

## **A Probabilistic Approach for Assessing Effects of Deposited Fine Sediment on Aquatic Insects**

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**Abstract.** Increased levels of deposited fine sediment in rivers and streams resulting from land use change and other anthropogenic influences are often associated with shifts in benthic macroinvertebrate communities towards tolerant taxa. However, the multiplicity of environmental factors structuring insect communities confounds our ability to quantify levels of fine sediment that alter benthic communities. Natural variability in fine sediment and macroinvertebrate community structure result from differences in hydrogeomorphic context. We present a probabilistic method to assess the response of benthic macroinvertebrates to deposited fine sediments using R/EMAP sites from the Southern Rockies Ecoregion of Colorado. We examine the role of relevant watershed-, valley-, and local-scale variables in influencing reach-scale percent sand and fines ( $\leq 2\text{mm}$ ) and richness of sensitive macroinvertebrate taxa (EPT) using classification and regression tree (CART) analysis. This research demonstrates a transferable approach for improving interpretation of macroinvertebrate community structure as a function of deposited fine sediment and will be used in conjunction with future conditional probability analyses to assess the risk of impacts to stream biota associated with fine sediment deposition.