



Regional Sediment Management Program

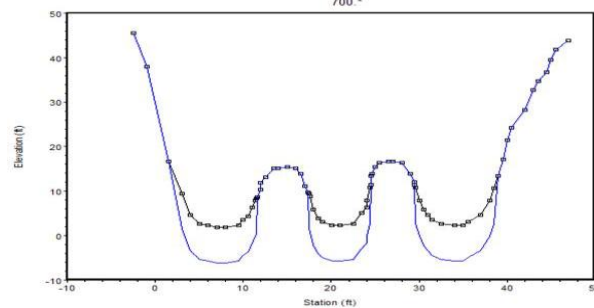
Integration of New Sediment Transport Tools in HEC-RAS



Description

HEC-RAS v.4.1 (Hydrologic Engineering Center – River Analysis System) is a one-dimensional numerical modeling suite designed to analyze river hydraulics. It currently contains a package of basic sediment transport tools to allow for quasi-unsteady analysis of sediment transport in riverine conditions. As more emphasis is placed on predictive modeling of sediment impacts for system restoration and environmental compliance, there is a significant need to expand the sediment tools to better replicate real-time geomorphic processes in numerical modeling.

A group of sediment tools were identified for development for future versions of the software. They include: *a) refinement of the cohesive sediment tools, b) development of reservoir routing routines (including coupling sediment transport with automated, rule based, reservoir operation), c) adding the BSTEM (Bank Stability and Toe Erosion Model)*



function to model bank recession and d) the ability to erode multiple channels independently within the bank stations. This work builds upon efforts started through RSM by NWK in 2012 and includes products developed for the Flood and Coastal R&D Program.

The figure shows an example of the ability to erode select areas of a cross-section while maintaining established inter-channel bars or islands. Use of this function will be vital to effectively model the evolution and removal of reservoir deltas.

Issue/Challenges

By developing these tools, HEC-RAS can better predict geomorphic change in natural river systems. However, incorporating some of these tools into a calibrated model requires significantly more data, which can increase the data collection cost for the model. In addition, with the use of new tools comes the need for additional documentation and training.

Successes

As of May 2013, all of the tools have been developed and are actively being tested.

Expected Products

The new sediment transport tools will be available in future releases of HEC-RAS, likely split between versions 4.2 and 4.3 over the next few years. The tools will only be included in new releases when sufficient testing has been completed.

Potential Users

All USACE Districts and thousands of public and commercial users

Projected Benefits

The use of the tools will allow for better prediction of channel change and delta formation in reservoirs.

Leveraging Opportunities

The development and testing of the new features is a team effort between HEC, the Missouri River Recovery Program (MRRP), the Flood and Coastal R&D Program, and supplemented the RSM Program.

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