FY18 RSM IPR St. Paul District, Chippewa River Sediment Loads

BLUF: The Chippewa River is the largest source of bed material in MVP. Understanding the magnitude and timing of sediment transport will improve channel management decisions.

Challenge/Objectives

- Estimating bed material loads
- Timing of channel surveys & dredging
- Dredge material management

Approach - Physical samples, dune tracking technologies, side looking ADVMs, and scour monitors will be compared and used to improve predictive capabilities



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NAVIGATION CHANNEL MANAGEMENT in St. Paul







Bed Material Load from the Chippewa River is 625,000 yd3 per year based on measurements by USGS from 1975 to 1981.





Navigation Pool Annual Dredging, 1981 to 2015





District/Other USACE PDT Members

St. Paul – Jon Hendrickson, Zach Kimmel

ERDC – David Abraham, William Butler

Leveraging/Collaborative Opportunities

- St. Paul was developing a support agreement with the USGS
- 2. MVD suggested including ERDC ISSDOTv.2 surveys and methods
- 3. RSM funds created the St. Paul, ERDC, USGS team

Stakeholders/Partners

Jeff Ziegeweid, Will Lund, Joel Groten, USGS Minn.

Dave Dean, USGS Grand Canyon Research Center

Dan Buscombe, Northern Arizona State University

Faith Fitzpatrick, Joe Shuler, USGS Wisc.





Accomplishments/Deliverables Lessons Learned

Site 1 - Mouth of the Chippewa	Site 2 - Hwy 35 Bridge	Site 3 - Durand
23-Apr		USGS
	USGS	
24-Apr		
ERDC 25-Apr DISCHARGE - 23831		USGS
ERDC 26-Apr DISCHARGE - 22351	ERDC USGS DISCHARGE - 28970	
27-Apr	ERDC DISCHARGE - 28707	USGS
ERDC 28-Apr DISCHARGE - 19304	ERDC DISCHARGE - 27683	USGS
30-Apr	ERDC DISCHARGE - 24386	ERDC DISCHARGE - 28613
ERDC 1-MayDISCHARGE - 14765	ERDC DISCHARGE - 21051	
ERDC 2-May DISCHARGE - 14188	ERDC DISCHARGE - 19292	





What challenges did you face to get your project to implementation and how did you move past them? If not yet implemented, what is your path forward to construction? (Give us your lessons learned that you think might benefit other Districts)





How is this project benefiting the USACE and Nation? (efficiency, monetary, technical, relationship building, outreach, etc.) (Volume of sediment to be managed, Acres created, etc)

- 1. Represents a collaborative effort between USACE and the USGS to provide sediment data that can be used in day to day channel maintenance decisions.
- 2. Knowledge gained and lessons learned regarding monitoring of bed load transport on sand bed river.



ISSDOTv2 Bed-load measurements and locations

ERDC

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Approximately 634 river miles on the Missouri River and 435 river miles on the Mississippi River

Mississippi River Data

ERDC

The method has been used on many different locations and under quite different flow conditions

Notwithstanding that, it has delivered consistent and repeatable results

It seems that the method is becoming a yardstick against which to compare other methodologies

Innovative solutions for a safer, better world

Questions / Comments

1. Integrated Section Surface Difference Over Time, Version 2 (ISSDOTv2)

- A method for computing bed load transport in large sand bed rivers by using multiple sequential bathymetric surveys of dune fields.
- The transport values obtained by this method can be used for sediment budgets by creating a bedload rating curve. The values can also be used for calibration of sediment models and determination of suitable habitat for endangered mussels.

As related to this method, bed load is defined as the portion of the bedmaterial load moving in the sand waves, or dunes.

