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Brunswick Town / Fort Anderson



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

by US Army Engineer Research and Development Center



Cape Fear River, North Carolina, United States

Protecting an important piece of American history. Brunswick Town–Fort Anderson, a historic colonial and Civil War site on the coast of North Carolina, was at risk. Constant tide forces and dynamic wave action were bombarding the colonial-era wharves and washing important historical artifacts into the Cape Fear River. Additionally, the erosion was destroying valuable coastal resources. So in 2012, the North Carolina Department of Natural and Cultural Resources tried unsuccessfully to stop the erosion and in 2017 turned to the Reefmaker concept as a way to mitigate the high wave energy causing it. The first phase of the project installed 67 meters of Reefmaker along the area with the highest erosion, and the second phase installed an additional 73 meters—just before Hurricane Florence hit the North Carolina coast. The Reefmakers proved effective; no structural damage occurred as a result of Hurricane Florence, and the shoreline is now stable. Further, the reef has encouraged a new marsh shoreline to form in front of the rock toe stabilization on the landward side of the phase-one Reefmaker structure, proving the Reefmaker’s ability to disrupt wave energy and enable accretion.

Article cover: The installed Reefmakers protect the shore from excessive wave energy. (Photo by Christopher Dustin, Scenic Consulting Group, PLLC)

Producing Efficiencies

The Department of Natural and Cultural Resources needed a long-term, cost-effective solution to the destructive wave action at Brunswick Town–Fort Anderson. With few maintenance costs, minimal impacts to the substrate, and the flexibility to adjust to any rise in sea level without additional permits, the Reefmaker met their needs. It now protects nearly 150 meters of vulnerable coastline, including the invaluable cultural resources at the historic site, and reduces current maintenance costs. This efficiency allows the department to focus on preserving other critical North Carolinian cultural heritage sites instead of maintaining the protective structure along the coast.

Using Natural Processes

Unlike traditional breakwaters, the artificial reefs allow sand to move from the open water to the shore, removing sediment from the water column and mimicking the natural accretion process of a coastal system. Without the destructive wave energy, the new material shores up the existing rocky revetment, adds to existing marsh, and allows the smooth cordgrass (*Sporobolus alterniflorus*) to regenerate naturally. The Reefmaker also provides a plethora of hiding spaces for local species such as eastern oyster (*Crassostrea virginica*) and blue crab (*Callinectes sapidus*), building up and maintaining the region's natural biodiversity.





The wave attenuator also provides substrate for oysters to grow.

(Photo by Phillip Todd, Atlantic Reefmaker)

Broadening Benefits

The Brunswick Town–Fort Anderson State Historic Site attracts almost 35,000 visitors a year and hosts several programs for students in the county. Solving the erosion threatening the site reduced sedimentation and turbidity in the water column, created new habitat, and allowed the existing habitat to recover naturally over time. Further, the Reefmaker structure has withstood flooding and high-tide storm surges from hurricanes, proving its resilience. Overall, the project enhanced the environment while maintaining tourism income for the region and protecting a historically important site.



The line of artificial reefs allows water to pass through while dissipating wave energy from passing boat traffic.

(Photo by Phillip Todd, Atlantic Reefmaker)



Phase 1 of the installation; the three phases took place from 2017 to 2020.
(Photo by Brandon Spaugh, North State Environmental Inc.)

Promoting Collaboration

The North Carolina Department of Natural and Cultural Resources worked with the North Carolina Department of Transportation and the U.S. Army Corps of Engineers–Wilmington District to design a solution to the erosive forces acting on Brunswick Town–Fort Anderson without disrupting the local ecosystem or creating ongoing maintenance costs for state and local municipalities. This Reefmaker project is a first for North Carolina, and these collaborations and outreach to other agencies ensured success.



The new structure has stabilized the shoreline and allows for sediment accretion.

(Photo by Christopher Dustin, Scenic Consulting Group LLC)



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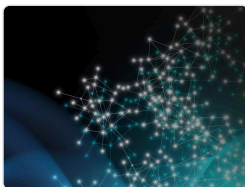
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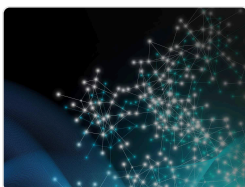
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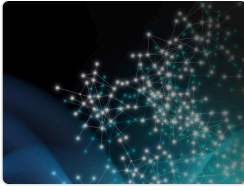
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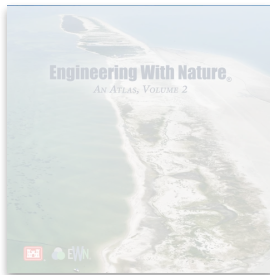
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