

INTRODUCTION

Hurricane Hugo, with winds in excess of 135 miles per hour (mi/h), made landfall near Charleston, S.C., early on the morning of September 22, 1989. It was the most destructive hurricane ever experienced in South Carolina. The storm caused 35 deaths and \$7 billion in property damage in South Carolina (Purvis, 1990).

This report documents some hydrologic effects of Hurricane Hugo along the South Carolina coast. The report includes maps showing storm-tide stage and profiles of the maximum storm-tide stages along the outer coast. Storm-tide stage frequency information is presented and changes in beach morphology and water quality of coastal streams resulting from the storm are described.

DESCRIPTION OF HURRICANE HUGO

Hurricane Hugo originated on September 9, 1989, as a cluster of thunderstorms near the Cape Verde Islands in the intertropical convergence zone off the northwest coast of Africa (not shown on fig. 1). The cluster of thunderstorms developed into a tropical storm on September 12 and a hurricane on September 14, which intensified as it moved westward (fig. 1). Hurricane Hugo reached maximum strength on September 15, with wind speeds of 190 mi/h at an altitude of 1,500 feet, and surface winds of 161 mi/h (Jarvinen, 1989), making Hugo a category 5 hurricane. Hurricane Hugo lost some intensity during passage over the Virgin Islands and Puerto Rico during September 17-19, but it strengthened in intensity as it moved over open water between the islands and the United States mainland. By September 21, Hurricane Hugo was a category 4 hurricane with maximum wind speeds exceeding 135 mi/h and a path 184 miles (mi) wide in which wind speeds exceeded 50 mi/h (Jarvinen, 1989). On September 22, Hurricane Hugo struck South Carolina, making landfall at Sullivan's Island (fig. 2) east of Charleston at an angle nearly perpendicular to the coast.

Hurricane Hugo was the most destructive hurricane to affect South Carolina to date (1992). The estimated maximum sustained wind speed at the time of landfall was 138 mi/h with an estimated minimum central pressure of 934 millibars (27.58 inches of mercury) (Purvis, 1990).

The highest recorded sustained wind speed was 85 mi/h at Folly Beach (south of Charleston). Rainfall associated with the hurricane ranged from a maximum of 10 inches south of Charleston to 2 inches in the northwestern part of the State (Purvis, 1990). Hurricane Hugo caused 35 fatalities in South Carolina, 13 during the hurricane and 22 from storm related causes after the hurricane. More than \$7 billion in damages statewide, including \$2 billion in crop damage, were attributed to this hurricane (Purvis, 1990). Hurricane Hugo proceeded inland along a path through South Carolina to North Carolina, where wind gusts of near 90 mi/h continued to cause extensive damage (National Oceanic and Atmospheric Administration, 1990). The hurricane was downgraded to a tropical storm near central North Carolina. It continued through Virginia, West Virginia, Ohio, Pennsylvania, and New York, and finally was lost to tracking devices near Greenland.

DESCRIPTION OF STUDY AREA

The study areas described in this report lie along the South Carolina coast between the North Edisto River and the Little River Inlet, near the North Carolina State line, a distance of approximately 140 mi (figs. 3-6). This coastal strip has been developed extensively for beach resort tourism except in areas that are predominantly marshland.

The most densely populated localities in the study area are Charleston, Mount Pleasant, Sullivan's Island, Isle of Palms, and Myrtle Beach (fig. 3). Development in the Folly Island, Sullivan's Island, and Isle of Palms areas is primarily on barrier islands, and development from Litchfield Beach to North Myrtle Beach is primarily on mainland ocean front.

Bays and inlets along the coast between the North Edisto River and the North Inlet include Charleston Harbor, Bulls Bay, Santee River, and Winyah Bay. Charleston Harbor is one of the large ports on the east coast.

