

Shore Protection Alternatives Analysis for Edisto Beach, SC

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Abstract:

The US Army Engineer District, Charleston is conducting a comprehensive hurricane and coastal storm damage reduction feasibility study for the Town of Edisto Beach, SC. A variety of design alternatives for reduction of hurricane and storm damages as well as environmental restoration and protection will be evaluated. The physical and economic performance of alternatives involving beach nourishment alone and beach nourishment in conjunction with coastal structures including breakwaters, headland breakwaters, and groins will be examined. The coastal evolution numerical models SBEACH and GENESIS will provide information on the engineering requirements, long-term physical performance, and short-term morphology response to storm events. A detailed and georeferenced structure inventory and damage functions will define the local assets and relate potential damages to the environmental forcing. The engineering-economic model Beach-*fx* will integrate input engineering data from the coastal processes models with the georeferenced structure inventory and damage functions and perform Monte Carlo simulations of future project lifecycles to estimate the costs and benefits of proposed shore protection alternatives. This paper will provide a brief description of the Corps of Engineers planning process and the engineering and economic analysis tools employed in that process and provide a summary of the available results at the time of the conference.

The presentation will summarize development and characterization of the environmental forcing, and our current understanding of the pertinent coastal processes including the local sediment budget and the role of long-term coastal processes within the context of the local geology and sea level change as well as the influence of short-term storm-driven coastal processes on coastal morphology within the town of Edisto Beach. It is expected that results of the alternative screening analyses will have been completed and the engineering and economic performance of several of the feasible alternatives as evaluated using Beach-*fx* will be available for presentation.

Mark Gravens is a coastal engineer with 24 years of experience at the Coastal and Hydraulics Laboratory of the US Army Engineer Research and Development Center. He is the laboratory point of contact for coastal morphology evolution numerical models SBEACH and GENESIS and is a co-developer of the only USACE certified coastal planning model Beach-*fx*. Beach-*fx* is an event-based Monte Carlo simulation tool developed for evaluating the physical performance and economic benefits and costs of shore protection projects.