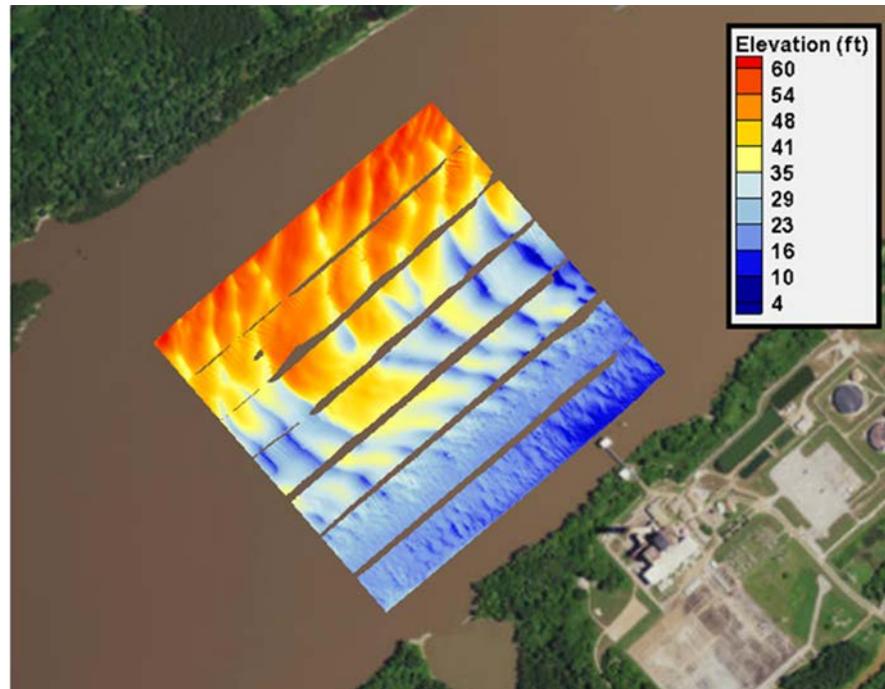




Analytic Methods to Reduce the Uncertainties in the ISSDOTv2 Methodology and Code

Description

Members of the ERDC CHL River and Estuarine Engineering Branch will create analytical test cases to investigate modifications to the widely used ISSDOTv2 (Integrated Section Surface Difference Over Time version 2) method of measuring bedload in order to reduce present uncertainties in the application of the method. The result of this effort will be a more accurate methodology/code with significantly reduced uncertainty that will promote further beneficial use of this method in regional sediment management practices.



Issue/Challenge To Address

The CHL bed-load transport team has ideas to modify the current methodology to address several sources of uncertainty. This research proposal would validate the solutions to these sources of uncertainty through analytical test cases, incorporate those solutions into the ISSDOTv2 code, and document accordingly. At the completion of this project, it is anticipated that the majority of the uncertainty in the method will be eliminated. The remaining uncertainty would be associated with nonequilibrium conditions and the accuracy of the data collection. At the successful completion of this endeavor, a second year proposal will be submitted to investigate the nonequilibrium impacts and improve the method to account for these conditions. This second year effort would enlist the aid of the USDA Sediment Research Laboratory in Oxford, Mississippi to conduct a flume study of the ISSDOTv2 method. Through the combination of this analytical effort and a future flume study, these remaining uncertainties in the methodology can be addressed. Once these efforts are complete, USACE and other Federal Agencies that have a need for bed-load measurements as part of regional sediment management practices will have a vetted, reliable, and consistent method to utilize with quantified bounds on the uncertainties associated with the methodology.



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Successes Lessons Learned

Lessons learned will be compiled during the duration of this study and documented accordingly.

Expected Products

- Description of quantified uncertainties and refined methodology
- Improved code to reflect remedied uncertainties
- Final Report and Presentation

Stakeholders/Users

The Mississippi Valley Division, along with several Corps of Engineers Districts along the Mississippi and Missouri Rivers are long time users of the ISSDOTv2 method. In regards to this specific effort, the Mississippi Valley Division is a stakeholder and the USGS will be solicited for advice and coordination throughout the effort.

Projected Benefits Value Added

This R&D effort should result in a bed-load transport measuring methodology that not only delivers repeatable and consistent bed-load measurements. Thus it will address a very important issue raised by both the USACE and other federal agencies such as the USGS. The USGS has stated that the only reason the ISSDOTv2 method is not currently being used to obtain and publish bed-load data obtained by this method is due to the uncertainties in the results. The proposed work effort will attempt to alleviate those concerns.

Leveraging Opportunities

The ISSDOTv2 methodology has filled a need of USACE Districts and other Federal Agencies charged with regional sediment management on America's waterways with a tool that aids in providing the total sediment bedload. The method has been used at multiple sites on the Mississippi River, Missouri River, Ohio River, Snake River, Columbia River, and Red River. It has been developed through a combination of R&D program funds and District applications. This work will leverage these previous investments. While many USACE agencies utilize ISSDOTv2 currently, the result of this R&D effort would result in a higher level of confidence and a reduced cost of the method, thus making it more appealing to USACE Districts as well as other agencies. In year two we would like to leverage an opportunity to work with the USDA-ARS National Sedimentation Lab in Oxford Mississippi for further development of the methodology.

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Participating Partners

MVD and USGS