

# Editorial

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This, the concluding issue of *Freshwater Reviews*, Volume 3, comprises four papers which, collectively, illustrate well the range of publications that the Journal encourages and is uniquely designed to offer to the freshwater science community. We have one modern review of recent work on the effects of enhanced ultra-violet radiation on zooplankton. We have two no-less modern perspectives on familiar analyses and techniques used in limnology and experimentation but the basis and rationale of which are either poorly understood or accepted without question. We also have an in-depth, critical review of the intent, efficacy and ultimate shortcomings of national legislation designed to protect the quality of freshwater habitats and the species that inhabit them.

The first of the two methodological reviews by Jack Talling is concerned with potassium – a vital constituent of all living organisms and a significant component in the solute content of most fresh waters. It is frequently measured and reported in analytical overviews of given habitats and regional series but it is seldom discussed as an influence on production or ecology. This contrasts with its role in terrestrial fertility and its importance in agriculture. Talling shows us that natural aqueous concentrations mostly saturate the needs of aquatic organisms, although a paucity of supply from the catchment, combined with seasonal uptake demands of vegetation, can leave a deficiency that can limit the distribution of crustaceans. In the second of his reviews, Jack Talling takes us through the electrochemistry of pH measurement and its useful applications related to the carbon-dioxide system in aquatic habitats. Like conductance, on which he wrote in an earlier review (*Freshwater Reviews* 2, 65–78, 2009), pH is measured because it is relatively straightforward to do so and because the record conveys something about the habitat; his argued preference for the greater value of alkalinity data is salutary.

Based upon their researches and experiments, and those of their collaborators in Finland, Canada and Austria, Milla Rautio and Barbara Tartarotti have crafted an informative and compelling review of the effects of ultra-violet radiation on zooplankton and of the adaptive, photoprotective mechanisms they invoke. Clear-water habitats in circumpolar latitudes or at high altitudes are especially susceptible to anthropogenically enhanced levels of harmful UV radiation. Their work is specialised but its findings are of widespread general importance.

The fourth paper, by Dale McCullough, is founded on experiences gained in the application of the key US science-based legislation, the Clean Water Act, ostensibly designed to protect aquatic biota and their habitats. Difficulties arise in selecting standards and criteria that can give guidance for enforcement across a very large area. Not surprisingly, Dale McCullough finds that “implementation of the Clean Water Act has been patchy”. Some notable successes of benefits accruing to sensitive, representative species (including salmonids) have been achieved in the Pacific North-West area. However, the author sees the need to devise more flexible, science-based standards built around good-quality habitat aquatic communities rather than being necessarily geared to protecting the habitat of the most sensitive species. This seems to be close to the intent of the European Water Framework Directive. Clearly, however, the application of science to secure good habitats still requires the best information that can be assembled and modelled on how biological productivity, spatial structure and diversity respond to variability in water quality. All of us still have much to do!

As is my custom, I record my grateful appreciation to our authors for their provocative overviews, to the various reviewers for their care and helpful suggestions, and to the meticulous attention of my colleagues on the production staff.

**Colin S. Reynolds**

Editor

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