

**FINAL REPORT FOR THE  
SANDGRABBER DEMONSTRATION PROJECT  
GRAND ISLE, LOUISIANA**

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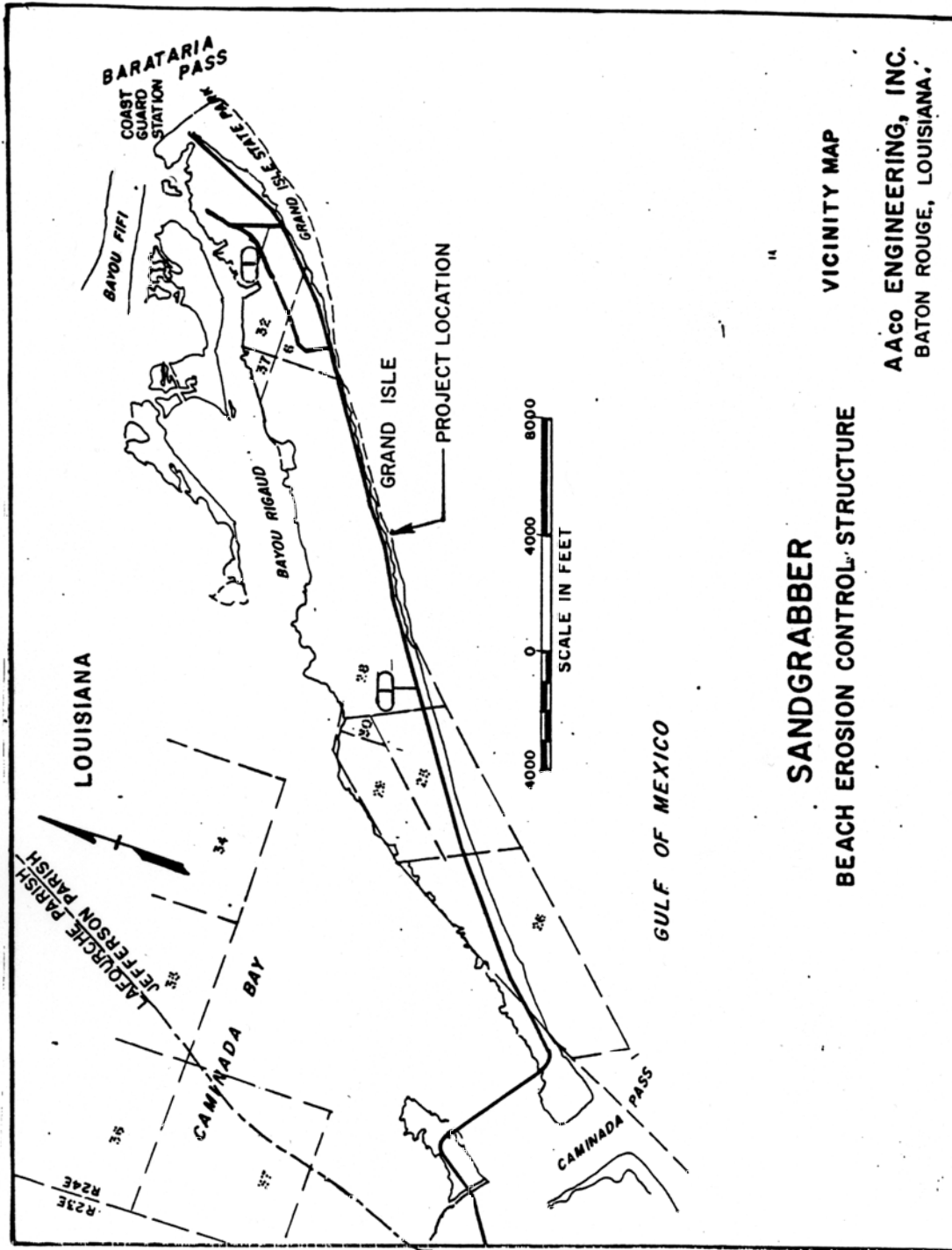
## INTRODUCTION

The study area lies within the boundaries of the Mississippi River Delta plain along the eastern portion of the Bayou LaFourche barrier system (figure 1). This barrier system has deteriorated over the last 100 yrs from a combination of inadequate sediment supply, storm impacts, subsidence, and human disturbance (McBride, R. A., et al. 1992). Specifically, the project is located along the shoreline of Grand Isle, which lies within Jefferson Parish, approximately 75 km west of the mouth of the Mississippi River and approximately 80 km south of New Orleans. Grand Isle is characterized by almost equal amounts of shoreline retreat and advance. The gulf shoreline has experienced relative stability along its mid-section, seaward accretion on its eastern end, and net retreat along its western end (McBride, R. A. et al. 1992). Between 1887 and 1988, gulfside shoreline change rates averaged +0.9 m/yr, whereas the average bayside rate of change was -1.0 m/yr (McBride, R. A. et al 1992).

