



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2004KY43B

Title: Fine sediment source areas and in-channel sediment storage in the Upper Green River Basin, KY

Project Type: Research

Focus Categories: Non Point Pollution, Sediments, Water Quality

Keywords: soil erosion, aquatic habitat, sediment supply

Start Date: 03/01/2004

End Date: 02/28/2005

Federal Funds: \$12,737

Non-Federal Matching Funds: \$31,508

Congressional District: KY 2nd

Principal Investigator:
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Abstract

Fine sediment pollution is an important water quality concern in the Commonwealth of Kentucky. As part of the US Department of Agriculture Conservation Reserve Enhancement Program (CREP), state and federal funds have been committed to reduce the amount of sediment, pesticides, and nutrients entering the Upper Green River Basin between Green River Lake and Mammoth Cave National Park. These funds are targeted to support the implementation of soil conservation practices in the Upper Green River Basin. In order to monitor and evaluate the effectiveness of these conservation practices, management agencies require information on the spatial pattern of potential agricultural and non-agricultural sediment sources and on the quantity and distribution of fine sediment stored in the stream channel network.

The scientific objectives of the proposed research are to identify potential sources of fine sediment in the Upper Green River Basin CREP area and to explain the distribution of fine sediment storage in terms of the spatial pattern of source areas and the geomorphic controls on patterns of in-channel and riparian sediment deposition. This information will be valuable to the CREP partner agencies and to individual program participants in assessing the effectiveness of conservation practices in specific locations, and will serve

as critical habitat data for resource management agencies charged with protecting aquatic biota in the Green River and Mammoth Cave system.

The proposed project includes documenting the spatial distribution of fine sediment stored in the channel and riparian zone of the Green River and its major surface tributaries. Field surveys of a stratified sample of channel reaches will determine locations and volumes of in-channel and overbank fine sediment storage. Reaches will be delimited and selected on the basis of geomorphic factors such as valley slope and width that can influence patterns of sediment storage. A spatial analysis of topography, geology, soils, land use, and soil conservation practices will be used to rank landscape units in terms of their potential as sediment sources. In addition, channel segments with the potential to supply sediment through channel enlargement or migration will be identified on the basis of field observations and digital hydrographic data.

The relationship between patterns of sediment storage and the distribution of potential sediment sources will be analyzed and explained in terms of landscape attributes that affect the delivery of eroded soil to channels and fluvial transport mechanisms that control patterns of in-channel and overbank deposition. Additional field surveys of land areas identified as potential sediment sources will identify active pathways of sediment delivery to channels, in order to refine the assessment of sediment supply potential and to evaluate the effectiveness of soil conservation practices.

The results of this project will elucidate patterns of sediment delivery, transport and storage in the Green River and tributaries and explain these patterns in terms of the dominant natural controls and land use management practices.