Carteret County's involvement with shore protection can be traced back to the 1840's when a young Robert E. Lee, who recently graduated from West Point, designed and supervised the construction of the first jetty, groynes, and other shore armoring structures at Fort Macon. Over a century and a half later, shoreline armoring has fallen out of favor thanks in large part to the State's regulatory and subsequent legislative bans on "hard" structures that were first promulgated in the 1980s. Carteret County and many other local governments throughout the State and the Atlantic seaboard have since opted for the "soft" solution, or beach nourishment, whose first application can be traced to long-time borough of Brooklyn engineer, Phillip Farley, who worked for roughly 20 years to see sand pumped onto the popular beaches of Coney Island, N.Y. in 1923. The Coney Island nourishment project was aimed to widen the beach to accommodate the thousands of city dwellers that swarmed the beaches in the summer – its engineered use to combat erosion was only realized later.

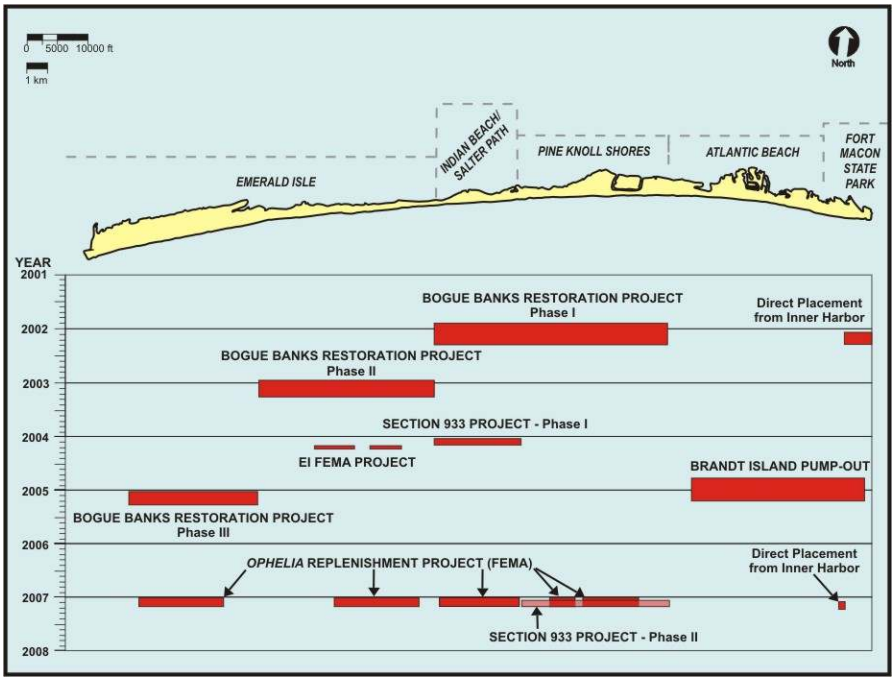
Ideally beach nourishment involves the placement of sand onto the beach from a source outside the eroding area, and although the sand can be delivered by dump trucks (often measured in cubic yards of material delivered), the quantities often involved with beach nourishment dictate the use of large dredges, thousands of feet of pipe, and ancillary equipment such as bulldozers, flat bed trucks, barges, etc. Carteret County's formative beach nourishment experience began in the late 1970s and persisted through the 1990s. Although the quantities involved with these projects was significant, the efforts were confined to the beaches of Fort Macon and Atlantic Beach, and were related to dredged material handling associated with the maintenance of the Morehead City Harbor. A spate of hurricanes however in the 1990s translated to a beach nourishment need for the remainder of Bogue Banks – Pine Knoll Shores, Indian Beach/Salter Path, and Emerald Isle.

Some of these projects involved the use of newly developed offshore borrow sites positioned along the continental shelf that generated some controversies concerning sediment quality and its relation to aesthetics and biological impacts. Other projects utilized very good beach quality sand dredged from the Morehead City Harbor ocean channel, and another project involved the use of dredged material encountered during the realignment of Bogue Inlet. Roughly 10 million cubic yards of sand have been used for nourishment since 2001 at a total cost (State, local, and Federal) of close to $80 million.

Currently, most of the beach nourishment activity within the County is coordinated by the Shore Protection Office that also serves as staff for the County's Beach Commission. The Shore Protection Office and Beach Commission collectively administer the portion of the County's occupancy tax legislatively-mandated for the purpose of beach nourishment, which yields over $2 million annually.

Adding to the complexity of the Carteret County beach erosion/beach nourishment picture is the continued dredged material disposal practices employed by the U.S. Army Corps of Engineers at the Morehead City Harbor, which entails offshore disposal (dumping) of beach sand that shoals the seaward reach of the Harbor channel. This sand, which would otherwise migrate freely between Shackleford and Bogue Banks, is currently being intercepted and diverted offshore well outside the beach/inlet system. To this effect, the County filed a complaint in a Federal District Court in late 2007 to seek remedial action. For many beach communities, sand is replacing potable water as the one identifiable limiting resource – nowhere is this becoming more relevant than here in Carteret County.

Beach nourishment in action - Pine Knoll Shores, 2007. Sand is pumped to the beach via long pipelines in a water/sand mixture called a slurry – the water drains off the beach while the weight of the sand helps the material stay in place. Bulldozers are subsequently used to contour the sand into the engineered beach design. Note the hopper dredge pumping sand in the background.



Schematic plotting the temporal and spatial extent of beach nourishment along Bogue Banks since 2001 with time along the vertical (y) axis and each project's geographic reach along the horizontal (x) axis. Roughly 10 million cubic yards of sand have been used for nourishment since 2001 at a total cost (State, local, and Federal) of close to $80 million.