A Draft Proposal
on

A MONITORING PROGRAM FOR THE GALVESTON BEACH NOURISHMENT PROJECT

prepared by
Dr. Y.H. Wang, P.E.
Department of Maritime Systems Engineering
College of Geosciences and Maritime Studies
Texas A&M University
Galveston, Texas 77553

15 November 1993

TABLE OF CONTENTS

EXECUTIVE SUMMARY

PROPOSED WORK

I. Scope of Monitoring Program

II. Field Site and Layout of Data Collection Stations

III. Data To Be Collected

Physical environmental data
Coastal bird population count
Dune vegetation
Economic impact data

IV. Data Analysis and Correlation

V. Instruments and Equipment Acquisitions

VI. Expected Results

VII. Student Participation and Personnel

VIII. Initiation of a Galveston Engineering Graduate Program

IX. Budget Estimations

X. Collaborators

IX. Biographic Sketch of the Principal Investigator

EXECUTIVE SUMMARY

* Two most recent beach nourishment monitoring projects were carried out on the Gulf of Mexico coastlines. The state-of-art monitoring techniques used in these monitoring programs will be adopted and improved for this proposed monitoring work.

* The Scope of this monitoring program will include physical and environmental aspects of the project site and the site of borrow area. The economical impact on Galveston will also be evaluated.

* The physical aspect of the monitoring work will include data collection on the driving functions and response functions. The former are coastal forces which transport the sediments; the latter are the deformable near shore boundaries which react and interact with various forces in the coastal zone.

* The driving function data should include the wave climate, the weather, current and tide; the response function data would consist wading beach profiles, bathymetric survey, aerial photographs and sand sampling.

* Data for both driving and response functions will be collected for normal sea state as well as for frontal conditions of the weather. The weather fronts are likely to inflict heavy erosion on the placed sand.

* Data will be collected in the borrow area as well. With scientific data in hand, a maintenance nourishment plan may be formulated with more confidence.

* With both driving and response functions known, the correlation of these two sets of data will be made to show the cause-effect relationship, and to estimate the time rate of change of the littoral environment.

* The biological aspect will include the planting of dune vegetation and on the assessment of the impact on resident and migrant birds population if there is any.

* The economic impact of the new beach on Galveston and on the State of Texas will be studied. This is done by analyzing the expenditures by non-resident beach users and by employment and payrolls.

* Every efforts will be made for providing answers to the following frequently asked questions:

  Where does the sand go and how fast is it going?
  What is the rate of littoral transport on the project site?
  What is a reasonable estimate of project life?
  Would the borrow area at Big Reef be replenished naturally and how soon?
  Is the wildlife and environment adversely impacted by the nourishment project?
  How does the offshore underwater mound interact with the newly nourished beach?

* The monitoring project provides excellent thesis topics for Master of Science degrees, therefore, it sets up the stage for initiating a Galveston engineering graduate program in the area of coastal processes.

* Collaborators would include the following Galveston faculty members and their students.

  Dr. James Webb - Dune vegetation
  Dr. Donald Harper - Coastal birds
  Dr. Golam Mohammad - Economic impacts