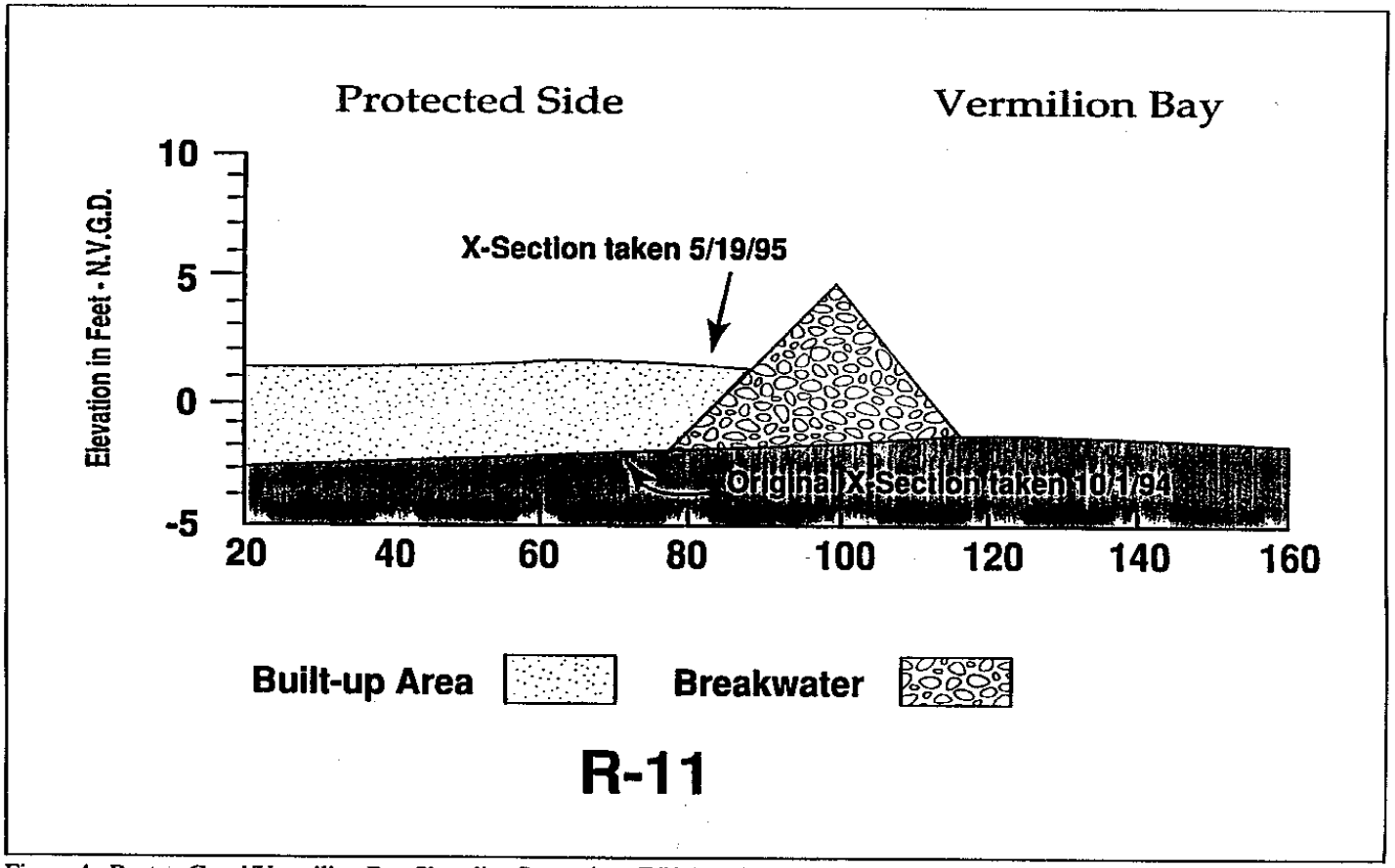


Figure 4. Boston Canal/Vermilion Bay Shoreline Protection (T/V-09) elevational profile of north-south transect R-11 showing accretion.

