



Advances in Nearshore Processes (FY21)

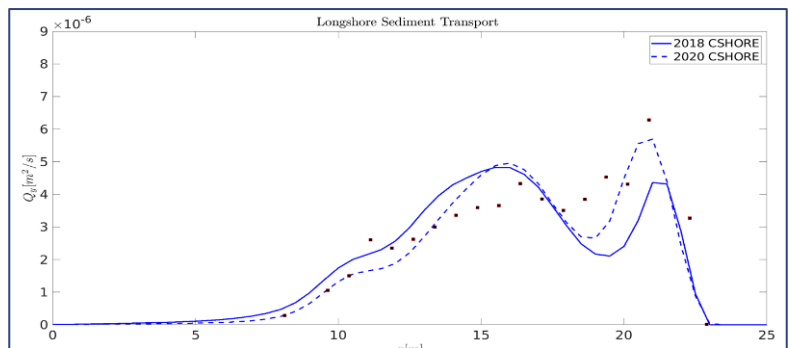


Background: The USACE-mandated mission to maintain the US coastline and provide some measure of storm protection through sand placement is a costly endeavor. According to recently aggregated data from Western Carolina University, the total cost of US beach nourishment is approaching \$10 billion. However, the lack of reliable predictive capabilities for nearshore hydrodynamics and morphology change has prevented optimizing the design. Likewise, deficiencies in the understanding of sediment transport processes limit the effective management of entrance channel in-filling, coastal structure impact assessment, and wetlands/habitat protection.

Approach: The Nearshore Processes R&D has been funded by multiple programs in the ERDC Civil Works portfolio. Research focuses on utilizing novel high-resolution oceanographic field datasets collected at the USACE’s Field Research Facility in Duck, NC to directly inform the development and validation of improved predictive methods for nearshore sediment transport and morphology change in sandy beach environments. This ongoing work has led to improvements in the capabilities and skill in the USACE-developed CSHORE family of models used for simulating morphology change for beach nourishment and other coastal application. Continued advancements through investment in Nearshore Processes R&D will enable the USACE to predict morphology change at time scales of relevance for managing coastal sediment resources and optimize sand placement.

Technical Advancements:

- Comprehensive field instrumentation provides measurements of waves, currents, water levels, and bed position over the surf zone.
- Development of new wave- and current-driven sediment transport algorithms incorporated into the CSHORE model family (2020), resulting in greater skill and generality in predicting morphology change.
- Adding CSHORE family of models to the Coastal Model Test Bed with measured morphology change allows for rapid assessment of nearshore morphology models.



Payoff: The ongoing Nearshore Processes research will result in improved predictions for nearshore morphology, impacting the design and implementation of USACE coastal solutions.

ERDC Points of Contact:

Brad Johnson, Principle Investigator
Tanya M. Beck, Program Manager

CIRP@usace.army.mil
Coastal Inlets Research Program
<https://cirp.usace.army.mil>

