



US Army Corps
of Engineers®

Engineer Research and
Development Center

Walton County, Florida Hurricane and Storm Damage Reduction Feasibility Study

Description

CHL, in support of the Mobile District (SAM), is providing technical oversight of engineering and economic analyses required for storm protection project design. The primary goal of this study is to investigate, analyze and recommend solutions to provide for hurricane and storm damage protection along the coastline of Walton County, Florida.

Alternatives will be formulated and recommendations made for Federal participation in

construction of a project that will offer significant protection to structures along the beach.



Issue

Standardized, risk-based economic justification for coastal storm damage reduction projects is required to promote consistent and defensible economic evaluations of coastal storm protection projects. A thorough and realistic approach to beach nourishment design is achieved through life cycle analyses. CHL, together with Institute for Water Resources (IWR), has developed a Monte Carlo simulation model for the engineering / economic analysis of shore protection projects (*Beach-fx*). The Walton County Feasibility Study was selected to serve as a test-bed application of the model. CHL and SAM staff performed engineering analyses to characterize expected beach morphology response to coastal storm events and to populate a Shore Response Database (SRD), on which *Beach-fx* relies for beach morphology change predictions over the course of a user-specified time horizon (50-year project life). A detailed GIS-based structure inventory was developed that encompassed all structures (residential, commercial, and recreational) subject to storm damages. *Beach-fx* estimates inundation, erosion, and wave attack damages to impacted structures (and their contents) based on predicted beach morphology changes and storm characteristics over multiple (on the order of 300) future project lifecycles. Model output includes expected average annual damages with confidence limits. Consequently, with and without project simulations enable rigorous estimation of the economic costs and benefits of alternative shore protection designs. The *Beach-fx* simulation technique also facilitates design optimization with respect to design features and renourishment intervals.

Products

1. Estimated average annual costs and benefits of with and without project alternatives.
2. Estimated nourishment quantities and renourishment intervals with associated confidence limits.
3. Calibrated Monte Carlo simulation model with and without project beach morphology evolution.
4. A comprehensive database of historically based, plausible coastal storm events for the Walton County area that can be applied for future studies.
5. Detailed GIS-based structure inventory.

Supporting Technology

The Walton County Feasibility study employed the coastal morphology change numerical models SBEACH (short-term storm-induced beach profile change), and GENESIS (long-term shoreline evolution) as well as the nearshore wave transformation model STWAVE and multiple supporting computer routines contained in the *Beach* module of the Coastal Engineering Design and Analysis System (CEDAS). The engineering/economic model *Beach-fx* was employed to integrate the results of the engineering analyses (beach morphology change) with the economic consequences associated with proposed project alternatives as well as the without project condition.

Benefits

The study provides a defensible assessment of the costs and benefits of a shore protection project in Walton County, Florida. The storm and structure databases, and the calibrated model can be applied for future evaluation of project modifications and assessment of damages prevented in the wake of future storm events.

Sponsors

The study is cost-shared between the US Federal Government (US Army Engineer District, Mobile) and the local partners (Walton County and the State of Florida).

Point of Contact

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