



Atlantic ReefMaker



Brunswick Town Fort Anderson – A Living Shoreline Alternative



Abstract

Brunswick Town/ Fort Anderson (BTFA) is a state of North Carolina historical site, and continues to experience rapid shoreline erosion from constant tide forces and dynamic wave action. The North Carolina Department of Natural and Cultural Resources (NCDNCR) seeks to halt the shoreline erosion for over 1 mile of shoreline to prevent additional buried colonial-era wharf destruction, the undermining of Civil War-era batteries and three other colonial era wharf sites. The site has lost 75-120' of shoreline from 2008 to 2013.

The Cape Fear River was deepened and widened in 2006 to promote harbor development and maritime commercial ship access to Wilmington, NC. Erosion on the banks of BTFA was first noted in 2008, and, in 2012, the NCDNCR attempted to arrest the shoreline erosion. The initial attempt failed.

The Atlantic ReefMaker (ARM) was identified as a potential solution to protect the natural and cultural resources at BTFA. The ReefMaker concept is a water flow through wave attenuation system. The system includes individual discs that are stacked on a fiberglass pile. The discs can be stacked to a uniform height. The system can withstand high wave energy impacts without breaking down.

The ReefMaker concept works by 'Venturi Effect'. The legs on the 'water front' side of ecodisc tray direct water to the fiberglass piling. The piling speeds up the wave energy speed, and when the water reaches the 'landward' side of the structure, then the water exits the structure. The wave energy dissipates, and sediment in the water column drops out, and it accretes on the shoreline.

While wave attenuation is the primary function of the ReefMaker concept, there are many ecosystem service benefits to the system. In the Gulf coast, the discs have been embedded with natural oyster shell and also soaked in oyster spat before installation to promote a higher rate of oyster settlement. The system provides excellent marine habitat.

The product had been used successfully on the Gulf of Mexico to stabilize shorelines in high energy wave environments. The ReefMaker design was modified for the Atlantic coastal environment. In summer 2017, Phase I was implemented involving 220' of ARM along the highest eroded area of BTFA site. In less than a year, there is 1' of accretion and 3 areas of *Spartina alterniflora* recruitment.

Phase II of the project (240') was completed in July 2018. UNC Wilmington is conducting monitoring as part of the Phase II project.



Why ARM instead of Rock Sill?

- Dissipates destructive wave energy
- Serves as ideal habitat for marine life
- Sits off of the substrate
 - Minimizing scour
 - Minimizing sand redistribution
- Provides flushing along the entire shoreline
- Works in high energy environments
- Minimizes 'foot print' substrate impacts
 - 12" diameter per piling (0.785 ft²/pile)
 - ReefMaker – 500' long (~100 piles) = 78.5 ft²
 - Rock wavebreaker with 2:1 slopes = 10,000 ft²
- Allows for modular construction & easy expandability

