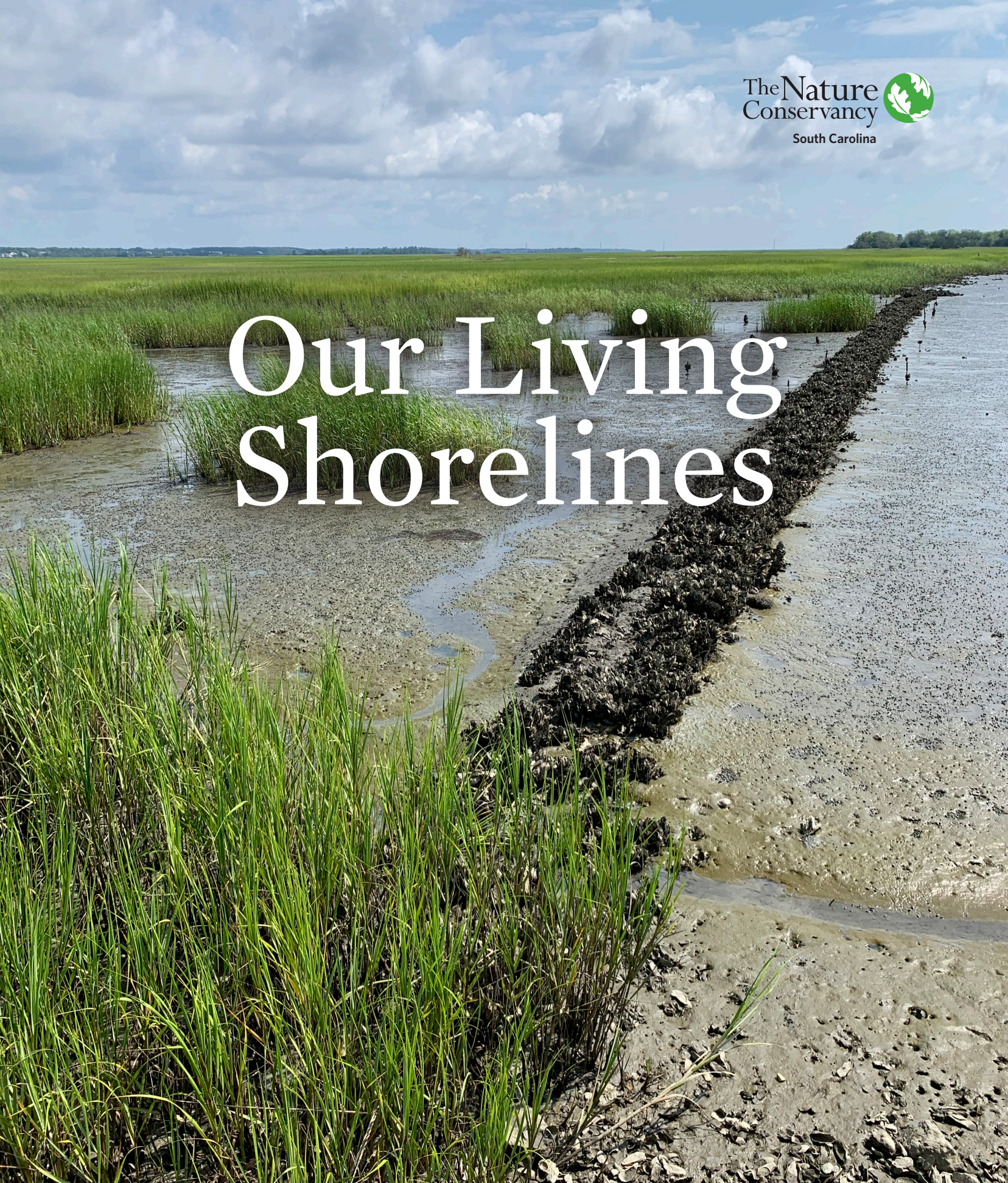


The Nature Conservancy
South Carolina

Our Living Shorelines

South Carolina's coast is well known for its beautiful beaches and expansive marsh vistas. In fact, South Carolina is home to 20 percent of all the salt marsh on the U.S. East Coast, supporting dynamic estuarine habitats, nursery grounds for important fishery species, oyster populations that filter our water, natural wave and storm buffers, and a robust tourism and recreation-based economy. Living shorelines are one type of nature-based solution to extreme weather events that The Nature Conservancy (TNC) in South Carolina has implemented to reduce shoreline erosion, enhance marsh habitat, and improve coastal resilience for our communities.

