Public Abstract
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Sedimentation is an important variable influencing the complex physical and biological features of streams. Hierarchical models of watershed characteristics, within third-order streams of the Osage River Basin in Missouri, were developed to identify linkages between watershed characteristics, stream sedimentation, and fish assemblages. The models aim to provide insights into both natural and anthropogenic variables associated with sedimentation, as well as the likely response fish assemblages would have to inputs of excess sedimentation from human activities.   A total of 36 sites was classified based on soil type and land-use variables previously shown to be associated with stream sedimentation. Following classification, sites were sampled to define sediment and substrate composition. A subset of sites (n=12), encompassing the range of sedimentation levels, was sampled to define fish-assemblage composition. Results indicate soil classification of a watershed may predict the range of sedimentation and substrate composition in streams. Both anthropogenic and natural-watershed variables relate to the degree of stream sedimentation. Variables associated with increased sedimentation include increased percent cropland within a watershed, riparian width alteration, and cattle access to the stream. Alternatively, variables negatively associated with sedimentation include percent forestland within a watershed, stream gradient, and riparian width. Analysis of fish-sediment relations shows that varying levels of sedimentation were associated with fish assemblage composition. This study identifies linkages on a system wide level and provides insights into the processes of stream sedimentation.