

# Our Living Shorelines

A person wearing a red rubber boot stands next to a wall of grey concrete blocks in a coastal area with green vegetation.

**Alabama's Gulf Coast supports healthy marine ecosystems and dynamic estuarine habitats that, in turn, support thriving fish and wildlife species, a robust seafood industry, strong cultural heritage, and resilient coastal communities.**



The Nature Conservancy in Alabama is implementing watershed and coastal restoration projects, in particular through living shorelines, to reduce shoreline erosion, enhance marsh habitat, and improve estuaries in Mobile Bay and beyond.

# What are living shorelines?

The term “living shoreline” refers to the use of nature-based techniques and materials such as oyster shells, reef blocks, bagged shells, live shellfish, and plants to help protect eroding shorelines. Working with our state, federal, and private partners, The Nature Conservancy is expanding the use of living shorelines at a number of sites around coastal Alabama to test the effectiveness of different techniques at limiting future erosion and establishing new habitat for native plants and animals.

Since 2005 The Nature Conservancy and our partners have worked with stakeholders to install more than 9 miles of reef at 17 locations across the Alabama Gulf Coast. This work, done in part with the support of 1,868 volunteers, represents more than \$28 million spent to protect and restore the coast, and has partly supported 152 jobs at two projects tracked in Alabama. Another four projects, encompassing almost three miles, have been approved at a cost of approximately \$31 million for construction in the next couple of years.

## **MONITORING IS KEY**

Monitoring is vital to determining if projects are functioning properly and achieving their restoration goals. In Alabama, The Nature Conservancy monitors their living shorelines annually. The monitoring parameters include measuring oyster settlement and growth and counting mussels that have colonized the reefs. Shoreline position behind the reefs is measured to evaluate if the shoreline has stabilized or continues to erode; and reef footprints are mapped to observe the stability of the reefs. Photographs are taken at multiple points for each restoration site to record any visual changes to the reefs that occur over time. All of this monitoring data is used to inform adaptive management.

## **ADAPTIVE MANAGEMENT**

The process of using monitoring information to make adjustments or corrections to management actions to achieve desired outcomes is commonly called adaptive management. In Alabama, our monitoring programs are designed to provide accountability to a wide range of stakeholders, including donors, agencies, partners, communities, and land and water managers. Incorporating an adaptive management strategy into our restoration actions is critical for ensuring their long-term success.



# Highlight projects

## A PRIVATE PARTNERSHIP

More than 80% of Alabama's coastline is privately owned. This means that private landowners play an out-sized role in conserving Alabama's coast. In 2014, The Nature Conservancy worked with members of a homeowner's association in Baldwin County to protect and restore Taylor's Riverview Park. The park includes a boat ramp and is a popular spot for recreational fishing, but had experienced significant erosion from boat wakes. The Nature Conservancy collaborated with private landowners, who worked as volunteers to remove large pieces of concrete that had been installed as shoreline armoring. Volunteers then installed artificial reefs to protect approximately 300 feet of shoreline. This, along with the planting of *Spartina* grass has helped to stabilize the shoreline.



PHOTOS ERIKA NORTEMANN/TNC

## CHANGING COURSE

Adaptive management requires changing course on restoration tactics when an original project does not work as well as it should. At Helen Wood Park, The Nature Conservancy's annual monitoring showed that the bagged oyster shell reefs had broken down and lost their vertical structure. While the oyster shell habitat is still great, the loss of vertical relief means that wave energy is not reduced as much as needed to help protect the marsh. In spring 2018, The Nature Conservancy restored the vertical relief by installing Oyster Castle™ reefs on the bay side of the bagged shell reefs. The concrete Oyster Castles™ are sturdier and will be able to withstand the frequent and high energy waves at the Helen Wood Park site.



# What we've learned

## **DIFFERENT SOLUTIONS FOR DIFFERENT SHORELINES**

Coastal Alabama houses a mosaic of habitats along its shoreline. Ranging from soft mud bottoms with expansive coastal marsh to fringing forest of oak and pine, to beach and coastal dune complexes, each combination, location and use (open space, residential, commercial) provide a unique scenario for planning a restoration project. The Nature Conservancy understands that coastal restoration is not 'one-size-fits-all' and works to match specific solutions with each unique site.

