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Conference Abstract

Functional traits link anthropogenic impact and disturbance regimes driving ecosystem function in a floodplain wetland complex

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Abstract

Floodplains are disturbance-driven ecosystems with high spatial and temporal habitat diversity, making them both highly productive and hosts to high biodiversity. The unpredictable timing of flood and drought years creates a mosaic of habitat patches at different stages of succession, while water level fluctuation directly influences macrophyte community dynamics, and thus habitat structure. This habitat complexity and diversity of disturbance regimes makes floodplains an ideal ecosystem in which to examine the links between biodiversity, traits and ecosystem function. With up to 90% of floodplains in North America and Europe altered to the point of functional extinction, it is particularly imperative to study and conserve those that remain intact, such as the Lower Saint John River and its associated floodplain, including the Grand Lake Meadows and Portobello Creek wetland complex. Despite the rise in trait-based science, taxonomic resolution has imposed limitations, especially in wetland and floodplain ecosystems where communities are vastly

understudied compared to their riverine counterparts. Compared to traditional biomonitoring, DNA-based biomonitoring from high-throughput genomics sequencing methods is powerful in that it can reliably characterize community composition in unprecedented detail, allowing us to assess how disturbance and environmental filters interact with invertebrate traits and ecosystem function. Using structural equation analysis, we take a whole ecosystem approach to examine ecosystem health across a floodplain disturbance gradient. We focus chiefly on how anthropogenic alteration within watersheds affects downstream floodplain wetlands, how the resulting patch diversity shapes communities and, finally, how those communities influence ecosystem function through trait diversity metrics. We also examine and compare which traits are associated with crucial ecosystem gradients.

Keywords

wetlands; floodplains; biomonitoring; ecosystem function; traits; structural equation modelling

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