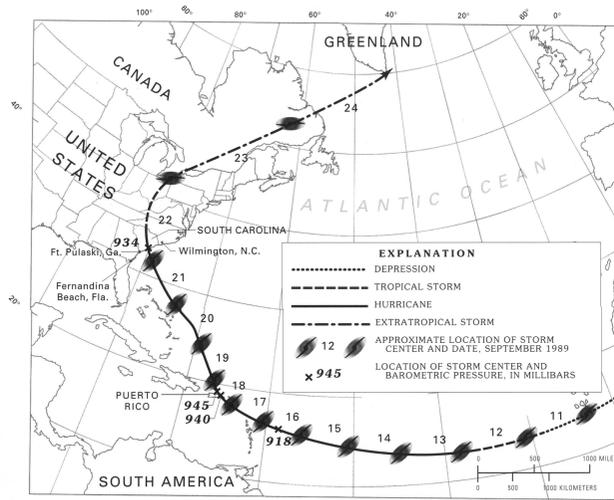


Figure 1. Origin and track of Hurricane Hugo, September 11-25, 1989.

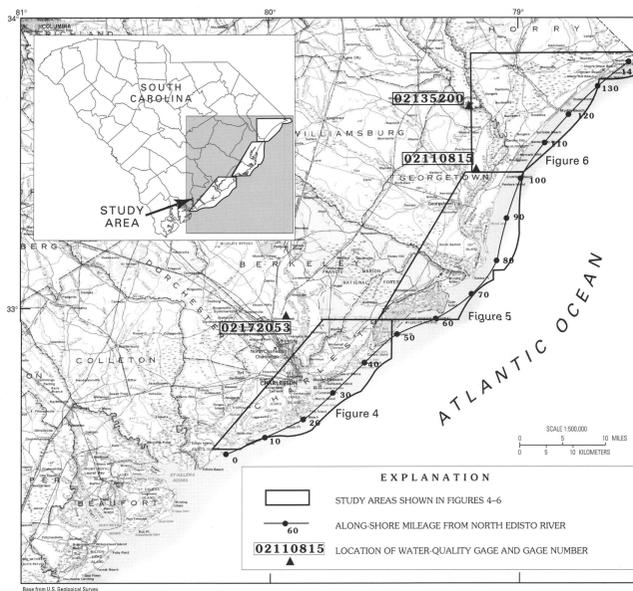


Figure 3. Study areas shown in figures 4-6 and location of coastal features.

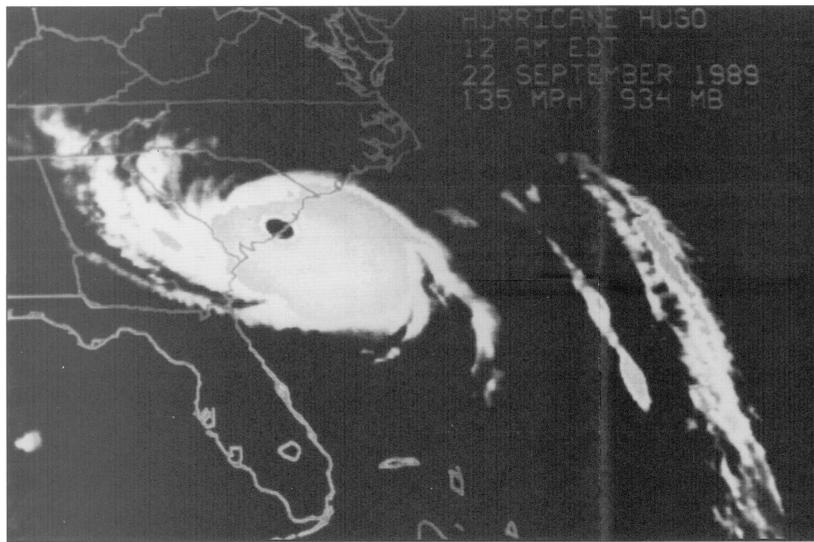


Figure 2. Satellite image of Hurricane Hugo at landfall. (Photograph courtesy of the National Oceanic and Atmospheric Administration, National Weather Service)