CLAY BOLT/TNC

What are living shorelines?

Living shorelines are natural areas along coastlines that use nature-based techniques and materials, such as oyster shells, reef blocks, bagged shells, and plants, to help protect eroding shorelines. Working with our state, federal and private partners, TNC is expanding the use of living shorelines at a number of sites around coastal South Carolina to test which techniques are effective at limiting future erosion and establishing new habitat for native plants and animals.

Since 2009, TNC and our partners have worked with public and private partners to install eight living shorelines along the South Carolina coast, totaling over 7,000 square feet, to protect our coast and provide oyster habitat. This work, done with the support of nearly 600 volunteers, represents an estimate of almost $900,000 to protect and restore the coast.

MONITORING IS KEY

Monitoring is vital to determining whether projects are functioning properly and achieving their restoration goals. In South Carolina, TNC monitors its living shorelines annually for the first few years after installation. The monitoring parameters typically include oyster settlement and growth, sediment accumulation behind the reefs, and shoreline position (i.e. whether the shoreline has stabilized, has accreted, or continues to erode). Photographs are taken at multiple points at each site to record any visual changes to the reefs that occur over time. All of this monitoring is used to inform adaptive management.

ADAPTIVE MANAGEMENT

Using monitoring information to adjust management actions to achieve desired outcomes is commonly called adaptive management. In South Carolina, our monitoring programs are designed to provide accountability to a wide range of stakeholders, including donors, public agencies and private partners, communities, and land and water managers. Incorporating an adaptive management strategy into our restoration actions is critical for ensuring their long-term success.

CLAY BOLT/TNC

Project highlights

A PRIVATE PARTNERSHIP

Often, it takes a champion to help move the needle on new or innovative ideas. Boeing South Carolina has been one of the most committed champions of living shorelines in the state, partnering with TNC to fund and build six reefs between 2011 and 2019. The Palmetto Plantation living shoreline, the first of these builds, is located on the Intracoastal Waterway, bordering a private property that has a TNC conversation easement on it. Boeing continued to show its support and commitment to the many benefits of living shorelines by funding a regional reef monitoring study to better understand the commercially and recreationally important fish species that use these reefs. Palmetto Plantation was one of the reefs included in that three-state study.


JOY BROWN/TNC

Boeing employees volunteer their time and sweat equity to build the Palmetto Plantation living shoreline. This is the first of six reefs that Boeing South Carolina has supported.

CHANGING COURSE

Adaptive management is not just about changing course on restoration tactics when an original project does not work as well as it should. It also helps steer how a project gets accomplished, from start to finish. The Goldbug living shoreline, installed in 2016, was the first reef TNC installed that required a full permit from the state permitting agency. TNC hired engineering firm CH2M to develop the certified engineering drawings to complete the permit. CH2M's design included a combination of geotextile-wrapped pallets, concrete blocks called Oyster Castles™, and bagged oyster shells, allowing the reef to sit on top of the very soft mud at the site. Learning how to navigate the complete permit application was invaluable for TNC, and we have submitted a permit application for each project since the Goldbug Island reef was completed.


CLAY BOLT/FOLK LAND MANAGEMENT

At Goldbug, 170 volunteers help build TNC's longest living shoreline in the state, designed by the engineering firm CH2M.

What we've learned

DIFFERENT SHORELINES NEED DIFFERENT SOLUTIONS

Coastal South Carolina hosts a mosaic of habitats, ranging from soft mud bottoms with expansive coastal marsh, to coastal fringing forest with a muddy sand bottom, to beach sand and coastal dune complexes. Each combination, location, and use (e.g., open space, residential, commercial) provide a unique scenario for planning a restoration project. TNC understands that coastal restoration is not 'one-size-fits-all' and works to match a specific solution with each site.

