Sediment yield and stream stability analysis of the Yalobusha River before and after a watershed scale stream rehabilitation project.

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Abstract.

The Yalobusha River basin is located in the loess hills of northern Mississippi and is a part of the COE Demonstration Erosion Control project. Historical land use changes and downstream channelization practices have created system wide channel instability in the watershed. Massive degradation in the upstream reaches coupled with aggradation in the lower reaches has created flood hazards, loss of agricultural and residential land, damaged infrastructure, and water quality impairment. A basin wide structural stream stability project has been proposed by the COE. This project along with pre-project conditions has been simulated using the SIAM (Sediment Impact Assessment Methods) model. This model combines steady flow HEC-RAS one-dimensional hydraulics, flow duration relationships, sediment transport calculations, field based sediment gradation data, and sediment supply estimates to simulate sediment transport capacity and supply at a reach (link) scale. Quantitative estimates may then be made regarding stream stability, sediment yield, sediment source distribution, and stream power reduction due to the proposed structures. These quantitative estimates of fundamental stream stability concepts may be used for design or monitoring efforts in a variety of stream rehabilitation applications.