The Sandgrabber structure is a demonstration project located on the Gulf of Mexico side at the east end of the island near Willow Street adjacent to the Grand Isle Community Center. The Louisiana Department of Natural Resources contracted this project with Sandgrabbers of Louisiana, Inc./Prairie Construction Co., Inc., the licensee in Louisiana for Sandgrabber, Inc., Linwood, Michigan. The total project budget was \$250,000 and included construction costs, surveying, some engineering, overhead and profit, and a partial fee of \$12,500 to the patent holder. This was deemed an innovative technique to demonstrate and evaluate the effectiveness of a patented structure to prevent shore erosion and accrete sand for the building of a beach. The patent gives the following description of the design:

"A seawall structure adapted to combat erosion of a shoreline by wave action comprises a perforate wall arranged along and substantially parallel to the shoreline and having openings therethrough seaward through which the water of incoming waves may pass. Each opening through the wall forms a tortuous passage for the water so that the energy of the water is dissipated gradually as it flows through the wall, thereby enabling sand entrained in the water to be deposited landward and seaward of the wall. The wall is composed of blocks arranged in horizontal rows and vertical courses, the upper edges of the blocks in the outermost rows projecting above the upper edges of the blocks of the next adjacent rows to provide an interlocking relationship between blocks of the outermost rows and the blocks of the next adjacent rows, as well as to provide for vertical deviations in the openings through the wall" (figure 2 ).

The test location was a 500-ft stretch of shoreline along the south side of Grand Isle. (figure 3). The contractor completed installation from January to March 1994. Construction specifications were for a 350 x 106.75 x 4-ft wall and two 75 x 106.75 x 4-ft wing walls. Approximately 659 cu. yds of precast concrete blocks were used.



**Figure 1.** Project location at Grand Isle.



**Figure 2.** Parallel rows of concrete blocks as described in patent.





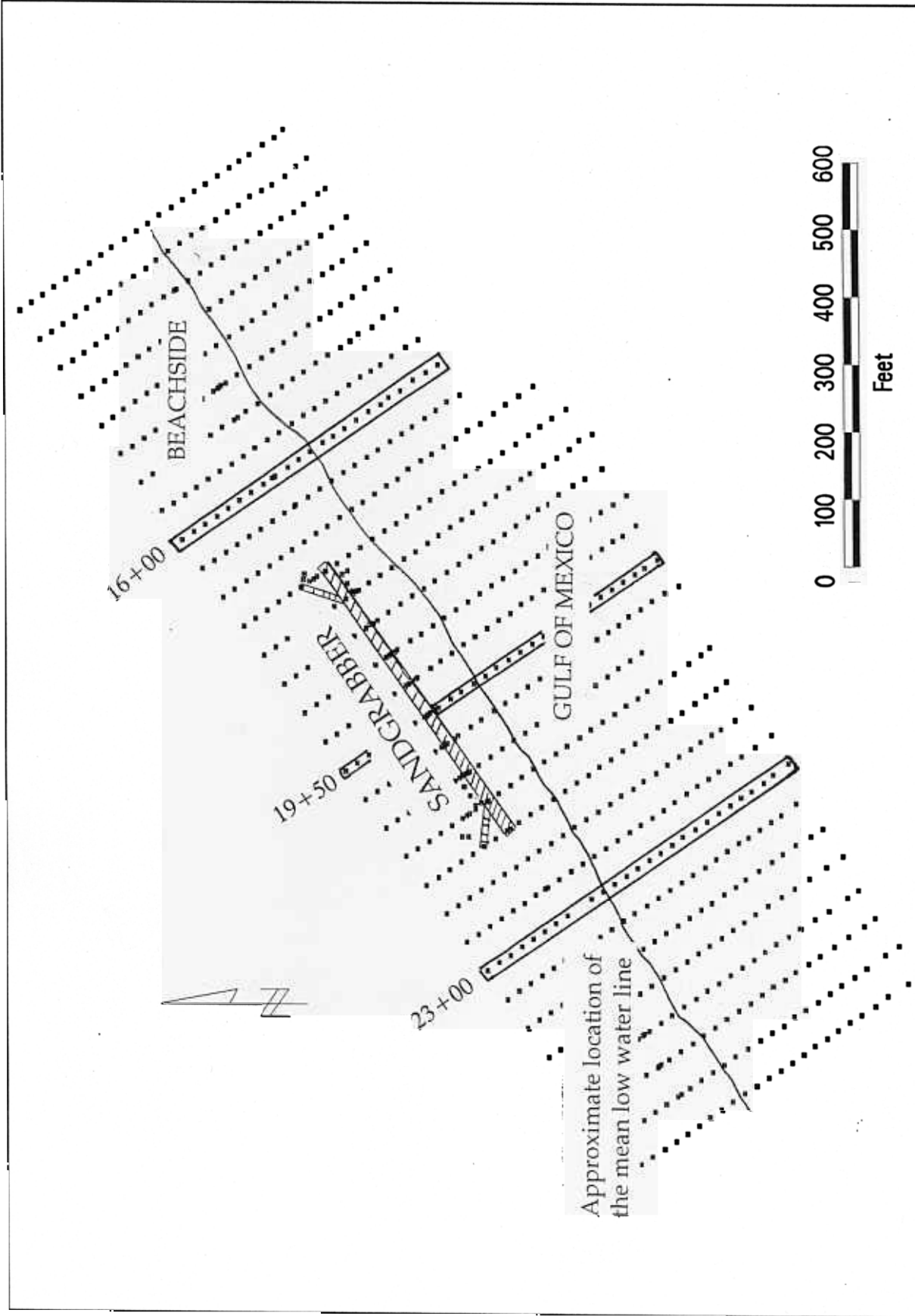
**Figure 3.** Beginning construction of Sandgrabber demonstration project.

