



Technology for Measuring Thin Sedimentation

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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Problem

Exposure estimates for environmental resources can be sensitive to sedimentation on the order of 1 mm or less. It is generally not considered feasible to measure at this scale in the field. Therefore, models have been used to estimate sedimentation. However, these models remain un-validated for applications of interest because relevant data cannot be collected. New methods are being developed to quantify sedimentation in the field on the sub-millimeter to centimeter scale. These methods require testing in a laboratory setting to demonstrate the measurement capabilities for fine grained sediment at the sub-mm scale. These methods also require a field demonstration in an environment with multiple sediment sources to verify that the contribution from dredging can be measured.



Photo credit: Sontek

Study Description

Whether originating from a plume resultant from the dredging process or placed directly as part of a restoration and beneficial use project, knowing the amount of accretion/erosion occurring in an area of concern is paramount to quantifying environmental impacts and assessing the effectiveness of placement of dredging operations. Commonly, methods utilized for measuring changes in bed elevation are best suited for instances when elevation change is on the order of centimeters to meters. Dredging projects that utilize strategies such as thin layer placement or that require monitoring of sedimentation from plume fall out require tools and techniques that are capable of measuring bed elevation changes on a finer scale (sub-mm to cm) than what are commonly utilized.

Products

Products from this project will include any instruments/equipment purchased after conducting appropriate market research on commercially available and applicable instruments capable of making the desired fine scale bed elevation change measurements required for this research.

Additionally, peer-reviewed reports discussing the methods and results of the research will be produced as a result of this RT. Technical notes generated by this RT will discuss the results of experiments specific to the instruments and methods tested.

Summary

This RT will develop methods and data collection protocols to quantify small-scale, dredge-induced bed elevation change in sensitive habitats where small amounts of sedimentation/erosion must be quantified to identify risk. These methods will help address questions concerning topics such as the impacts of dredging operations on downstream or nearby ecosystems; as well as the effectiveness and fate of dredge material placed in a region for beneficial use. The data from fine scale bed elevation monitoring will be used to validate models for far-field sedimentation, which presently remain un-validated due to the lack of data collection methods.



Photo credit: Echologger



Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.



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