

# Engineering With Nature

## Project Fact Sheet



### **Title**

Portfolio Framework to Quantify Beneficial Use of Dredged Material

### **Background**

Each cubic yard of dredged material provides two distinct benefits. First, removal of the material allows safe and efficient navigation. Second, the collected material is a resource that can be utilized in different ways. In some cases, safe disposal of this material is the most cost-effective course of action. In other situations, however, dredged material may be put to a use that provides a benefit in terms of habitat, recreation, shore protection, construction, or commercial cultivation. Ongoing efforts provide an opportunity to formalize the process of considering both additional costs and resulting benefits when evaluating multiple beneficial use projects from a season of dredging.

### **Objectives**

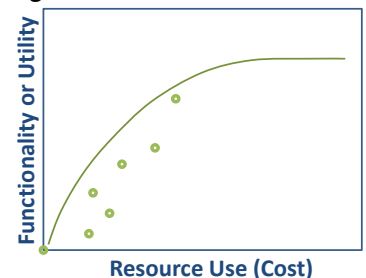
The objective of this value-added effort is to develop a quantitative portfolio approach based on the potential beneficial uses (BU) of dredged material in a single season of dredging. Developing a portfolio requires additional research into resulting benefits, including the amount of enhancement as a function of the material properties and the benefits achieved from the project. These benefits are not easily monetized, but the portfolio will provide information that could be used for economic valuation.

### **Approach**

Three steps are anticipated. The first step is developing and verifying a matrix of attributes and benefits associated with each class of dredged material placement. The relationship between the functionality of each beneficial use alternative and its features (e.g., volume of material, footprint of project, habitat type, and quality) will need to be determined from cases, experts, and the literature. The second step is considering the combined functionality of these features. The third step is developing case studies, which will allow calculation of the differential costs and benefits associated with alternative placement decisions.

### **Outcomes**

The portfolio framework provides two distinct sets of benefits. First, it requires consideration of the BU of dredged material. In this way, the model is an archive of the most up-to-date understanding of BU, incorporating case studies already analyzed and compiled by the U.S. Army Engineer Research and Development Center. The deliverable will be a matrix of dredged material placement attributes. Second, it provides a platform for calculating the collective utility of alternative BU projects. While this approach does not address the logistical complexity associated with dredged material management, it will help project managers visualize the changes in non-monetized benefits gained or lost with alternative approaches or investments. The follow-on deliverables will be a portfolio model and case studies.



**Figure 1. Project groups that increase functionality or benefit at little increased cost. Projects that fall on the line (Pareto frontier) have maximal utility.**

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