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Quantification of In-channel Sediment Contributions : Black Vermillion River, KS

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Abstract:

In June 2007 we established nine monitored stream reaches in three, main stream branches of the Black Vermillion Watershed of northeast Kansas, and completed baseline measures by August of 2007 (average 1200' in length). Baseline measures of monitored reaches involved stream channel dimensions, pattern, and profile allowing stream classification following Rosgen (1996). Additional parameters were measured or predicted according to Rosgen Level III (2007) and WARSSS(2006) (Watershed Assessment for River Stability and Sediment Supply) protocol in order to show departure from stable or reference conditions, to reveal current stream state, and predict future trend(s) for the stream channels. During the summer of 2008 we re-measured the nine stream reaches and the additional parameters according to Rosgen Level III and IV (2007).

This USDA-CSREES project is aimed at measurement and subsequent modeling of sediment sources, transport, and deposition within the agricultural watersheds that supply the Black Vermillion River. The Black Vermillion river system has been drastically modified to facilitate agriculture and flows into a federal, multi-purpose reservoir. The particular concern of the geomorphic stream channel assessment work is to predict and validate, through measurement, the sediment contributions from stream banks and beds. Measurements of bank/lateral migration (via erosion pins) and bed scour/degradation or aggradation (via scour chains) will yield sediment sizes and volumes contributed by the monitored channel reaches on an annual basis. Annual survey of bed sediment sizes and distribution will reveal sediment size shifts and trends. Channel measures will be added to measures of model-predicted sediment yield from overland flow and ephemeral gullies to produce a comprehensive sediment budget for targeted watersheds.

This presentation briefly recounts measurement methods used to conduct the study. We will also present Year 1 findings of in-channel sediment yield as well as size distribution shifts in the watershed. Finally, we address long-term goals for prediction, measurement and validation of streambank erosion tables/curves for Midwestern streams and rivers that allow rapid, accurate prediction of annual sediment contributions from stream channels.

Impact Statement:

Outputs: Quantification of sediment from stream channel sources.

Partnerships: Kansas Water Office, Kansas Dept of Health and Environment, Kansas Geological Survey

Leverage Resources: Possible coordination with Kansas Water Office for future sediment studies

Lessons Learned: Ongoing, however, currently the streams are becoming storage centers for sediment, swamping out stream facets.

Category: Watershed Assessment and Restoration

Type of Presentation: Oral Presentation