

Emergency Beach/Dune Restoration Along South Carolina's Grand Strand Following Hurricane *Hugo*

Project Scope — Hurricane *Hugo* (21-22 September 1989) caused more than \$5 billion in property damage in South Carolina. Immediately after the storm, Coastal Science & Engineering (CSE) was retained by the State of South Carolina to develop a beach-dune restoration plan in coordination with FEMA's poststorm damage response.

Services Provided

CSE identified priority beach areas and outlined a \$10 million nourishment plan based on extensive prior work in the 65-mile reach from South Carolina's Grand Strand to Charleston, the main areas impacted. The restoration plan prescribed:

- Borrow areas.
- Reach lengths and unit volumes of beach fill.
- Construction methodology.
- Environmental protection.
- Estimated costs.

Included was a detailed cost-share recommendation for federal and state funding (including extra FEMA funds under the improved projects category where prior nourishment had been performed).

Specifics of the plan were presented by CSE principals to the governor and FEMA officials three weeks after the storm. The plan was approved in its entirety one week later and was implemented over the following six months. Dune restoration by scraping was completed along ~65 miles of shoreline one month after the storm.

Nourishment of 22 miles (1.3 million cubic yards, five projects) was completed by April 1990. Surveys indicated the combination of nourishment and natural beach recovery restored recreational beaches to pre-*Hugo* levels by summer 1990. Beach tourism revenue one year after *Hugo* was reportedly 5 percent higher despite adverse publicity during the storm.

Relevant areas of engineering expertise:
Beach design, beach surveys, storm damage surveys, littoral budget

Client: SCDHEC's Bureau of Ocean and Coastal Resource Management (OCRM)



Lessons Learned — CSE had developed a statewide plan for beach restoration and presented it to the legislature prior to *Hugo*. Having such a plan in hand when the storm struck the coast facilitated poststorm emergency response. Priority restoration areas were established based mainly on the prestorm ranking of problem beaches because *Hugo* greatly exacerbated existing trends. The prestorm plan also allowed rapid cost estimating, identification of suitable borrow areas with little additional research and development of a credible emergency construction plan in record time.