Environmental drivers of benthic communities: the importance of landscape metrics

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Abstract

The distribution of aquatic communities is dependent on processes that act at multiplescales. This study comprised 270 samples distributed over 2 years and used a nested sampling design to estimate the variance associated with three spatial scales: basin, site and microhabitat. Habitat assessment was made using River Habitat Survey. The derived Habitat Quality Indices and the benthic composition were crossed with landscape metrics and types of soil use, obtained from GIS data, using multiple non-parametric regressions and distance-based redundancy analysis. Invertebrate variation was mainly linked with intermediate scale (site) and landscape metrics were the main drivers determining local characteristics. The aquatic community exhibited a stronger relationship with landscape metrics, especially patch size and shape complexity of the dominant uses, than with habitat quality, suggesting that instream habitat improvement is a short-term solution and that stream rehabilitation must address the influence of components at higher spatial scales.

Keywords: landscape metrics, soil use, macroinvertebrates, habitat, spatial scale

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