

Modeling Decadal Trends in Sediment Flux in Critical-Habitat Reaches of the Colorado River

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Gravel-bed reaches of the Colorado River in western Colorado-eastern Utah provide important habitat for endangered fish species. Over time, habitats in these reaches have been altered due to reductions in peak flows and sediment loads caused by the construction and operation of reservoirs. In this talk, I will present a sediment routing model designed to track downstream changes in the mass flux and grain size distribution of the bed material through a 250 km segment of the Colorado River in western Colorado-eastern Utah. The model is applied to a series of 10 reaches where channel width, depth and slope have been measured, and bankfull discharge has been estimated. For each reach, the mass flux and grain size distribution of the bed material load are computed knowing the local hydraulic conditions and the grain size distribution (GSD) of the sediment coming into the reach from upstream. The results show close agreement between the modeled GSDs of the bed material load and the measured GSDs of the sediment on gravel bars, except for two reaches in the lower part of the study area where channel slope is affected by salt tectonics. Except for these two reaches, the modeled bed material fluxes seem reasonable (0.5-1.0 kg/m/s at bankfull discharge), and exhibit downstream trends that are consistent with trends reported in previous studies.