







NCCOS AND USACE COLLABORATIONS TO **ADVANCE ENGINEERING WITH NATURE®**

THE PROBLEM

Native coastal habitats minimize shoreline erosion by absorbing and dampening wave energy and mitigate flooding by slowing the inland transfer of water during flood and storm events. In recent decades, intense coastal development has resulted in a loss of natural habitats and at the same time, an increased need for their protective services. While the use of NNBF can help to mitigate habitat losses, this strategy is not widely accepted due to perceived uncertainties in their ability to sufficiently reduce coastal storm and flood impacts.

THE SOLUTION

NCCOS, USACE and multiple state and federal partners are conducting multidisciplinary, collaborative research on the use of dredged sediment for coastal habitat restoration with emphasis placed on the ability of these features to reduce risk to nearby coastal communities. Results of these efforts will inform the design and implementation of NNBF in coastal systems and increase confidence in their ability to provide the intended protective benefits.

OUR COLLABORATION

NCCOS and USACE's Engineering With Nature® (EWN®) Program work collaboratively to harness the power of nature to achieve a broad suite of engineering, environmental and socio-economic benefits. This collaboration is focused on the use of natural and nature-based features (NNBF) such as beaches, dunes, islands, wetlands, and reefs to increase the resilience of coastal regions to storms and sea level rise. Together, NCCOS and USACE are providing the research, science, engineering and guidance to help coastal communities know how, where, and when to best construct NNBF.

THE IMPACT

This collaborative work will increase the quantity of dredged sediment retained in coastal systems for the purpose of creating or restoring natural systems. Such efficiencies will produce billions in cost savings while maintaining navigation channels and commerce. NNBF constructed from dredged sediment resources will increase resilience and social benefits for coastal communities while also creating or restoring coastal habitats for wildlife.

Michael G. Jarvis **Congressional Affairs Specialist** Office of Legislative and Intergovernmental Affairs National Oceanic and Atmospheric Administration michael.jarvis@noaa.gov https://coastalscience.noaa.gov/

Caitlyn McGuire, Ph.D. Research Program Liaison Engineer Research & Development Center (ERDC) U.S. Army Corps of Engineers caitlyn.m.mcguire@usace.army.mil https://ewn.el.erdc.dren.mil/

NCCOS AND USACE EWN COLLABORATIONS



Swan Island (Chesapeake Bay, Maryland)

Swan Island is a 25 acre island that serves as a natural wave break for the Town of Ewell, Maryland. Prior to sediment placement, Swan Island was comprised of low lying and highly fragmented marsh. In 2019, the USACE's Baltimore District beneficially used approximately 60,000 cubic yards of dredged sediments to raise Swan Island elevations to support dune, high and low marsh vegetation types. Ongoing multi-disciplinary investigations include analysis of the effects of this restoration on Swan Island's long-term resilience. The outcomes from this study will be used to quantify and predict performance and the environmental benefits derived over time for other created and restored islands.



Photo by: Bill Hubick

Wicomico River Dredging and Thin Layer Placement (Chesapeake Bay, Maryland)

The USACE's Baltimore District will place approximately 130,000 cubic yards of dredged sediments on 72 acres of fragmented wetlands located within the Deal Island Wildlife Management Area WMA. With incremental placements over the next 20 years, this project will restore approximately 650 acres of fragmented wetland. The project design will target elevations that support critical nesting habitat for two endangered marsh birds. Using drone-based imagery, NCCOS scientists developed habitat classification maps and Digital Elevation Models (DEMs) to inform the placement design. Construction to begin November 2021.



Mordecai Island (Barnegat Bay, New Jersey)

This island provides habitat for wildlife and nesting shorebirds and serves as a wave-break protecting the adjacent developed shoreline of Beach Haven, NJ from wave induced erosion in Barnegat Bay. Prior to restoration, chronic erosion resulted in a breach that effectively separated the island into north and south lobes. In 2015, the USACE's Philadelphia District beneficially used approximately 30,000 cubic yards of dredged sediment to create a seamless transition between the north and south lobes. NCCOS scientists are working to quantify the benefits of this beneficial use practice at Mordecai Island.



Development of International NNBF Guidelines

NCCOS and many other international partners have collaborated on the development of the USACE-led International Guidelines on the use of Natural and Nature-Based Features. The project brought together a collection of international expertise, across sectors, to develop guidelines for using NNBF for flood risk management while expanding and diversifying project value through economic, environmental and social benefits. More than 150 authors and contributors from greater than 70 organizations and 10 countries contributed to this effort. Publication of the NNBF Guidelines will occur in summer 2021.