

Aquifer fed naturally fluctuating water bodies (turloughs and fluctuating meres)

Introduction

These are natural water bodies which experience extreme fluctuation in water level, with periods of complete or almost complete drying out as part of the natural cycle. They have no surface inflow or outflow streams, but are directly connected to the underlying groundwater system. They periodically empty and are recharged via swallow holes or smaller openings in their beds.

This is a very rare habitat, both in the UK and internationally, although there are probably a number of aquifer fed water bodies which were once naturally fluctuating but have been deliberately modified and so have lost most of their biological interest.

The aquatic fauna of these fluctuating water bodies is adapted to survive periods of desiccation. Invertebrates include many highly mobile insect species such as dragonflies, water boatmen and diving beetles, but there is also a rich assemblage of micro-crustaceans such as water fleas, which have resting stages that can remain viable in the soil during dry phases. Snails such as the Marsh snail (*Lymnaea palustris*), which breathe air and can persist during periods of drought under stones and in damp vegetation, are common in both turloughs and meres. Many rare invertebrates have been recorded, including the Two-spined seed-shrimp (*Cypris bispinosa*), the small diving beetle *Bidessus unistriatus*, a Priority species, and the Scarce emerald damselfly (*Lestes dryas*) from the Breckland meres.

Threats

- **Climate change**

Decreased rainfall could alter groundwater regimes and may ultimately depress levels in the underlying aquifers to such an extent that these water bodies cease to fill with water.

- **Water abstraction**

Water abstraction from the aquifers for public supply or for irrigation may upset the delicate hydrological balance of these lakes and hence damage their characteristic flora and fauna.

- **Eutrophication**

Heavy use of artificial fertilisers on arable land and pollution from livestock rearing, sewage effluent or road drainage may result in over-enrichment of the lake water with plant nutrients, leading to algal blooms and loss of biodiversity.

- **Inappropriate grazing management**

An appropriate level of grazing is important to maintain the open condition of aquifer fed naturally fluctuating waters. High stocking levels can result in over-grazing and poaching within the drawdown zone, but complete cessation of grazing could result in the invasion of rank vegetation.

- **Afforestation**

Extensive conifer plantations in the vicinity of these water bodies may exacerbate drawdown by drying up nearby wells.

- **Stocking with fish**

Fish are not naturally found in this type of water body and their presence is likely to have an adverse effect on the characteristic invertebrate assemblages of this habitat.

- **Quarrying**

There are long-standing rights for limestone quarrying near Pant-y-llyn. If a quarry were to be opened up it could lead to significant drawdown of water in the catchment which supplies the only known turlough in Wales.

Habitat management

Avoid modification

Pond deepening, creation of surface drainage or inflow channels and other modifications likely to lead to major changes in the hydrology should be prevented.

Prevent excessive water abstraction

Excessive draw down of water levels outside of normal ranges as a result of abstraction for water supply or crop irrigation should be avoided wherever possible.

Maintain high water quality

Discharges of effluent from waste water treatment works and other point sources of pollution should be strictly controlled to ensure that the quality and quantity of these discharges does not pose a threat to the survival of aquatic invertebrates.



Azure hawker (*Aeshna caerulea*) © Roger Key

Prevent encroachment of scrub or woodland

Encroachment of woodland or scrub may create excessive shading of marginal vegetation and enrichment of the water through the input of leaf litter.

Avoid stocking with fish

Fish feeding on aquatic invertebrates in these closed water bodies will severely compromise their survival.

For a list of species associated with this habitat, please see the download list.

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