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Nearshore Placement as a Regional Sediment Management Practice

"Beneficial use of dredged material is an important practice for Regional Sediment Management in order to keep valuable sediment within the littoral zone and system. There are many ways to beneficially use dredged material, but an increasingly utilized method is to place sediment in the nearshore zone in the form of a berm or mound. The goals of this method are to place sediments as a feeder berm which supplies sediment to the beach profile and shoreline or place sediments as a stable berm to add protection to the shoreline through the dissipation of wave energy by breaking over the nearshore berm. However, little is known about the transport and dispersion of the sediment after it is placed in the nearshore. To that end, several research programs within the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC), including the Regional Sediment Management (RSM) program, Coastal Inlets Research Program (CIRP), and the Dredging Operations and Environmental Research (DOER) program are working collaboratively to advance the science and our understanding of nearshore placement of sediment.

Several tools are available through the CIRP and RSM programs to determine whether sediment placed in the nearshore will move including the Sediment Mobility Tool (SMT; McFall and Brutsché, submitted), the Coastal Modeling System, and the Depth of Closure database. All three of these tools were used at a case study at Vilano Beach, Florida. Material was dredged by the USACE dredge Murden from St. Augustine Inlet and placed in the nearshore of Vilano Beach. Approximately 150,000 yd3 of material was placed in two discreet 1000 ft berms adjacent to a highly eroded section of the shoreline over a period of 45 days. Two different berm designs were chosen to determine whether berm shape had an impact on overall performance. Multi-beam and cross-shore surveys of the placement area were taken prior to construction and twice post construction. In addition to topographic surveys and the use of the SMT, two separate camera arrays were deployed to monitor qualitative changes in the shoreline and wave characteristics created by the presence of the nearshore berms. Finally, the Coastal Modeling System (CMS) was used for additional prediction, verification, and visualization of the berm's influence on the hydrodynamic conditions."

Katherine Brutsché is a Research Physical Scientist at the USACE Engineer Research and Development Center in Vicksburg, M.S. She received her Ph.D. at the University of South Florida in 2014, where she also received her Masters of Science degree in Geology in 2011. Her Bachelor of Science degree in Geosciences, with dual emphasis in Geology and Earth Science Education, was completed at Virginia Tech in 2007. Her dissertation research focused on the sediment characteristics and morphological impacts of the nearshore placement of dredged material in Fort Myers Beach, Florida and Perdido Key, Florida. Currently, she is continuing her research on nearshore berms as well as other issues pertaining to the dredging and placement of sediment in the nearshore.