SOUTH PADRE ISLAND, TEXAS, SECTION 933 BEACH FILL STUDY

Final Report
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Galveston District
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Contents

List of Figures

List of Tables

Preface

This study was authorized on January 23, 1995, as Contract No. DACW64-95-C-OO18 between the U.S. Army Corps of Engineers (USACE), Galveston District, and the Conrad Blucher Institute for Surveying and Science, Texas A&M University-Corpus Christi. Mr. Sidney Tanner and Mr. Ronnie Barcak were the Galveston District contract technical monitor and technical point of contact, respectively. Mr. Patrick O'Malley, Galveston District, provided technical coordination for operating the Beach Fill Module (BFM).

The storm and wave hindcasts developed for this study were produced by Mr. William Grosskopf of Offshore and Coastal Technologies, Inc.-East Coast, Avondale, Pennsylvania. The economic resource inventory was conducted by Mr. David Reagan and Mr. Joseph Garza of Shiner, Moseley and Associates, Inc., Corpus Christi, Texas. B9th firms worked under the direction of the Conrad Blucher Institute. For this report, Mr. Grosskopf provided portions of the material for the storm analysis, and Mr. Reagan provided portions of material for the resource inventory. These narrative contributions were edited and modified by the authors.

Permission was obtained from the U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center (CERC), to employ a test version of the BFM for the economic analysis. The BFM is currently under development by CERC under guidance of a Corps of Engineers technical committee. Assistance in implementing the BFM in this study was provided by Mr. Randall Wise, CERC; Mr. Michael Wutkowski, US ACE, Wilmington District, and Ms. Mona King, USACE, Los Angeles District, all involved actively in BFM design. Mr. Ronald Livesay and Mr. Eric Livesay, Hecate Software, Inc., Dallas, Texas, who are responsible for BFM software development, also assisted in this

first full field implementation.

The beach profile survey was conducted by Blucher Institute personnel staff: Mr. John Adams as boat captain; Ms. Cheryl Brown, Mr. Niall Durham, and Dr. Nicholas Kraus as field party members; and Mr. Daniel Prouty and Mr. Russell Ochs as chief surveyor and assistant surveyor, respectively. Mr. Patrick O'Malley, US ACE, and Dr. Jennifer Prouty, Texas A&M University- Corpus Christi, provided assistance in the field.

Executive Summary: South Padre Island, Texas, Section 933 Beach Fill Study

The work reported herein was performed in support of a Section 933 study being conducted by the U.S. Army Corps of Engineers, Galveston District. Section 933 of the 1976 Water Resources Development (amended 1986) promotes beneficial use of dredged material by allowing the Federal Government, through the Corps, to cost-share with a local government sponsor in placement of beach quality material on the beach, if there is a federal interest as demonstrated through a favorable benefit in enhanced shore protection. The additional cost associated with the beach fill project that exceeds the least-cost alternative for disposing of the dredged material is shared equally between the federal government and the local sponsor. If the Study indicates a net benefit, the project can be initiated. Alternatively, and separately from the Section 933 process, a local government entity can simply pay for the total incremental cost above that of the least-cost disposal alternative and have sand placed on the beach by the Corps without federal cost sharing and the associated federal study and other expenses.

The State of Texas requested a Section 933 study be conducted for the Town of South Padre Island, a major tourist destination of substantial development located on the southern end of Padre Island, Texas, a long sandy barrier island. A portion of the 5-mile long Gulf-fronting beach of the Town has been experiencing historic shoreline recession of as much as 8 ft per year, increasing the Town's existing vulnerability to potentially catastrophic damage by high water levels and erosion accompanying hurricanes.

The work described in this report included a review of the coastal processes and the collection of data needed to conduct the Section 933 study. Data collection involved beach profile surveys by sea sled, sediment sampling, and an economic resource inventory. A hindcast of expected storms and a frequency analysis were also conducted for waves and water level. Based on the survey data and expected volume of available beach-quality dredged material, a beach-fill design was developed to nourish approximately 6,000 ft of eroding beach along the northern end of the Town of South Padre Island. The design process included numerical simulation modeling of long-term shoreline change and preparation of data sets for modeling of storm-induced beach erosion (performed by the Galveston District).