## **OYSTERS DON'T ALWAYS GROW (AKA IF YOU BUILD IT, IT MAY TAKE A WHILE FOR THEM TO COME)**

In Mobile Bay's systems, salinity levels can vary greatly over small distances. Freshwater inflow from rains and upstream waters can lead to sizable differences in salinity levels. While significant oyster growth is always a goal, Mobile Bay is an estuary (where freshwater and saltwater mix) which means that in some areas tremendous oyster recruitment will be observed, while in others, there may be no oysters for years. Often mussels will colonize reefs and perform similar functions of water filtration and natural habitat creation on the reef. Additionally, some years will see oyster growth, while in other years there may be a significant decline due to predators, climate extremes, or other factors. Regardless, when the timing and conditions are right, the reefs will be in place and ready for larval oysters to land and establish their home.

## **PARTNERS ARE NECESSARY**

None of The Nature Conservancy's projects would happen without successful partnerships. Private partnerships have proven vital to completing critical projects not funded by state or federal agencies. Similarly, working with public agencies has led to the successful and necessary restoration, and protection, of more than 9 miles of Alabama's coast. These partnerships provide funding, support, and, most importantly, critical opportunities to learn from each other to make each successive project better.

## **THIS WORKS**

We've seen restoration work. Habitat enhancement and shoreline protection have been observed at nearly all of our sites. We've tested 8 techniques to determine what works best for different sites and different outcomes (shoreline protection, oyster recruitment, etc.). Mussels and oysters have colonized the reefs in varying abundance and provide the foundation for the community of organisms that are part of the reef complex. We've watched sediment accumulate behind these reefs, providing shallow tidal flats for bird foraging. We've learned that restoration needs to encompass the northern Gulf Coast nursery habitat trifecta (oyster reefs,



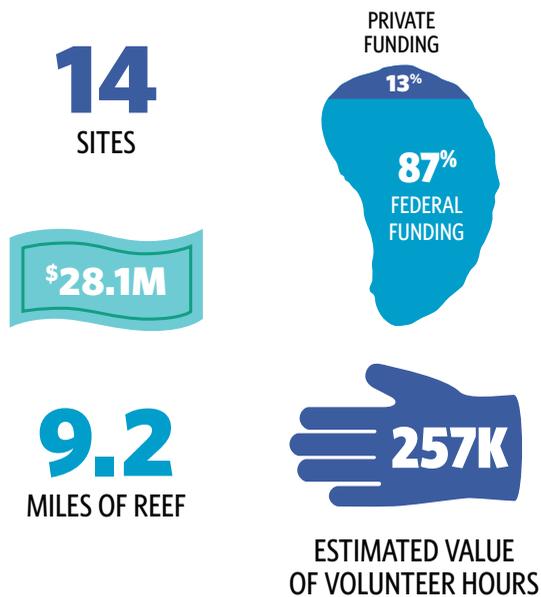
Progression photos of a private living shoreline retrofit of a bulkhead seawall in Mobile Bay.

seagrasses and marshes) to truly move the needle on coastal habitat recovery. We've engaged private citizens and landowners as reef builders and experimental sites to help us learn at a value of more than \$257,000. We've seen the public, charter boats, and commercial fishermen using our reefs. We've seen classes, birders, and explorers investigating the restoration sites, and we have influenced regulations, specifically with the Army Corps of Engineers, to encourage more living shorelines in Mobile Bay and help streamline the permitting process for private landowners to use a general permit for living shoreline implementation.

### THIS IS LONG-TERM WORK

Success is observed over the long-term. In some years there will be sediment accumulation behind a reef, in other years there may be shoreline loss. Similarly, oyster and mussel recruitment can vary from year to year. Over the long term, however, ongoing monitoring has demonstrated significant progress in enhancing Alabama's coastal resources with living shorelines.

### BY THE NUMBERS



### WHERE WE WORK









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