## RESULTS

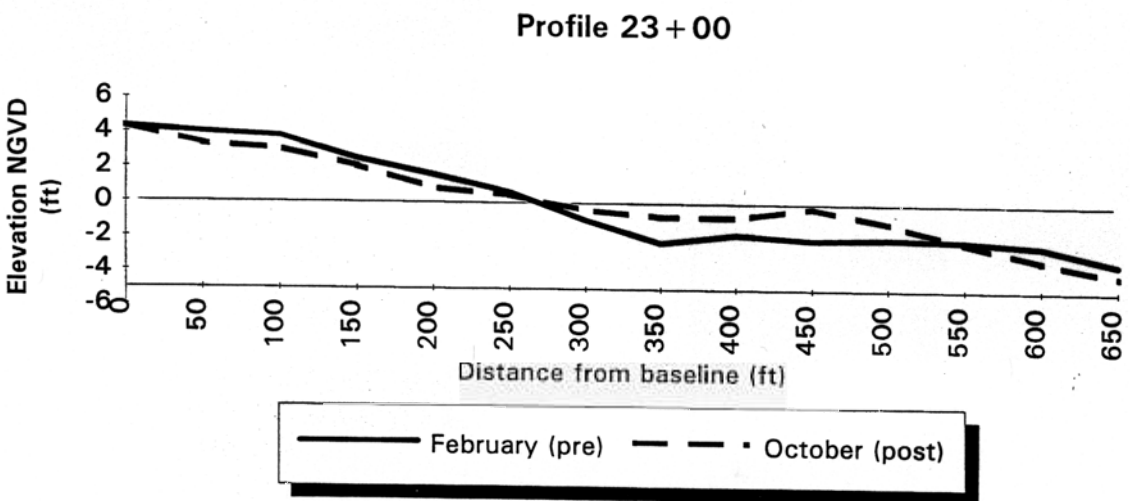
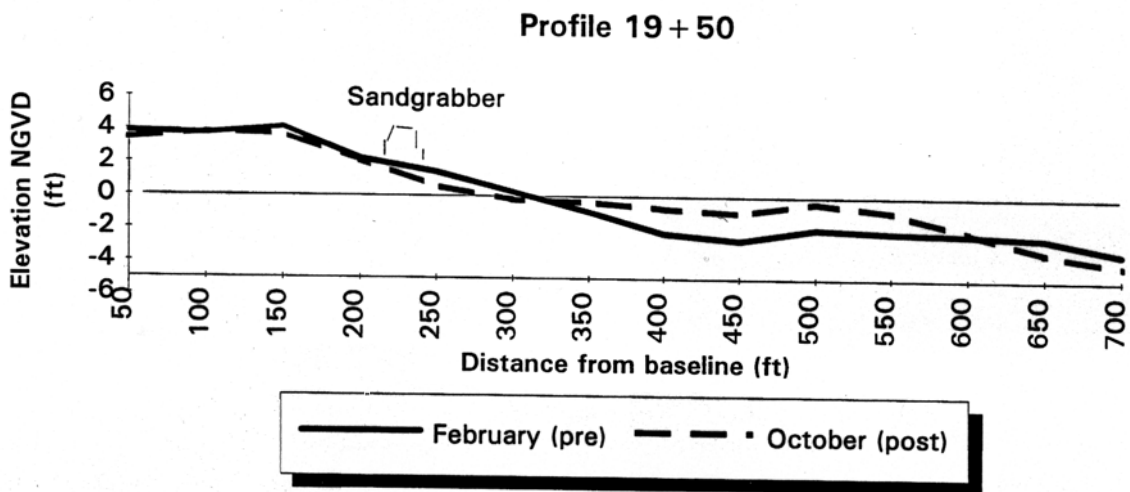
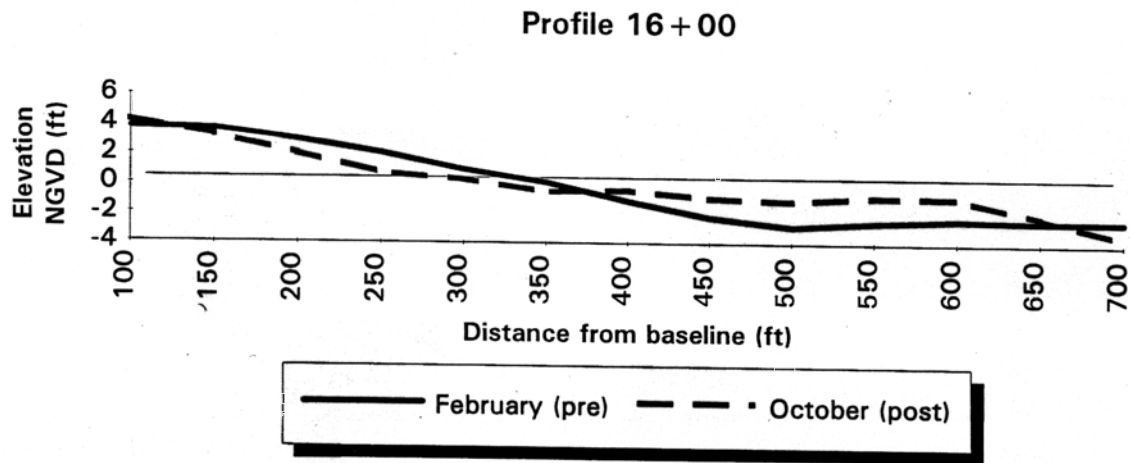
Elevational profiles were originally planned to include four time intervals: prior to construction, 1 mo after construction, 6 mos after construction, and 1 yr after construction. Due to failure of the structure after 10 mos, only two surveys were used to evaluate project performance, February and October 1994. Profiles were run at the structure and for 500 ft on each side of the outermost point of each end of the structure. A total of 31 profiles spaced 50 ft apart with elevations taken at 20-ft centers were surveyed on each profile line. All elevations were referenced to NGVD (figure 4). Due to the failure and subsequent removal of the project, only intensive field observation reports and comparison between two field surveys will be used to describe project performance. Elevational changes determined by T. Baker Smith and Son, Inc., show minimal accretion in the project area; accretion is well offshore and extends both east and west of the project (figure 5). In the areas surrounding the Sandgrabber structure, little accretion had accumulated.