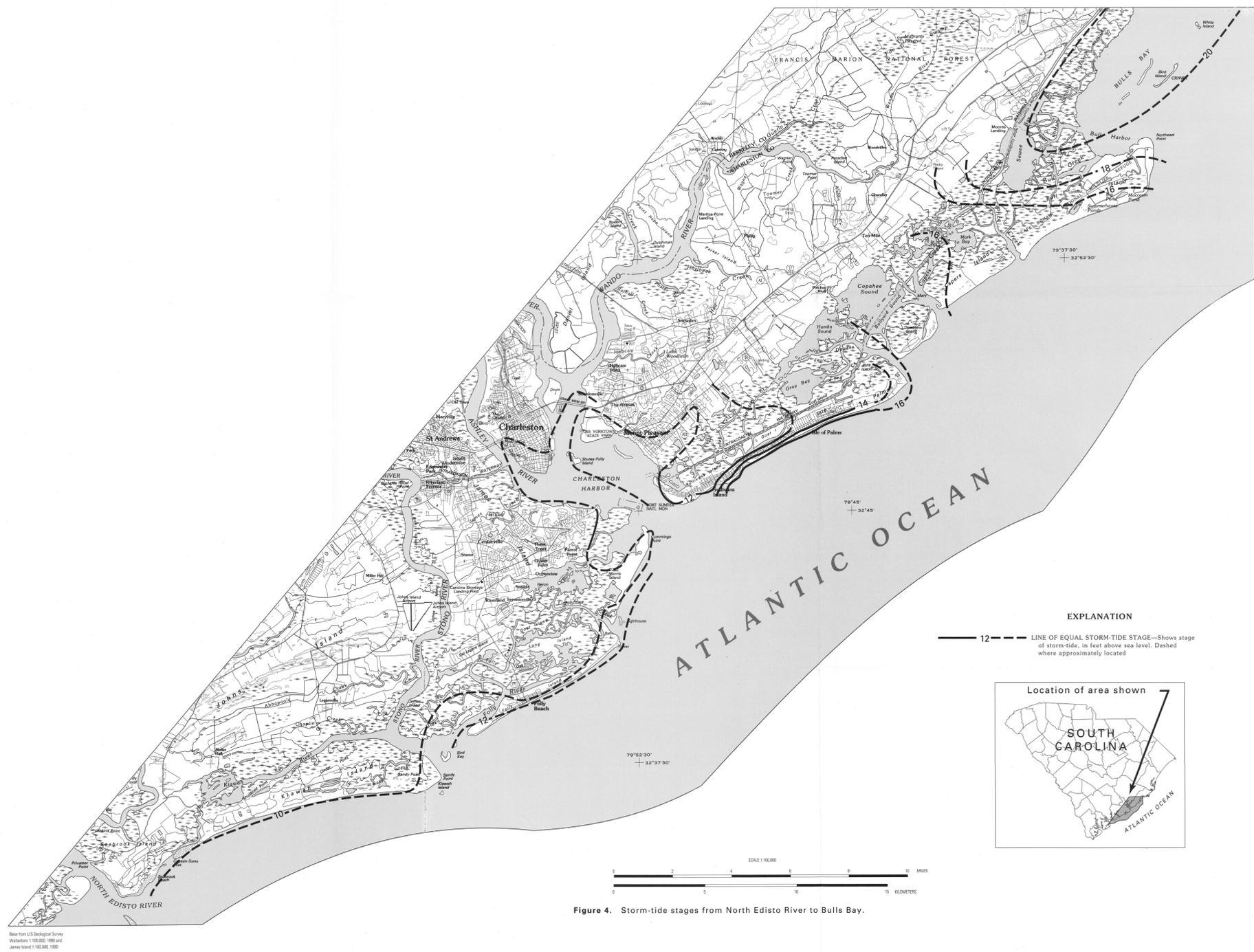


Figure 4. Storm-tide stages from North Edisto River to Bulls Bay.