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Framework for Characterising Oligotrophic (3110 and 3160) Lakes Using Practical Methods and Assessment Tools

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Identifying pressures

Oligotrophic lake habitats are protected freshwater habitats in Ireland. They are unproductive environments where it can be difficult to sustain life. These lake habitat types are characterised using the presence of plant communities. However, other organisms, such as algae and macroinvertebrates, also show potential for characterising these lake habitats and could aid in assessing their conservation condition. This project aimed to investigate this potential through (i) characterising the water profile and plant and animal communities of oligotrophic lake habitats, (ii) evaluating what environmental conditions are needed to maintain these lake habitats in favourable conservation condition, (iii) assessing and recommending monitoring methods and assessment tools and (iv) proposing measures needed to maintain these lake habitats in favourable conservation condition.

Informing policy

We assessed water chemistry and data from plant communities, including macrophytes, algal communities (including desmids) and invertebrate communities, such as dragonflies, damselflies and beetles, from 24 water bodies within Atlantic blanket bog landscapes in western Ireland. We found all water bodies to be acidic with low alkalinity and conductivity and high water colour and organic matter content. Plant communities were sparse and species-poor and showed no distinct vegetation zonation patterns. A low plant species richness was observed across all water bodies sampled. Desmids (a type of algae) were the most species-rich group in the water bodies sampled, with oligotrophic lake habitats deemed important places for rare and vulnerable desmid species. In addition, the application of the desmid nature conservation value metric proved a useful monitoring tool, indicating the conservation value of the surveyed water bodies. Damselflies and predatory beetles were the most important macroinvertebrates differentiating oligotrophic lake habitat types. Furthermore, water bodies sampled hosted four Irish national red list species, highlighting the conservation value of these lake habitat types for invertebrate diversity.

Developing solutions

This research is important for the conservation of small water bodies (area ≤ 0.01 km^2) within Irish peatland landscapes. Such small water bodies would benefit from an updated National Peatlands Strategy implementation plan to safeguard their long-term monitoring and protection through financial supports and the implementation of conservation measures. Based on our research findings, we recommend that state agencies with responsibility for monitoring protected lake habitats in Ireland conduct a short "snapshot" field sampling programme to include a broader range of oligotrophic lake habitat types. This snapshot field sampling programme should collect data on water colour, pH, alkalinity and organic matter; maximum depth of macrophyte colonisation in the water body; dominant algal groups; and desmids and macroinvertebrates. It should also calculate the desmid nature conservation value metric and note rare species of all plants and animals. These findings will support the monitoring of favourable conservation conditions in oligotrophic lake habitats under the EU Habitats Directive.

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