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Engineer Research and
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Research Brief: Spatial and Temporal Sediment Transport Processes Within a Systems Context

Issue Without proper understanding of the fluvial system, even projects intended to rehabilitate streams can cause severe instability. Because of the magnitude and complexity of channel response, there is a growing interest in developing improved design guidance for regional sediment management, both nationally and internationally. Therefore, there is a great need for improved guidance for the assessment and design of channel systems that meet the complex goals of projects while avoiding adverse impacts throughout the watershed.

Objective The objectives are to:

- " Evaluate existing sediment management projects throughout the country.
- " Assess the short- and long-term performance of these projects, both from an engineering and a biological perspective.
- " Expand the knowledge of sediment transport processes in river systems, particularly with respect to the source and ultimate fate of sediments.
- " Apply this knowledge and produce a regional sediment transport model that assists with selection and design of rehabilitation measures that meet sediment management goals.

Research/Design The scope of work proposed for this work unit will include the research tasks listed in the following outline:

- " Conduct international literature review and select series of channel systems throughout the United States for detailed data collection and analysis. Channel systems will be selected to characterize urban, agricultural, humid, semi-arid, and other watershed types.
- " Conduct field investigations and data collection at select channel systems, identifying major sediment sources and sinks in the systems, and collecting bed and bank sediment samples. Size fraction of bed and bank materials will be determined through laboratory analyses.
- " Conduct hydrologic, geomorphic, biologic, and sediment transport assessment of the channel systems to establish overall morphologic character and to assess the short- and long-term performance of these systems.
- " Integrate the results of the analyses to evaluate the effectiveness and applicability of various approaches used at the study sites. Produce a conceptual geomorphic model that correlates the impacts of sediment sources on the morphologic trends in the channel systems to transport processes on scales ranging from local to regional.

- " Develop a regional sediment transport model that will provide engineers with the capability to rapidly select and evaluate a variety of sediment management schemes on a system-wide basis.

Application

The proposed multidisciplinary research will provide a tool for water resource engineers and scientists. The process-based framework to select effective alternatives for stream and watershed rehabilitation projects will help attain improved engineering and ecological goals, and may reduce life cycle costs. The benefits will serve federal, state, local, and private agencies involved in sediment management activities.

Products

Links and information will be posted here. View online at <http://rsm.usace.army.mil>.

Research Team

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