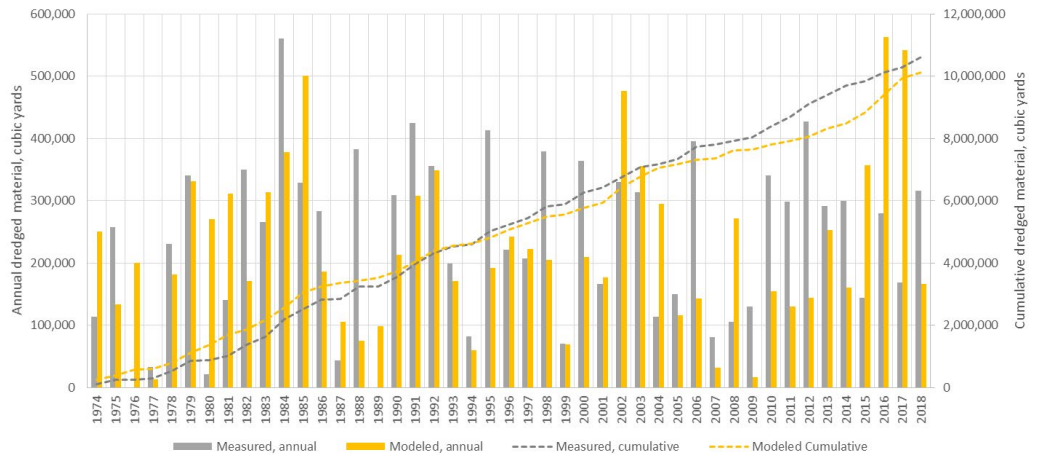




Description

With the development of a 1D HEC-RAS model as a tool to help USACE in estimating timing and quantities of sediment being delivered from the Chippewa River to the Upper Mississippi River, there is an opportunity to take a recent 1D model with a wealth of calibration and validation data and convert it to a 2D sediment model for help in testing the newly added capabilities in HEC-RAS 5.1.



Comparison of modeled to measured sediment delivered to the Mississippi River navigation channel from the Chippewa River, 1974-2018

Issue/Challenge To Address

This modeling analysis will serve two primary purposes. The main goal is to provide model testing of new Beta releases of HEC-RAS 5.1 with two-dimensional sediment modeling capabilities. With the recent completion of the complex 1D sediment model for the Chippewa River and the associated sediment data collection performed by USACE and USGS, this modeling reach would be an ideal area to model two-dimensionally for testing purposes. The other goal in this effort is to continue providing insight into channel maintenance concerns along the Mississippi River Lower Pool 4 navigation channel.

Successes Lessons Learned

The previous one-dimensional modeling effort revealed that the measurements and estimates of sediment load may not be accounting for the total load being delivered to the navigation channel. This effort may provide further insight on this potential issue.

Projected Benefits Cost Savings Value Added

Research and Development – Beta Testing HEC-RAS Software
Channel Maintenance Benefits – potential cost savings in decision making
Utilizing recent data collection efforts (USGS, USACE)

Expected Products

- Technical Note

Stakeholders/Users

Channels and Harbors Project Office, St. Paul District, U.S. Army Corps of Engineers
Hydrologic Engineering Center, U.S. Army Corps of Engineers

Leveraging Opportunities

This proposed project directly leverages a contracted effort by the USGS to provide real-time monitoring of suspended and bedload transport along the Chippewa River, an effort by USACE-ERDC to fully characterize the bedload transport along same reach of river using the ISSDOTv2 method, and the previous 1D sediment model constructed as part of an FY19 RSM Project.



**US Army Corps
of Engineers.**
Engineer Research and
Development Center

National Regional Sediment Management Program St. Paul District (MVP):



Comparison of 1D and 2D Sediment Models using HEC-RAS for the Chippewa River

Points of Contact

Alex Nelson, USACE-MVP-EC-H, Senior Hydraulic Engineer (Technical Lead)
Jon Hendrickson, USACE-MVP-EC-H, Regional Technical Specialist (DQC Review)
Stanford Gibson, CEIWR-HEC-RAS, Research Civil Engineer (HEC Review & Coordination)

Participating Partners

St. Paul District, U.S. Army Corps of Engineers
Hydrologic Engineering Center, U.S. Army Corps of Engineers