Engineering With Nature Project Fact Sheet

Engineering With Nature® (EWN®) Jekyll Island "Sand Motor"

Background

Recent hurricanes, sediment starvation, and chronic erosion have degraded significant sections of beach, dune, and upland habitat adjacent to the popular Driftwood Beach on Jekyll Island, GA. Dredged sediment from the Brunswick Harbor entrance channel could be strategically concentrated in a feeder beach or "sand motor" that passively distributes sediment across a wide section of retreating shoreline to reduce erosion and provide a broad array of benefits. Partnerships and collaboration in this project will build a broad base of support for applying an EWN® solution. Incorporating a diverse range of technical expertise from ERDC and leveraging partnerships with the Jekyll Island Authority, the University of Georgia's Skidaway Institute of Oceanography and Institute for Resilient Infrastructure Systems, and a broad range of other stakeholders and resource agencies will help the Savannah District (SAS) optimize beneficial placement of dredged sediment and use the lessons learned to build support for similar strategies in other locations.

Objectives

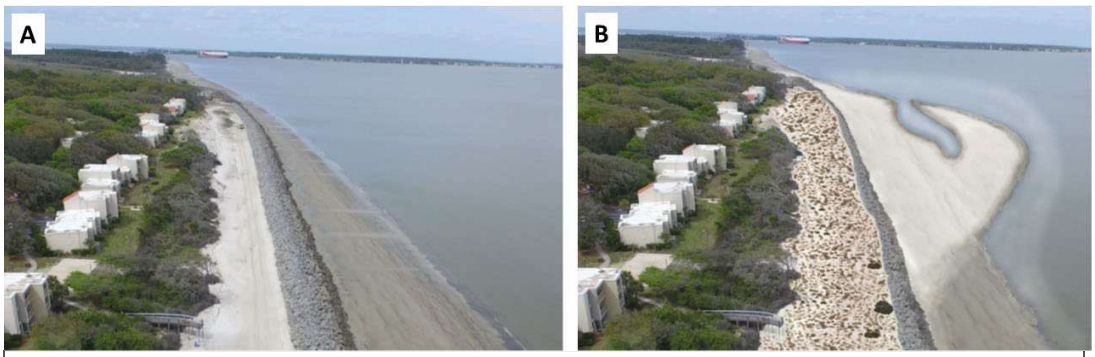
This project intends to optimize "sand motor" characteristics to meet a variety of environmental, public safety, and storm risk reduction needs. A conceptual design will aim to cost effectively strengthen sediment starved beaches and improve critical coastal habitats with a configuration and volume of dredged sand that may be able to better align engineering and natural processes to achieve a similarly broad range of benefits at many tidal inlets in the region and beyond.

Approach

A multi-disciplinary team will work towards the project objectives through six interrelated tasks: (1) engaging stakeholders, (2) coordinating with resource agencies, (3) collaborating with the University of Georgia's Skidaway Institute of Oceanography and Institute for Resilient Infrastructure Systems to collect and leverage data, (4) modeling sediment transport and likely changes in beach form related to the "sand motor", (5) analyzing potential environmental and wildlife implications, and (6) combining findings from all other tasks to recommend a conceptual "sand motor" design.

Outcomes

This project will develop and evaluate key design and decision criteria to arrive at an actionable, innovative, and shovel ready EWN® "sand motor" project. A well-designed sand motor may be able to restore the natural beach and dune system through passive nourishment using natural processes (see figure below). Developing the feeder beach technique using dredged sand to achieve a healthier beach and dune system could become an easily transferable strategy to enhance public safety, recreation, and community and ecosystem resilience that also supports progress towards establishing Georgia as an EWN® Proving Ground.



A) Northern Terminus of Jekyll Island Revetment. B) Conceptual visualization of added "sand motor" to strengthen the transition to the natural shoreline and beneficially use sandy material. In this conceptualization, vegetation has also moved into the sandy area landward of the revetment. Graphic from Hansell and Carswell (2019).

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