



Regional Sediment Management Program Omaha District (NWO)/Hydrologic Engineering Center (HEC): Monitoring Spencer Dam Flushing on the Niobrara River to Reduce Uncertainty in HEC-RAS Reservoir Flushing Modeling



Description

Data collection before, during, and after a scheduled reservoir flush at Spencer Dam on the Niobrara River will allow validation testing of the HEC-RAS model software for reservoir management modeling. This will be the first validated reservoir flushing model developed in HEC-RAS, which will and demonstrate and help improve USACE capabilities to assess reservoir sediment management alternatives. The results of this study help refine HEC-RAS sediment transport tools for reservoirs and will be used on the Lewis and Clark Lake Sediment Management Study (LCLSMS).

http://moriverrecovery.usace.army.mil/mrrp/f?p=136:155:11022096654403::NO::PIS_ID:28



Spencer Dam during Flushing – October 2014

Issue/Challenge To Address

This study must address result scalability. While sediment behind Spencer Dam is similar to the sediment in Lewis and Clark Lake downstream, thick silt lenses, delivered by floods, separate the dominant sand deposits in. The poor erodibility of the lenses will be a challenge to the model. Additionally, an early freeze postponed the post-flood survey until four month after the flush. This elapsed time between the flush and the survey will require careful calibration and creative data management.

Successes Lessons Learned

Data collection for pre- and during-flush was completed on 10 November 2014. Unfortunately the reservoir pool froze over before it could be surveyed after refilling. USACE is perusing additional funding to complete a full post-flush survey before the next flush. The pre-flush model has been developed and the sediment data collected by USGS will be delivered in early 2015.

Expected Products

- Data Collection pre-, during-, post-flush, and USGS report
- RSM/EWN Working Meeting/IPR Presentation
- FY15 Tech Note



US Army Corps
of Engineers
Engineer Research and
Development Center

Regional Sediment Management Program Omaha District (NWO)/Hydrologic Engineering Center (HEC): Monitoring Spencer Dam Flushing on the Niobrara River to Reduce Uncertainty in HEC-RAS Reservoir Flushing Modeling



- Chapter on model development in the Lewis and Clark Lake Sediment Management Study Phase II Report
- Case Study for the HEC-RAS 5.0 Manual

Stakeholders/Users

Nebraska Public Power District (NPPD)
Users of HEC-RAS v.5.0+
Missouri River Management Agencies (USACE, USFWS, NEGP)
Missouri River Recovery Program (MRRP)

Projected Benefits

Novel reservoir management options have no historical events to tested against. They must be evaluated with models. Validating the reservoir flushing transport features in HEC-RAS, to an actual flushing data set would increase confidence and reduce uncertainty in future models developed in HEC-RAS, where they cannot be compared to historic data.

Additionally, a good model of the Spencer Dam/Niobrara River system would improve the existing model of Lewis and Clark which is highly sensitive to the Niobrara load. Finally, there is a population of Pallid Sturgeon at the mouth of the Niobrara, and a working model of this system would help managers understand how episodic the sediment delivery to this region is (versus, how much the intervening reach captures and lags the sediment over time).

Leveraging Opportunities

This project leverages funding and resources from 1) USACE Omaha District, 2) IWR-Hydrologic Engineering Center, 3) the Large Rivers Initiative at the US Geological Survey, 4) The Missouri River Recovery Program (MRRP) and 5) the RSM Program.

Points of Contact

Paul M. Boyd, Ph.D. P.E.
Hydraulic Engineer
River and Reservoir Engineering
Omaha District, USACE
402-995-2350
Paul.m.boyd@usace.army.mil

Participating Partners

Stanford Gibson, Ph.D., USACE IWR-HEC, 530-756-1104,
Stanford.Gibson@usace.army.mil
Ron Zelt, Associate Director, USGS Nebraska Water Science Center, 402-328-4130,
rbzelt@usgs.gov