

## Beach Nourishment Project and Groin Repairs at Edisto Beach, Edisto Island, South Carolina

**Client:** Town of Edisto Beach

**Project Scope** — This project involved repairs and lengthening of 21 groins in conjunction with beach nourishment using an offshore borrow source. The budget for this work was limited to \$1.5 million (combined state, county, and municipal funds).

### Services Provided

CSE formulated the project solution based on the expected cost of borrow sand. This was a politically sensitive project because prior mistakes in the placement of groins had exacerbated erosion along some areas. Working closely with Town of Edisto Beach officials, CSE principals developed an objective plan which was sensitive to downdrift property owners.

A number of design tools were used to formulate the project including a shoreline change model (GENESIS), a cross-shore model (S-BEACH), and the SPM sand compatibility model. Borrow area surveys confirmed the presence of sufficient coarse sediments ( $D_{50} \sim 0.7$  mm) on an exposed ebb-tidal delta, where most of the surrounding sediment was finer. Coarse sand was needed to match the unusually coarse (for South Carolina) native beach.

To reduce the cost of the project, CSE used smaller armorstone (matching the historically inadequate stone size) for the groin extensions, but grouted the structures using a prescribed high-strength mix to increase durability. Lengths of groin repairs were individually varied to produce a more uniform beach width (compared to existing conditions).

Nourishment volumes were tailored to the specific groin improvements within each groin cell. Through various economies, the CSE team was able to overfill the cells beyond the contracted design and provide a surplus stockpile to feed downdrift areas. The project was completed on time and on budget. CSE provided construction management services. Weeks Marine (New Jersey), Great Lakes Dredge & Dock Company (Illinois), and a local contractor (Westbank Construction) built the project. CSE has provided yearly monitoring of the project including detailed surveys offshore to document movement of the nourishment sand.

### Relevant areas:

Beach nourishment design, coastal structures design, coastal processes analysis, borrow area surveys

### Key Features

- First project on the East Coast of the United States to use grout and improve performance of an existing groin field
- Demonstrated cost efficiency of grout for groin repairs
- Yearly monitoring of the repaired structures shows negligible signs of cracking/displacement or sand losses within the repaired groin cells
- Project demonstrated a new and innovative technique for repair of quarystone groins

