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Cat Island and Ship Island

from **Engineering With Nature: An Atlas, Volume 2.**

by **US Army Engineer Research and Development Center**

Cat Island and Ship Island, Mississippi, United States

Creating valuable habitats while protecting the mainland coast and Mississippi Sound. Hurricane Camille cut Ship Island in half when it raged through the Gulf Coast in 1969. The 5.6-kilometer breach between East and West Ship Islands, known as Camille Cut, had almost naturally healed when Hurricane Katrina carved it open again in 2005. Meanwhile, Cat Island, another barrier island off the coast of Mississippi, had lost hundreds of acres of land to erosion. The two islands represented a critical opportunity to restore the Mississippi coastlines' first line of defense against coastal storms. The U.S. Army Corps of Engineers (USACE)–Mobile District partnered with Mississippi's Secretary of State's Office and the Mississippi Department of Marine Resources to restore Cat Island and the National Park Service to restore Ship Island, the latter of which is the second largest restoration project in the history of the National Park Service. Using millions of cubic meters of sand and reused dredged sediment, the project teams restored areas of both islands, creating valuable beach and dune habitats and enhancing their ability to absorb wave energy, sheltering the mainland Mississippi coastline.

Article cover: Cat Island postrestoration in 2017. (Photo by USACE Mobile District)

Producing Efficiencies

For Ship Island, the riskiest part of the project was closing Camille Cut without significant sediment losses, and the most challenging for Cat Island was matching sand grain size and color to the native beach. In both cases, extensive scientific research and on-site investigations ensured the technical precision required to succeed. For Cat Island, researchers identified a borrow site through a partnership with the U.S. Geological Survey. The Ship Island project team took advantage of hydrodynamic and morphological modeling to choose the most effective method of closure. For both, scientific and engineering expertise translated to cost savings and successful outcomes.

Ship Island construction in 2018.
(Photo by USACE Mobile District)

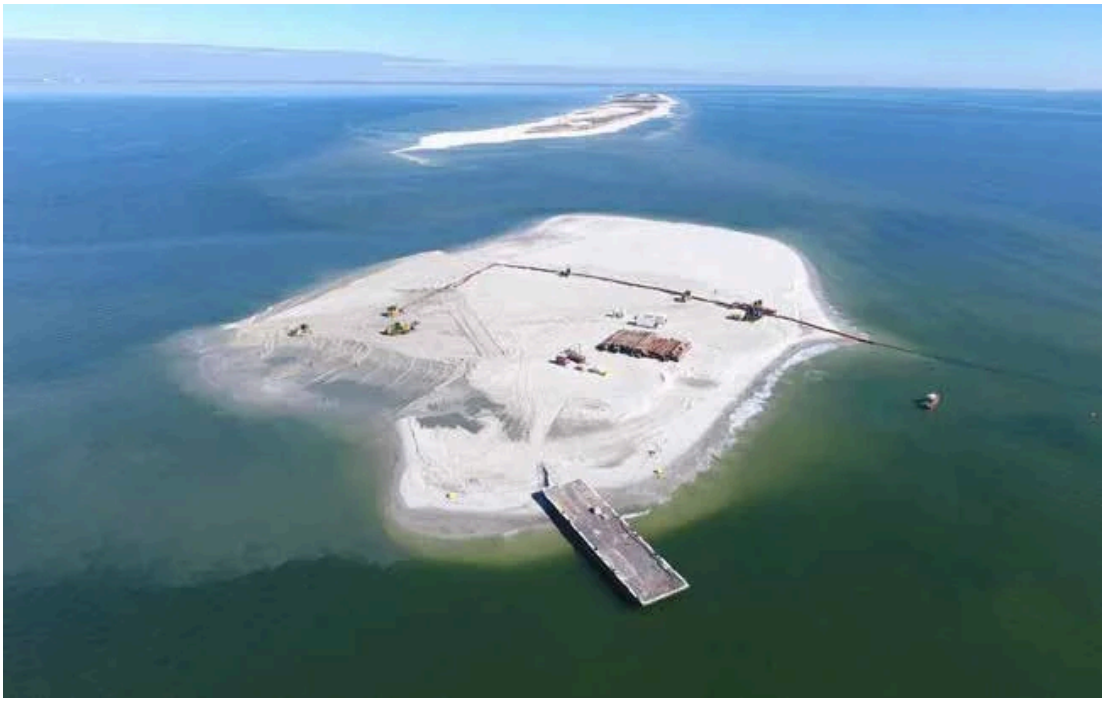
Using Natural Processes

Both islands have specific erosion patterns, so the project teams worked with these natural tendencies to minimize sediment losses during construction. Plantings of native plant species, such as Gulf bluestem (*Schizachyrium maritimum*), sea oats (*Uniola paniculate*), and bitter panic (*Panicum amarum*), further maximized sand retention and natural revegetation. On Ship Island, many plantings were from cuttings and seeds from the island itself, taking advantage of an already-available natural resource. The two projects planted a combined 415,000 plants, which established healthy stands within months of installation.

Path traveled by sea turtle hatchlings on Cat Island in 2017.
(Photo by USACE Mobile District)

Broadening Benefits

Restoration of both Cat Island and Ship Island provide a wealth of societal benefits. They provide additional areas for fishing, hiking, birdwatching, and other recreational activities; and they help guard the Mississippi coastline from wave action and storm surges. This will protect cultural sites, improve public safety, raise property values, increase local tax revenue, and shield fishery habitat and limit saltwater intrusion in Mississippi Sound. Furthermore, the restored islands provide critical habitat for sea turtles; commercially valuable shellfish; native and essential fish; and coastal, marine, and migratory bird species.



Construction pad at the center of the Camille Cut at Ship Island during construction. (Photo by USACE Mobile District)

Promoting Collaboration

A combined 16 different organizations, including state and federal agencies, universities, and private companies were critical in the planning, design, and implementation of these restoration projects. Although the numerous stakeholders and agencies involved had differing perspectives and governing missions, they ultimately strongly supported the effort, making the projects successful. That the native habitats on each island are thriving is a testament to the positive outcomes possible when people are willing to work hard, be honest with each other, and listen to the perspectives of others.

Plantings on the landward side of sand fencing at Cat Island in 2017.
(Photo by USACE Mobile District)

Ongoing beach restoration at Cat Island in 2017.
(Photo by USACE Mobile District)

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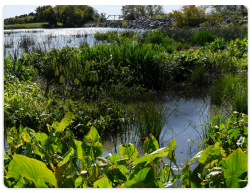

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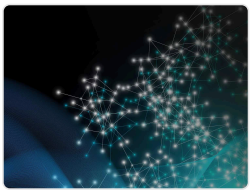

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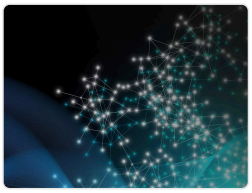

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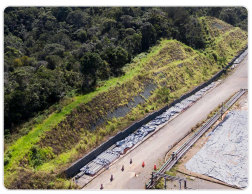

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