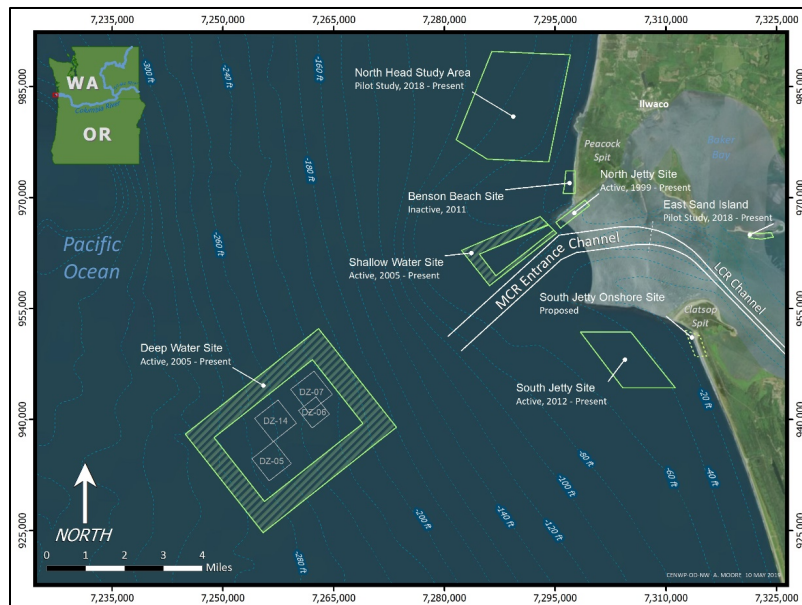




## Life-Cycle Cost Analysis of RSM Strategies

### Description

USACE needs to utilize a life-cycle analysis approach to fully account for costs and benefits from RSM approaches, compared with dredged material disposal and placement alternatives across multiple maintenance dredging cycles. This analysis will reveal hidden costs and benefits at a programmatic level that may not be accounted for in a per-cycle analysis. This will potentially provide evidence for support of sustained implementation of RSM strategies at a system scale. USACE will use Portland District as a case study to evaluate RSM strategies that result in a cost-savings, and their programmatic adaptation as the standard practice for dredged material placement.



Mouth of the Columbia River (MCR) Overview of the Federal Navigation Channel, and placement sites.

### Issue/Challenge To Address

Maintenance dredging is subject to the Federal Standard – that is the least-cost, environmentally-acceptable and engineering-sound placement option. Application of RSM principles including beneficial use of dredged material are sometimes assumed to cost more than conventional placement methods in CDFs, in-water sites, or ODMDS's. While cost per maintenance dredging cycle, or even event, may be higher in some cases, full life-cycle costs may result in a net cost savings to the government. This is especially true when RSM strategies result in a reduction in sediment re-handling or capital costs for construction of new CDFs, or the authorization of new ODMDS's. Likewise, benefits from RSM approaches may not be realized unless analyzed at a system scale over multiple maintenance dredging cycles. While cost data are documented, a full analysis of the cost-benefit of RSM strategies utilizing a life cycle approach has not been implemented. Since RSM seeks to provide value across business lines, benefits from all mission areas will be considered so true value to the nation from the application of RSM principles can be examined.

### Successes Lessons Learned

Portland District has many regional partners who are deeply invested in the management of the regional aquatic systems. These partners are tasked with collecting data that can be utilized to quantify benefits from past RSM actions. NOAA and EPA have conducted benthic monitoring at ODMDS and nearshore placement sites to understand benefits of

thin-layer placement of dredged material. WA Department of Ecology and USGS have monitored the movement of sediment in the nearshore environment to quantify the impact that nearshore and on-shore placement of dredged material has on the erosion of the Oregon and Washington coast. Similarly the Oregon Department of Geology and Mineral Industries (DOGAMI) has tracked the changes to the Oregon coast as a result of nearshore placement, and USACE RSM projects to stabilize the foredune at the South Jetty of the Mouth of the Columbia River. A number of private entities and universities have also contributed to understanding the regional aquatic systems, including the operation of Argus cameras, evaluating Aeolian transport, and tracking presence/absence and movement of various species. NWP has done initial cost analysis of individual placement events at nearshore beneficial use sites, which indicate cost savings versus traditional off-shore placement. A larger programmatic approach is needed.

### **Estimated Benefits & Cost Savings**

- \$1,000/per placement event at MCR, nearshore versus offshore to the O&M Program.
- Benefits to benthic communities by keeping clean sand in the nearshore environment, while placing in a way that minimizes impacts (thin-layer placement)
- Benefits to the coastal communities as the sediment combats highly erosive shorelines.
- Economic benefits for shipping, as nearshore placement results in faster cycle times, meaning more sediment can be removed from the FNC in a shorter time period.

### **Expected Products**

- Life-cycle cost analysis of contract and government dredge use
- Quantification of benefits that RSM strategies have provided
- Final Report and Presentation

### **Stakeholders/Users**

Stakeholders within the Portland District, the lower Columbia River especially, are generally in support of innovative uses of dredged material that support RSM objectives. We plan to utilize data and expertise of these stakeholders to identify and quantify any ecological benefits from RSM practices.

### **Projected Benefits Value Added**

RSM strategies are frequently shown to produce cost savings or monetary value added; however, savings or value is highly site specific and depends on many things including regulations and market. Utilizing a life-cycle analysis approach across multiple maintenance dredging cycles will more fully account for hidden costs and benefits of both RSM and CDF or ODMDS disposal approaches. The analysis may allow for the projection of future savings and benefits as well as an identification of additional opportunities.

### **Leveraging Opportunities**

RSM strategies have already been implemented in a number of ways within NWP. This initiative will capture the benefits of the cumulative impact that those strategies, and allow for projects of future benefits to the overall O&M navigation program. A framework exists within the district that will facilitate the implementation of programmatic changes that result in benefits. NWP and its stakeholders embrace innovation.

### **Points of Contact**

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### **Participating Partners**

NOAA, USGS, EPA, DOE, DEQ, DLCD, WDFW, ODFW, DOGAMI, Columbia River Bar Pilots, Port of Ilwaco, Port of Chinook, Oregon State University, CRCFA, others