

Catchment structure that supports organic matter providing a natural control on rising river nutrient concentrations

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The connectivity of sources of pollution in catchments has been well studied and brings concepts such as pollution hotspots and critical source areas. However, consideration of the placement of other structures combating rising pollution impacts has been less considered. One such area that is receiving developing focus is the layout of riparian management and buffer strips. However, there are wider aspects of connectivity and landscape structure that can bring benefits to delivery and in-stream processing of pollution. These include wetlands, forests and the distribution of soils of differing connectivity of organic matter varying in bioavailability.

Organic matter is a great modulator of catchment processes from controlling the potential of land use (e.g. constraints of soil organic matter and wetness on agricultural use), to the amount and form of nutrients leached from soils, to controls of dissolved organic matter on in-stream biology that responds to nutrient concentrations. As the fundamental control of ecosystem energy available for many heterotrophic processes it mediates uptake, recycling and speciation of N, P at many stages of the catchment from soils to waters; as such DOM can be considered as a nature-based solution exerting a background level of control on inorganic nutrients.

This poster explores the role of different structural aspects of catchments that provide beneficial organic matter inputs to rivers. At the fine scale the lability of riparian soil and leaf litter DOC are considered. At a riparian management scale the local changes in buffer strip soil C and DOC relative to field soils are considered. At the largest scale spatial data are explored for riparian structure, forests, wetlands and soils differing in delivery and forms of C across major Scottish rivers and used as co-variates to explain differences in in-stream processing of nutrients.