### Field Observations

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|-----------------|---|
| <b>2/1/94</b>   | Construction of project completed.  |
| <b>2/8/94</b>   | Accretion behind the structure was noted, some minor settlement along the west end of the structure had occurred (figure 6).  |
| <b>3/3/94</b>   | Settlement of the structure has now occurred on both east and west ends; significant settlement and displacement of the concrete masonry units at the east end (figure 7).  |
| <b>3/25/94</b>  | Settlement repairs completed on east and west ends.   |
| <b>10/2/94</b>  | Severe storm at Grand Isle Oct. 1-2, resulting in erosion behind the structure. Tides were elevated 3-4 ft above normal, with heavy surf from the southwest reaching across to the dunes. Significant high tides and very strong winds caused overtopping of the structure. The main structure at the east wing wall had been undermined for a length of approximately 25 ft, and sank into the resulting hole by approximately 2.5 ft. Also 15 ft of the seaward end of the east wing wall had settled into a hole. The main structure west of the undermined area failed for a distance of approximately 75 ft on the seaward side. Approximately 50 ft west of this failure, the low front row is leaning outward and the top row is developing longitudinal gaps from 1 in. to 4 in. in width. Scouring occurred under the structure at the junction of the wing wall with the main structure (figure 8). |
| <b>10/27/94</b> | Follow-up damage inspection shows damage to the structure is progressing. Sand accretion, however, does continue behind and in front of the structure.  |
| <b>12/7/94</b>  | Decision was made to remove structure instead of incurring additional repair costs. Dismantling took place December 8-December 16, 1994.  |



**Figure 4.** Original monitoring plan design.



**Figure 5.** Examples of survey data taken pre/post construction downdrift (16+00), centerline (19+50), and updrift of the structure(23+00).





**Figure 6.** Some accretion and settlement on the west end.





**Figure 7.** Settlement along the east end of the structure.