PARTNERS ARE NECESSARY

None of TNC's projects would happen without successful partnerships. Private partnerships have proven vital to completing critical projects that were not funded by state or federal agencies. Partnerships with public agencies have also been useful and have led to the successful and necessary restoration and protection of portions of South Carolina's coast. These partnerships provide funding, support, and most importantly, critical opportunities to learn from each other and make each successive project better.

RESTORATION WORKS

We've seen restoration work. Habitat enhancement and shoreline protection have occurred at nearly all of our sites. Oysters have colonized the reefs in varying abundance and provide the foundation for the entire reef ecosystem. We've watched sediment accumulate behind these reefs, stopping erosion of the marsh grass and providing foraging habitat for birds. We've engaged private citizens and landowners as reef builders, built experimental sites to learn more, and seen the public, charter boats, and commercial fishermen using our reefs.

PEOPLE WANT RESTORATION

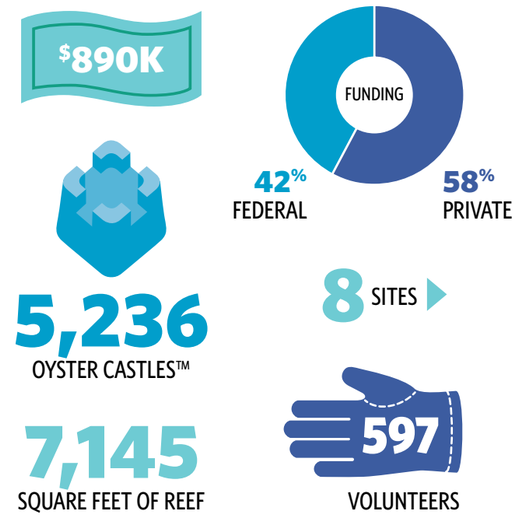
People are interested in this work. They've seen living shorelines work and they want them in their own backyards. As of 2019, there is no regulatory definition of a living shoreline in South Carolina; therefore, anyone interested in installing a living shoreline must go through an arduous general permitting process. In fact, it is easier to apply to build a seawall than a living shoreline. However, this will soon change. Through a science-based approach, the South Carolina Department of Health and Environmental Control (SC DHEC) is working to develop a comprehensive regulatory process to guide the design and permitting of living shorelines. Partnering with the state's Department of Natural Resources, SC DHEC has comprehensively analyzed potential living shoreline strategies that are suited to South Carolina's coastal conditions to inform living shoreline regulations. TNC participated in this process, and four of our reefs (Jeremy Island, Palmetto Plantation, and Stono Island Phases I and II) were included in the project monitoring.

THIS IS LONG-TERM WORK

Success is observed over the long term. At some reefs, success is almost immediate, such as at Botany Island, where 3-inch oysters were found on the reef only six months after installation. We also saw a significant grow-back of eroding marsh behind the Goldbug Island reef just two years after installation. At other reefs, success takes longer to quantify. For example, at Oak Point, sediments eventually covered about 90 percent of the bagged shell, making it difficult for oysters to establish there. However, marsh grass grew on the mud covered shell bags and erosion was drastically reduced along the shoreline within two years.

While we hope that all reefs achieve their objectives of shoreline protection and restoration, even the projects that do not succeed provide us with valuable learning experiences. The reef built on South Island in Winyah Bay ultimately was not successful in recruiting oysters or stabilizing the shoreline to encourage marsh growth, but it did provide useful lessons that we applied to a living shoreline project built the following year on the North Island. We ensure that our projects build in time for monitoring—extensively in the first year and annually for at least 3–5 years thereafter. In addition, we visit our living shorelines after significant storm events to capture more data on the effectiveness of these types of nature-based solutions to withstand storm surge and buffer our shorelines.

BY THE NUMBERS



WHERE WE WORK

CLAY BOLT/TNC

The Nature Conservancy
South Carolina

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CLAY BOLT/TNC COVER PHOTO ELIZABETH FLY