

Comparison of riparian and catchment land use effects on stream fauna in the context of landscape features

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Biographical Sketches of Authors

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Abstract

The Clinch/Powell watershed in Virginia, USA historically harbored a high diversity of mussels and fish but species richness has declined precipitously over the past several decades. In a previous risk assessment, riparian corridor rather than upland land uses were more important in determining biological integrity and habitat quality. This study builds on that work by evaluating relationships between land uses in different size riparian corridors and biota and habitat quality, as mediated by landscape slope and drainage area size. Riparian land use, especially urban land, was more closely (negatively) associated with biotic and habitat integrity than whole catchment land use. Effects of urban and forested land within long riparian corridors (5 km) on mussel species richness were more evident in large drainage area streams than in small ones. Among high slope streams, urban land within long corridors was more closely correlated with fish IBI scores than within short corridors, suggesting that longer riparian buffer zones may be necessary to protect fish communities in high slope streams. Our results suggest that evaluating land use relationships with biotic and habitat stream characteristics, in the context of natural landscape characteristics, is important for developing or refining restoration strategies.