

2006 EAST END BEACH RESTORATION PROJECT
KIAWAH ISLAND SOUTH CAROLINA

Survey Report No
February 2011



Prepared for:
Town of Kiawah Island

2006 EAST END BEACH RESTORATION PROJECT
Kiawah Island South Carolina

SURVEY REPORT NO. 07
Annual Beach and Inshore Surveys

Prepared for:



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[CSE 232 YR 7]
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COVER PHOTO Viewing west along Kiawah spit in January 2014

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SYNOPSIS

This report is the seventh in a series of annual monitoring reports following the 2006 east end beach restoration project. It presents results of detailed surveys encompassing the ocean-front of Kiawah Island with particular focus on the area around the Ocean Course and Stono Inlet.

The Town of Kiawah Island sponsored the east end project at a cost of \$3,575,000 for purposes of mitigating encroachment on the Ocean Course and restoring the sand flow to down-coast beaches. The flushing channel was closed and a new channel was opened to the east. About 550,000 cubic yards (cy) of sand were scraped from the new outer beach and were placed along the Ocean Course. [LD Weaver Construction Company was the contractor, and all work was performed by land-based equipment between 8 June and 28 July 2006, a schedule based on recommendations by the US Fish & Wildlife Service.]

In addition to the goal of restoring the flow of sand to downcoast areas of Kiawah Island, the east end project was designed to prolong washover habitat. This was accomplished by removing excess sand in some areas (and transferring it downcoast) before a stable dune line could become established with vegetation. Habitat monitoring showed that washover habitat increased in area by over 50 percent from 2006 to 2011 (CSE 2012).

Kiawah Island remains one of the healthiest beaches in South Carolina (Fig A). The results of shoreline monitoring and tracking the sand supply have provided new insight into the formation of barrier islands and rates of evolution of important habitats. Based on the results herein, the

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FIGURE A. Kiawah Island remains one of the healthiest beaches in South Carolina (S

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APPENDIX A) Beach Profiles

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1.0 INTRODUCTION

This report is prepared as part of a series of annual beach monitoring reports following the east end restoration project completed in July 2006 (CSE 2005, 2007). The Town of Kiawah Island (SC) is sponsoring annual surveys of the sandy shoreline for purposes of determining the rates of sand movement, accretion, and erosion adjacent to the project area. This seventh report of the series follows over a dozen shoreline erosion reports prepared by Research Planning Institute (RPI) and Coastal Science & Engineering (CSE) for Kiawah Island since the 1980s (eg Kana et al 1983, CSE 1999). Annual post-project surveys have been conducted in the fall of every year between 2007 and 2013.

The purpose of this report is to describe the current health of Kiawah Island as compared to past conditions. This involves documenting sand volume changes along the entire island (Captain Sams Inlet to the north) where the beach and dunes may be eroding or accreting. Annual monitoring provides a quantitative account of sand volume changes, which can then be used to infer sediment transport rates along the shoreline and predict future areas of concern before critical situations arise.

The scope of work for the annual monitoring effort includes:

- Ground surveys of the dunes, beach, and inshore zone.
- Oblique aerial photography
- Data analysis and production of a technical report describing beach volume changes.

The next section presents a brief description of Kiawah Island and its historical shoreline changes. A summary of the methods used during surveying and data analyses follows in Section 3. Section 4 includes the results of the survey. Section 5 presents a discussion of recommendations.

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2.0 SETTING AND HISTORY

Kiawah Island continues to be one of the healthiest barrier islands in South Carolina. The addition of sand generated from Stono Inlet has led to stable dunes spanning the beachfront with only minor localized erosion in specific hot spots as sand migrates downcoast from Stono Inlet. The addition of sand through the process of inlet bypassing and the foresight of the *ecology of the island* (Hayes et al 1975, Hayes 1977) make Kiawah Island an excellent example of beachfront development and a premier community along the South Carolina coast (Fig 2.1).



FIGURE 2.1. View east from Beachwalker Park 2014 January

2.1 Geologic History of Kiawah Island

Kiawah Island has been studied in detail since 1974, when Professor Miles O. Hayes and colleagues at the University of South Carolina initiated field measurements and review of the geologic history of the island in South Carolina (Hayes+1977, 1994; Hayes & Michel 2008). The oldest part of the island, adjacent to the Kiawah River, was found to be about 4,000 years old and has prograded several thousand feet seaward since the mid 1800s, leading to the creation of parallel dune ridges, each representing the shoreline at the time it was created.



