4 MINUTE READ

Hancock County Marsh

from **Engineering With Nature: An Atlas, Volume 3.**

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

Hancock County, Mississippi, United States

Constructing the longest continuous living shoreline in Mississippi. Located in the Gulf Coast, the 8,462-hectare, state-owned Hancock County Marsh Coastal Preserve was the fastest eroding marsh in Mississippi, experiencing a loss of one to five meters, or roughly three hectares, of intertidal marsh each year. Funded under the Resources and Ecosystems Sustainability, Tourist, Opportunities, and Revived Economies of the Gulf Coast States Act and settlement funds from the *Deepwater Horizon* oil spill, the first major coastal ecosystem restoration in Mississippi was initiated in 2015 to stem this loss. Early restoration goals included reducing marsh erosion along the coastal preserve, protecting existing habitat, and enhancing secondary benthic productivity. The Mississippi Department of Environmental Quality (MDEQ), partnering with the National Oceanic and Atmospheric Administration (NOAA), worked with Anchor QEA to design, permit, and construct three habitat-restoration components in five phases: an almost 10-kilometer segmented living shoreline breakwater built on the coastal preserve, 19 hectares of restored intertidal marsh, and a 19-hectare subtidal reef constructed in Heron Bay. Since construction,

the project has weathered with minimal damage multiple impacts from more than 17 hurricanes and tropical storms. Because of the success of the breakwater construction, an additional phase is underway to connect the living shoreline system to a U.S. Army Corps of Engineers (USACE)–Mobile District project at Bayou Caddy, protecting 12 kilometers of the coastal preserve shoreline.

Article Cover: Aerial view from Mississippi Sound, looking north and west into Heron Bay during a low-tide event in February 2023. (Photo by Anchor QEA)

Producing Efficiencies

The project design team used studies conducted by the University of South Alabama, Mississippi State University, and the University of New Orleans to evaluate the marsh shoreline failure mechanism coupled with 2D and 3D hydrodynamic and wave models to analyze wave energy and currents acting on the area and the proposed project additions. These model analyses were used to design natural features as well as a low-relief artificial breakwater (to reduce shoreline erosion by dampening wave and current energy), a subtidal reef (for cover and forage habitat for benthic and finfish species), and dredging templates (for the marsh fill).

Using Natural Processes

While the project aimed to provide coastal storm damage reduction and habitat protection, the project was also designed to encourage sediment trapping from this sediment-starved shoreline segment. Ongoing beach nourishment for maintenance of the coastal beaches will eventually provide a source to recover lost coastal preserve hectares leeward of the living shoreline breakwater. In the future, additional dredged materials can be placed along this shoreline segment to augment recovery of the lost coastal preserve, renourish the restored marsh, and enhance the marshes in the coastal preserve. The project's series of natural and nature-based features (especially the segmented breakwater) serve as multiple lines of defense to reduce flood risk and enhance habitat value in the area.

A blue crab hiding among the breakwater rocks, waiting for its next meal.
(Photo by Sarah Ballard, Anchor QEA)

Broadening Benefits

Ongoing annual monitoring of the project has shown new marsh growth and increased shellfish and biomass accumulation on the sill, marsh, and reefs. Leeward marshes are now stable and have started to recover behind the living shoreline. Additionally, monitoring has demonstrated the project's ecosystem value, attaining more than 100% of the seven-year ecological goals in some segments over the first year. Enhanced commercial and recreational fishing opportunities are also now available in this area of Mississippi that is underserved by coastal infrastructure.

Birds loafing on the breakwaters.
(Photo by Anchor QEA)

Colonization of mussels on the rocks collected from the subtidal reef.
(Photo by Sarah Ballard, Anchor QEA)

Promoting Collaboration

Successful collaboration between NOAA and MDEQ allowed the efficient planning, design, construction, and monitoring of this large-scale restoration project, achieving the goals of federal, state, and local stakeholders. Components of the design were realigned to optimize positive impacts to the project area based on concurrent reviews and coordination with USACE Mobile District, state resource agencies, and the stakeholders. Several public awareness meetings were held with local and regional stakeholders. Furthermore, the design team leveraged their relationships with USACE Mobile District and the Mississippi Department of Marine Resources to secure difficult-to-obtain permit approvals.

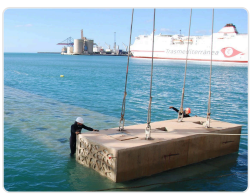
Measuring bivalve abundance and size for biological monitoring on the subtidal reef.
(Photo by Sarah Ballard, Anchor QEA)

More articles from this publication:

Conclusion
4min pages 292-297

Mayer Ranch
4min pages 288-291

Kaskaskia River Basin
4min pages 284-287



Port of Málaga
4min pages 280-283

Big River at Calico Creek

4min pages 276-279

Shark River

4min pages 272-275

Port Lands

5min pages 268-271

Cape Cod

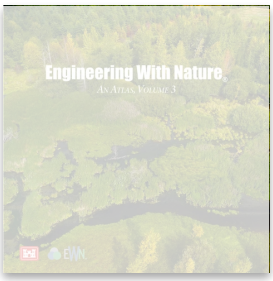
4min pages 264-267

Newlyn

4min pages 260-263

Show more

This article is from:



Engineering With Nature: An Atlas, Volume 3.

by US Army Engineer Research and Develop...

Issuu Inc.