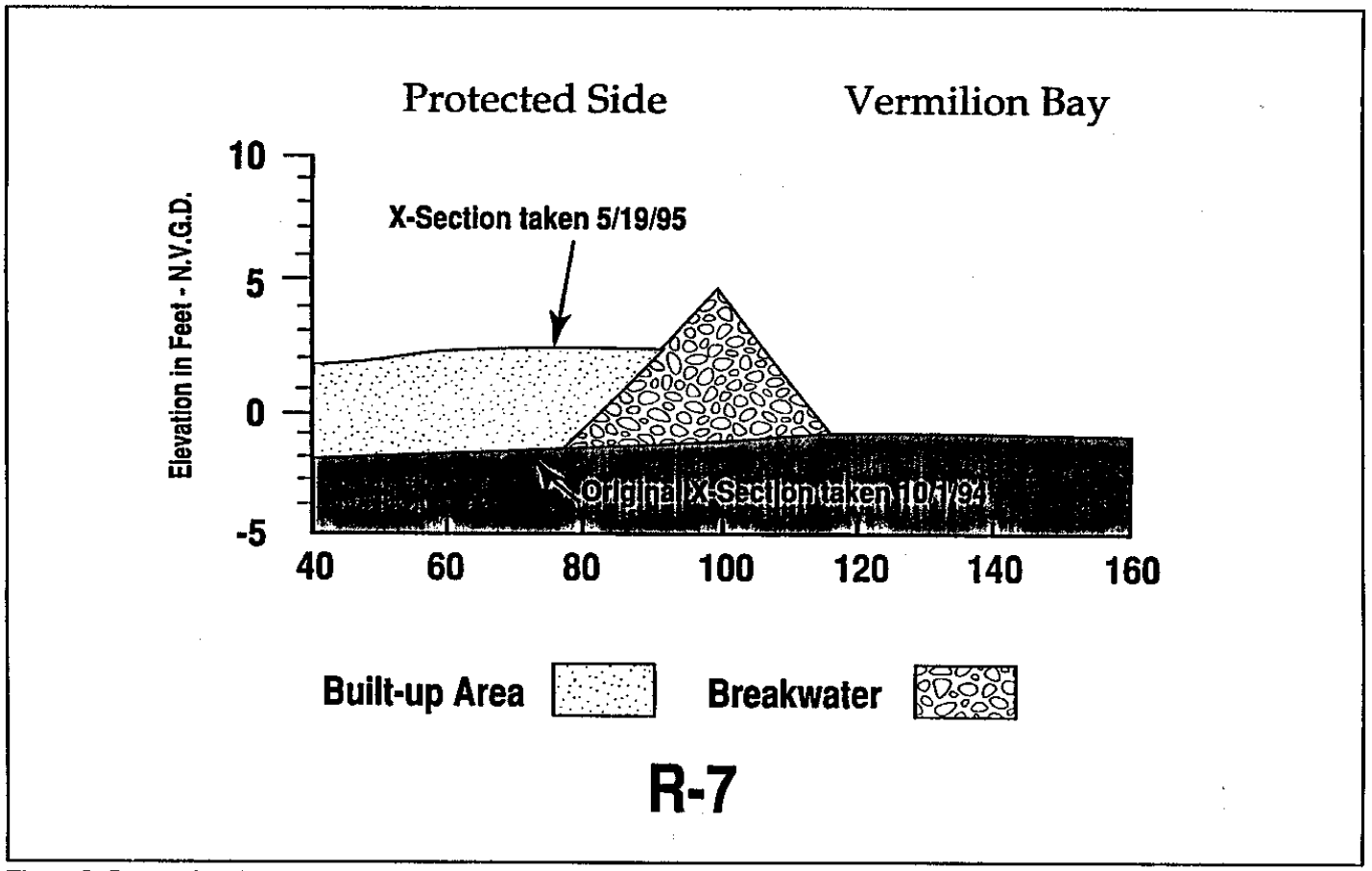


Figure 5. Boston Canal/Vermilion Bay Shoreline Protection (T/V-09) elevational profile of north-south transect R-7 showing accretion.

**Table 1.** Summary data of smooth cordgrass (*Spartina alterniflora*) plantings in 64 sampling plots (3% of total planting plots) from June 1995 to December 1995. Means with different letters are statistically different (P<0.05). Land type 1=straight mineral (34,000'), 2=deeply scalloped organic (5500'), 3=gently scalloped mineral (18,000'), 4=gently scalloped mineral with north/ south orientation (10,900').

| Land type | Number of plots | Mean survival (%) | (S.D.)* | Mean plot coverage (%) | (S.D.)* |
|---|---|---|---|---|---|
| 1 | 28 | 74.6 a | (33.6) | 29.2 ab | (24.4) |
| 2 | 5 | 100.0 ab | ( 0.0) | 45.5 a | (26.7) |
| 3 | 23 | 96.5 b | (10.4) | 27.8 ab | (15.8) |
| 4 | 8 | 98.7 ab | ( 2.4) | 12.1 b | ( 4.9) |
| Overall mean | | 87.9 | (25.2) | 28.1 | (21.0) |

*S.D. = standard deviation.