



Preface: Small water bodies in the landscape

Mary Kelly-Quinn · Jeremy Biggs ·
John Iwan Jones · William D. Riley

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Small water bodies are increasingly recognised as important for biodiversity and in terms of their influence on downstream water quality and contributions to catchment ecosystem services (Riley et al., 2018). At the same time, they are among the least studied elements of our freshwater resources, in part due to their high abundance in landscapes and inadequate consideration in Water Framework Directive monitoring. They are also highly vulnerable to anthropogenic pressures.

This issue contains papers from a special session on small water bodies presented at the 2021

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Guest editors: Mary Kelly-Quinn, Jeremy Biggs,
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M. Kelly-Quinn (✉)
School of Biology and Environmental Science and UCD
Earth Institute, University College Dublin, Dublin, Ireland
e-mail: mary.kelly-quinn@ucd.ie

J. Biggs
Freshwater Habitats Trust, Knowle House, North Place,
Headington OX3 9HY, Oxford, UK

J. I. Jones
Queen Mary University of London, London, UK

W. D. Riley
Centre for Environment, Fisheries and Aquaculture
Science, Pakefield Road, Lowestoft NR33 0HT, Suffolk,
UK

Symposium of European Freshwater Sciences (SEFS12). The issue opens with a paper drawing attention to dispersal routes in landscapes, where inter-freshwater dispersal may have an important role in ensuring freshwater ecosystem resilience (Borthagaray et al., 2023). In terms of ecosystem services, Jeffries et al. (2022) addressed carbon sequestration in British lowland ponds, while the ecological contribution of eutrophic fishponds in Austria to the surrounding terrestrial environment was highlighted by Fehlinger et al. (2022). Cuenca-Cambronero et al. (2023) reviewed the role of ponds and pondscapes as nature-based solutions for variously delivering Nature's Contributions to People.

Three papers addressed water quality issues in small streams. Antunes et al. (2022) investigated the impact of cattle access to watercourses in terms of the contamination of streambed sediment with *E. coli* in five agricultural catchments in Ireland. Hogan et al. (2023) reviewed nutrient impairment in small streams in Ireland, developed a novel and transferable method for the characterisation of nutrients, and proposed potential mitigation strategies. Pschenyckyj et al. (2023) examined the influence of drained peatlands on regional stream water chemistry.

The next four papers report on macroinvertebrate assemblages, riparian land-cover influences and the hydrogeomorphological classification of small and headwater streams. Rimcheska & Vidinova (2022) analysed macroinvertebrate taxonomic diversity and similarity in communities between river basins in

the Eastern Balkans. In Oester et al. (2022) we read how leaf-associated macroinvertebrate assemblages and leaf litter fragmentation rates differed between forested and non-forested sites in Switzerland, demonstrating that the functioning of ecosystems depends on the vegetation type in the riparian zone. Pye et al. (2022) assessed how riparian land cover and climatic variability affected the supply, retention and downstream transport of particulate organic matter in headwater streams. The spatially hierarchical stream hydrogeomorphology classification presented by Cox et al. (2022), based on 42 Irish headwater streams, is simple to apply and may be applicable across northern and western Europe with similar climate–landscape conditions.

It is clear from these papers and others presented at SEFS12 that the extensive length of the small stream network and high numbers of ponds poses challenges in terms of water quality and biodiversity monitoring. In this regard, Kelly-Quinn et al. (2022) proposed a framework for operationalisation of citizen science for filling these gaps. Finally, many of the papers highlight the need to better integrate small water bodies into catchment and landscape management strategies as well as actions to achieve national and international environmental policy targets. Given the abundance of small water bodies in the landscape, the high connectivity between aquatic and terrestrial ecosystems, the benefits of restorative action and stakeholder buy-in, the opportunities for multiple positive outcomes seem obvious.

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