FIGURE 2.2. Barrier island drumstick model (after Hayes 1977) using Isle of Palms upcoast end is wider due to additions of sand from shoals in the inlet. Net transport south builds a spit at the downcoast end of the island.

The island is roughly 10 miles long, bounded by Stono Inlet to the east and Captain Sams Inlet to the west (Fig 2.3). The eastern end episodically gains sand by way of shoal-bypassing events (Williams & Kana 1986, Gaudio 1998), and the sand eventually spreads to down-coast parts of the island until reaching Captain Sams Inlet, where it accumulates and forms Kiawah spit. These shoal-bypassing cycles are responsible for the continued growth of Kiawah Island, but can also cause temporary erosion, which will be discussed later. The geologic history of Kiawah and the processes controlling sand movement along the island are discussed in more detail in CSE (1999).

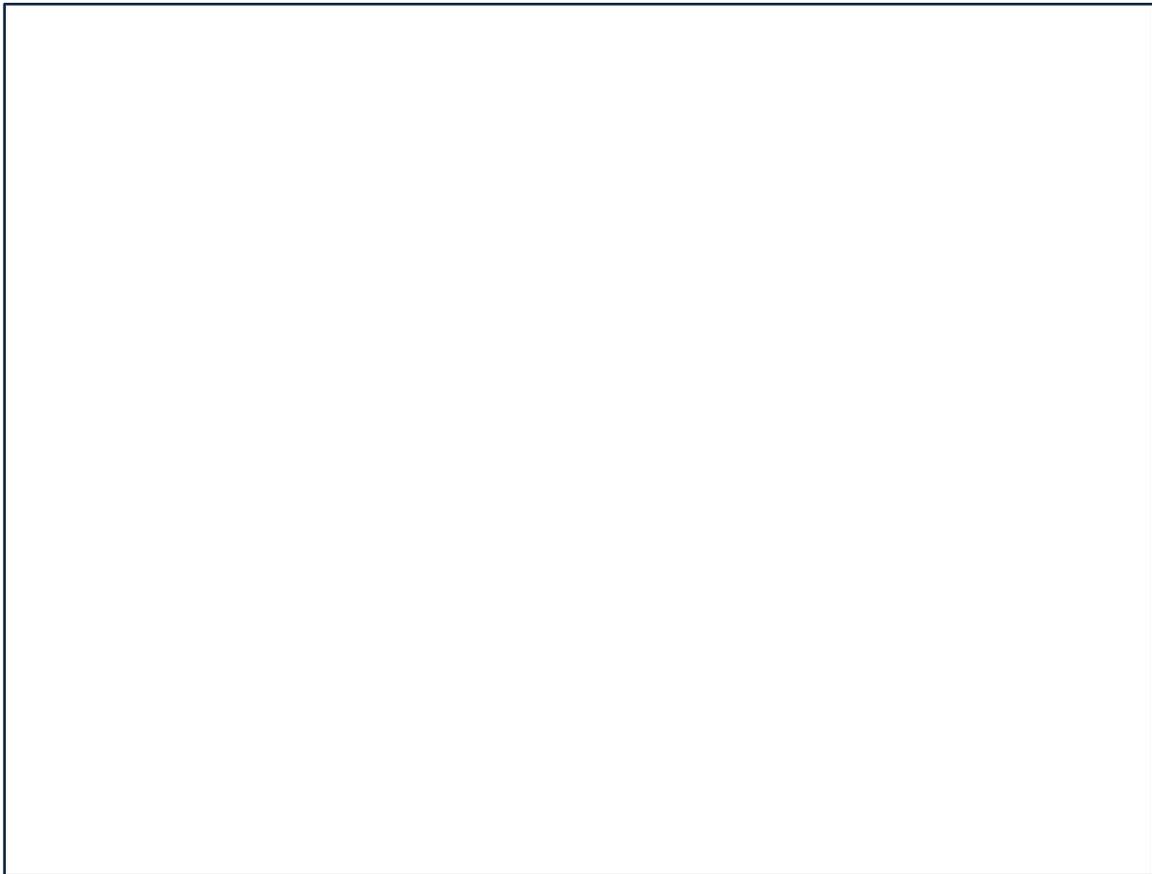


FIGURE 2.3. South Carolina coastline from Seabrook Island to Charleston Harbor [Image courtesy Res Planning Inc and SCDNR]

