UK Biodiversity Action Plan
Priority Habitat Descriptions

Mesotrophic Lakes

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Mesotrophic Lakes

The definition of this habitat remains unchanged from the pre-existing Habitat Action Plan (https://webarchive.nationalarchives.gov.uk/20110303150144/http://www.ukbap.org.uk/UKPlans.aspx?ID=22), a summary of which appears below.

Physical and chemical status

Mesotrophic lakes (i.e. those in the middle of the trophic range) are relatively infrequent in the UK and largely confined to the margins of upland areas in the north and west. They are characterised by having a narrow range of nutrients, the main indicative ones being inorganic nitrogen (N) and total phosphorus (P). Typically, mesotrophic lakes have nutrient levels of 0.3–0.65 $mgNl^{-1}$ and 0.01–0.03 $mgPl^{-1}$. Whilst such levels simplify the complex interaction between plant nutrients and the hydrological and physical characteristics of individual lakes (for instance, virtually all available nutrients are 'locked up' in algae during the growing season), they serve to show the sensitivity of the trophic state to artificially increased levels of nitrogen and phosphorus. Thus, this is an increasingly rare type of lake.

Several of the largest and most important lakes in the UK, including Lough Neagh and Lower Lough Erne were once mesotrophic but are now classified as eutrophic and not included in this action plan. Two existing large mesotrophic lakes, Lough Melvin and Upper Lough MacNean straddle the international border with the Republic of Ireland.

Biological status

Mesotrophic lakes potentially have the highest macrophyte diversity of any lake type. Furthermore, relative to other lake types, they contain a higher proportion of nationally scarce and rare aquatic plants. Macroinvertebrates are well represented, with particularly important groups being dragonflies, water beetles, stoneflies and mayflies.

Rare fish, of which only three species are found in UK lakes, are well represented in mesotrophic lakes. The vendace, *Coregonus albula* is only found in two sites in Britain, one of which is Bassenthwaite Water in Cumbria. Another whitefish, *Coregonus lavaretus*, known as the schelly (or gwyniad, or powan), is found in a mesotrophic tarn in Cumbria. The schelly is also found in oligotrophic lakes in Cumbria, Wales and Scotland and there is uncertainty as to whether it is abnormally stressed in a mesotrophic environment. In general, fish communities in mesotrophic lakes are a mix of coarse and salmonid species, but today there are few truly natural assemblages due to introduced species.

Current factors affecting the habitat

Pollution:
Enrichment by excessive nutrient input (eutrophication) is the main impact. Anthropogenic nutrient inputs can include:

- sewage effluent;
- point and diffuse sources associated with agriculture and forestry;
- accidental spillages (e.g. slurry);
- fish farms in the lake and its feeder streams.

The effects can be exacerbated by excessive water abstraction upstream, leading to a reduction in the quantity of water reaching the lake. This may affect the residence time of water in the lake, increasing the time available for nutrient uptake by aquatic macrophytes and algae, and so enhancing plant production. This is the primary symptom of eutrophication.

Other sources of pollution which can have significant impacts are industrial pollution and pesticide losses. Water acidification is also a factor in some upland catchments.

Catchment land use:
Ploughing up of grassland and surrounding habitats, and under-drainage both increase the possibility of soil erosion with a consequent increase in water-borne sediments. Settled sediments may continue to introduce nutrients into the water column. Sediments in suspension cause turbidity and the resulting light attenuation may inhibit the growth of rooted aquatic plants in the spring, increasing the changes of algal dominance. Ploughing associated with afforestation can have a similar effect, as can peat-cutting on moorland catchments.

Fisheries management:
Introductions of fish to lakes can alter the natural integrity of mesotrophic lakes in various ways:

- through competition, altering the native species composition;
- if bottom-feeding fish are involved, through continual disturbance of the sediments, leading to turbidity and the mobilisation of nutrients (favouring algal blooms);
- through altering the structure of the food web, for example leading to increased predation of the invertebrates that graze algae.

Recreation:
Water-borne traffic can damage aquatic plants at the point of launch, or through bankside wave erosion, passage through strands of vegetation, or the cutting action of propellers. Increased turbidity from boatwash may also compound macrophyte loss. The suppression of macrophyte communities by these mechanisms may favour algal growth.