

# Engineering With Nature

## Project Fact Sheet



### Title

Developing Engineering Guidance for Natural and Nature-Based Features

### Background

Natural structures are resilient, adapting to changes in physical, biological, geologic, and chemical processes. Nature-based features (NNBF) created by humans to provide specific services, such as coastal risk reduction. The use of natural and nature-based features in engineering design incorporates natural processes into the structure or project design, in order to take advantage of the resilient properties of natural systems. In addition, incorporating NNBF into USACE practices would reduce maintenance costs, and also provide ecosystem services within the project footprint. Currently, there is not an accepted guidance for incorporating NNBF into engineering design.



*Dredge Material Site*

### Objectives

This project has three main objectives. The first is to identify the current state of practice associated with NNBF design and application across all US agencies, including documenting the use of NNBF in historical and current USACE projects. Second, a multi-disciplinary and multi-agency team will develop a series of engineering guidance documents that describe (a) how to evaluate potential direct and indirect engineering and environmental benefits/impacts from NNBF implementation, (b) considerations for NNBF design and construction, (c) mechanisms to adaptively monitor and manage NNBF once in place, and (d) critical knowledge gaps. Finally, this effort will synthesize the previous objectives into an interagency document describing the state of practice, current types of NNBF, and lessons learned.



*Marsh Creation*

### Approach

This guidance will have two foci: the first will place NNBF into the context of current Engineering with Nature efforts, and will include a framework for developing NNBF, the benefits of these types of projects, and considerations for incorporating these approaches into current practice. The second will center on providing guidance for developing for the most critical types of NNBF features. Each section will receive contributions from ERDC PI's, USACE personnel, and members from other agencies and the international community.

### Outcomes

The products from this project will include an 18 chapter guidance document, an international working group will be formed to facilitate the incorporation of NNBF into future projects dedicated to the implementation of NNBF, technical notes describing the recurring international workshops held on the topic, and finally a technical report describing the use of NNBF within the USACE.