

The Canaveral Shoals Blues:

How beach nourishment using the Canaveral Shoals borrow site has degraded the surf breaks of Cape Canaveral and Cocoa Beach, Florida

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Cocoa Beach, Florida has billed itself as the surfing capital of the East Coast for over 50 years. It boasts the world's largest surf shop, Ron Jons Surf Shop, and hosts numerous surf contests including the Easter Surf Contest, which is one of the oldest continually run surf contests in the world. Cocoa Beach has been home to many distinguished surfers, past and present, including Dick Catri, Matt Kechele, Todd Holland, and of course eleven-time World Champion Kelly Slater. It is not an overstatement to say that surfing and the surfing lifestyle are integral to the identity of Cocoa Beach.

What made Cocoa Beach a popular spot for surfing was its wide, flat beach which produced a spilling breaker which broke consistently over all tide ranges and provided reasonably long rides when the conditions were good. The beach was historically so wide that people would drive their cars onto the beach, park, and spend the day.

Since the construction of Port Canaveral and its jetties in 1954, the beaches of Cocoa Beach and Cape Canaveral, its neighbor to the north, as well as Patrick Air Force Base to the south, have experienced higher rates of erosion which has been well documented by the Army Corps of Engineers and the Florida Department of Environmental Protection. To combat the effects of this erosion, the North Reach of Brevard County, which includes Cape Canaveral and Cocoa Beach, was the subject of 14 beach nourishment projects between 1972 and 2010. The beach at Patrick Air Force Base has been nourished four times since 1998.

The nature of a sandy beach is primarily dependent upon the characteristics of its sediment (primarily made up of sand grains and shell). If a beach is nourished with fill sediment that does not match its natural sediment, the fill may have impacts on the beach slope and subsequently the surfing wave environment.

Previous research concluded that the fill projects conducted between 1972 and 1998 did not significantly modify the surfing wave environment of Cape Canaveral and Cocoa Beach. Please refer to the white paper, "*How beach nourishment has impacted the surf breaks of Cape Canaveral and Cocoa Beach, Florida*" (Hearin, 2018) for details regarding this research. However, this research also determined that the North Reach Shore Protection Projects conducted in 2001 and 2005 used fill sediment from the Canaveral Shoals II borrow site which is significantly coarser (larger) than the native beach. The coarser fill from those projects transformed the surfing wave environment in the North Reach. At low tide, the beach break retained its character as a spilling breaker with a reasonably wide surf zone but at higher tides, the waves would plunge much closer to shore and in many cases, shut down altogether.

Previous research also determined that the Canaveral Harbor Sand Bypass projects, conducted in 2007 and 2010, used fill from the Cape Canaveral Air Force Station borrow site (beach north of the jetty) which is a much better match for the native beach sediment. In fact, this is the sediment that would flow south into the North Reach naturally if the Port Canaveral jetty did not trap it. Sediment data collected in 2011 showed that Cocoa Beach were still coarser than its natural state and that it could take many years for it to return to normal, assuming the beach was left undisturbed.

The North Reach Shore Protection Project was conducted again in 2014, using the same coarse fill from the Canaveral Shoals offshore borrow site. For the 2014 project the North Reach was divided into 3 zones, the north and south zones were filled while the central zone was not, as it had remained relatively stable.

Research conducted during the 2014 project confirmed that the filled sections of the beach were again coarser and steeper after nourishment. Additionally, volunteers with significant surfing experience performed visual assessments of the wave conditions daily from January

through December of 2014, using a modified version of criteria developed by the Army Corps of Engineers for wave observations. The information from these wave observations was entered into an online database and was used to draw quantitative comparisons between the surf in the nourished and non-nourished zones of the beach. The statistically significant results showed that the surf zone width was narrower, the average ride duration was shorter, and the overall surfing wave quality was lower in the filled zones when compared to the unfilled zone.

Another round of the North Reach Shore Protection Project is scheduled for the spring of 2018 and there is no reason to expect that the impact to the surfing wave environment will be any different. If left undisturbed, the entire North Reach could eventually return to its natural state through a process known as natural sorting. However, if beach nourishments using fill from the Canaveral Shoals borrow site continue to occur, the beach will continue to trend more coarser and steeper.

The North Reach beach nourishment projects must be considered a success from a coastal protection point of view. The beaches of Cape Canaveral and Cocoa Beach are much wider and boast a much healthier dune system than before the fill projects began in 2001. It is the author's opinion that the North Reach beaches could be maintained and protected without degrading the surfing wave environment. The following recommendations are offered as a way forward.

All the available data and previous research shows that the Cape Canaveral Air Force Station borrow site is a much better match for the natural beach profile sediment of the North Reach. Utilizing that borrow site for all future nourishment projects in the North Reach would help restore the natural character of the beaches and preclude negative impacts to the surfing wave environment.

A more robust, long term, physical monitoring program is needed to capture the impacts of beach nourishment projects on recreational activities such as surfing, swimming, diving, and fishing.

Two independent studies have determined that Port Canaveral Harbor is a primary cause of beach erosion for the North Reach and Patrick Air Force Base. Since the original 1993 sand bypass study was completed, the actual unit cost for traditional dredging operations has doubled, while the technology for fixed sand bypassing stations, such as Tweed River in Australia and Lake Worth Inlet in Florida, has improved. It would prove beneficial to all stakeholders to re-evaluate the possibility of adopting a fixed sand bypass system at Port Canaveral. A fixed bypass system would promote a more natural flow of compatible sediment around the harbor and reduce the need for disruptive dredge and fill projects.