

GOLDBUG ISLAND LIVING SHORELINE

SINCE 2016 | MOUNT PLEASANT, SC | THE NATURE CONSERVANCY



CHARLESTON, SOUTH CAROLINA has experienced an increase in flooding due to rising sea levels and extreme precipitation events. Annual days of tidal flooding, which cause storm-water drainage stress and street flooding, increased by 12 days to a total of 50 between 2015 and 2016 and is forecasted to reach 180 days by 2045.¹ Nature-based solutions, such as living shorelines and oyster reefs, provide a cost-effective way to address these threats.

The Goldbug Island Living Shoreline was completed in 2016 near Sullivan's Island as an illustration of one way to address tidal flooding. The Nature Conservancy worked with local groups to develop this installation, using oyster habitat restoration to increase vegetation and assist in shoreline protection. Over a hundred volunteers assisted to create the 240 feet long living shoreline, built from wooden pallets, castle building blocks, and oyster shells.²

Oysters have attached to the reef at Goldbug, helping wildlife and fish populations thrive while also protecting the eroding shoreline from increasingly high tides. The visible high tide vegetation line moved out 30 to 70 feet from the shore between 2016 and 2018 (photo on reverse), indicating increased stability and protection against higher tides.³

Living shoreline installations utilize structures and reinforcements created from natural materials, such as oyster shells and vegetation, to protect shorelines from erosion and flooding caused by storms and sea level rise. These protected coastal zones are a valuable alternative to grey infrastructure, which can cost up to three times more for materials and installation and often causes accelerated erosion on adjacent properties or damage to habitats when wave energy bounces off rigid seawalls.^{4,5} Living shorelines also enhance the natural habitats of marine life, increasing water quality and fish populations, bringing a benefit to those who make a living fishing.

In addition to these shorter-term benefits, living shorelines play an important role in climate change mitigation through carbon uptake and storage. In a year, one square mile of marsh stores the carbon equivalent of 76,000 gallons of gasoline.⁶

PROJECT GOALS

- Display co-benefits of oyster restoration
- Alleviate flooding
- Prevent erosion
- Restore marine life habitats

OYSTER REEF BENEFITS



One oyster can filter 180 liters of water per day⁷



They boost populations of over 130 fish and invertebrate species, improving sustenance fishing for communities⁸



SC commercial fishing value of oysters was \$2.6 million in 2017⁹



Oyster reefs save \$750/meter on coastline protection⁷



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GOLDBUG LIVING SHORELINE RESULTS³

- 2019 New vegetation clusters
- 2019 Vegetation above high water
- 2018 Vegetation above high water
- 2017 Vegetation above high water
- 2016 Living shoreline reef
- - - 2016 Vegetation above high water



LEADERSHIP AND COLLABORATION

The Goldbug project was initiated by The Nature Conservancy (TNC) and funded with a 2-year Climate Adaptation Fund grant from the Wildlife Conservation Society. CH2M worked with TNC to develop the design of the structure, and over 200 volunteers have participated in installation and monitoring of the project, including groups from the Citadel and Boeing. TNC and the South Carolina Department of Natural Resources (SCDNR) continue to monitor water quality, oyster and vegetation growth, and sediment accretion from the installation.²

BUSINESS

CH2M (D)
East Cooper Outboard Motor Club (I)
H&E Equipment Services (F)

SOCIAL MISSION

The Nature Conservancy (A, C, D, E, I)
Wildlife Conservation Society (F)
Lowcountry Land Trust (E, I)

GOVERNMENT

SC Department of Natural Resources (E)

A: Advocacy, C: Champion, D: Design, E: Evaluation, F: Funding, I: Implementation

REPLICATION

The Nature Conservancy has installed living shorelines across the United States, including 8 in South Carolina since 2009. The Living Shorelines Academy provides a collection of databases listing these and other installations across the US, online training modules, and a practitioner directory.

A working group comprised of the South Carolina Department of Health and Environmental Control and SCDNR is in the process of a 5-year study to define living shorelines permitting separately from grey infrastructure, setting standards and evaluation criteria to make these projects accessible to more people in the state.¹⁰

CLIMATE AND RESILIENCE BENEFITS

CLIMATE BENEFITS



RESILIENCE BENEFITS



OTHER BENEFITS



FOOD & WATER
JOB & ASSETS
HEALTH, WELLBEING, & SAFETY
CONNECTION
RESILIENCE

CONTACT INFORMATION

Joy Brown, Marine Program Manager
The Nature Conservancy
joy_brown@tnc.org
Tel: 843-937-8807 x 35

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