

The Relationship Among Landscape Characteristics, Stream Habitat and Composition of Benthic Macroinvertebrate Communities in Two Midwestern Agricultural Watersheds

by

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ABSTRACT

I studied the relationships among landscape and stream habitat characteristics and benthic macroinvertebrate community composition in two Midwestern agricultural watersheds. The Universal Soil Loss Equation (USLE) was used to derive Sediment Erosion Potential (SEP) from key landscape features. In the Lower Minnesota River watershed (Minnesota), stream habitat was of relatively low quality and was highly variable across sites. Benthic Macroinvertebrate-Index of Biological Integrity (BM-IBI) scores were strongly related to stream habitat variables but were not related to SEP. Topography and soil permeability may have determined the extent of stream channelization, which strongly affected stream habitat quality and macroinvertebrate composition. In the Maquoketa River watershed (Iowa), stream habitat was of relatively high quality and was evenly distributed across sites. In this watershed, BM-IBI scores were not related to individual habitat variables but had a strong relationship to SEP. In both watersheds, BM-IBI score increased with increased rates of soil permeability and conservation tillage. The percentage of land in the watershed as row crop or forest had no effect on BM-IBI scores. Regional variation in landscape characteristics can have a strong effect on stream communities and, as a result, management plans may be more effectively approached from the watershed scale.