UK Biodiversity Action Plan
Priority Habitat Descriptions

Eutrophic Standing Waters

From:
UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.

This document is available from:
http://jncc.defra.gov.uk/page-5706

For more information about the UK Biodiversity Action Plan (UK BAP) visit
http://www.jncc.defra.gov.uk/page-5155

Eutrophic Standing Waters

The definition of this habitat remains unchanged from the pre-existing Habitat Action Plan (https://webarchive.nationalarchives.gov.uk/20110303145921/http://www.ukbap.org.uk/UKPlans.aspx?ID=23), a summary of which appears below.

Physical and chemical status

Eutrophic standing waters are highly productive because plant nutrients are plentiful, either naturally or as a result of artificial enrichment. These water bodies are characterised by having dense, long-term populations of algae in mid-summer, often making the water green. Their beds are covered by dark anaerobic mud, rich in organic matter. The water column typically contains at least 0.035mgL^{-1} total phosphorus (which includes phosphorus bound up in plankton and 0.5mgL^{-1} or more total inorganic nitrogen (mainly in the form of dissolved nitrates). Many lowland water bodies in the UK are now heavily polluted, with nutrient concentrations far in excess of these levels although there is some geographical variation in the extent of the enrichment. This action plan covers natural and man-made still waters such as lakes, reservoirs and gravel pits but it excludes small pools, field ponds and brackish waters. It includes some waters, such as Lough Neagh, Northern Ireland, which have been enriched as a result of human activity and so have been forced along the trophic continuum from a mesotrophic to a eutrophic state. The biodiversity action plans for mesotrophic and eutrophic waters are therefore complementary and their implementation should be co-ordinated. Eutrophic waters are most typical of hard water areas of the lowlands of southern and eastern Britain, but they also occur in the north and west, especially near the coast.

There are no accurate estimates of the amount of eutrophic standing water in Great Britain. The total area of still inland water is estimated as 675km^2 in England, 125km^2 in Wales, and 1,604km^2 in Scotland. Current work suggests that over 80% of this resource in England, some 40% in Wales, and approximately 15% in Scotland is eutrophic. On this assumption, the area of eutrophic standing water in Great Britain would be about 845km^2. Measurements made by the Environment and Heritage Service put the area of eutrophic standing water in Northern Ireland at approximately 940km^2. The total UK area for eutrophic standing waters is therefore likely to be around 1,785km^2.

Biological status

In their natural state eutrophic waters have high biodiversity. Planktonic algae and zooplankton are abundant in the water column, submerged vegetation is diverse and numerous species of invertebrate and fish are present. Plant assemblages differ according to geographical area and nutrient concentration but fennel-leaved pondweed *Potamogeton pectinatus* and spiked water-milfoil *Myriophyllum spicatum* are characteristic throughout the UK. Common floating-leaved plants include yellow water lily *Nuphar lutea* and there is often a marginal fringe of reedswamp, which is an important component of the aquatic ecosystems. A rare plant found in a few eutrophic waters is ribbon-leaved water-plantain *Alisma gramineum*.

Bottom-dwelling invertebrates such as snails, dragonflies and water beetles are abundant and calcareous sites may support large populations of the native freshwater crayfish *Austropotamobius pallipes*. Coarse fish such as roach *Rutilus rutilus*, tench *Tinca tinca* and pike *Esox lucius* are typical of eutrophic standing waters, but salmonids also occur naturally in some. Amphibians, including the protected great crested newt *Triturus cristatus*, are often present and the abundance of food can support internationally important bird populations. Loch Leven and Lough Neagh, for example, each support over 20,000 waterfowl, including large numbers of wintering whooper swan *Cygnus cygnus*. Loch Leven is nationally important for breeding ducks such as wigeon *Anas penelope*, gadwall *Anas strepera* and

shoveler *Anas clypeata*, and Lough Neagh is of national importance for breeding great crested grebe *Podiceps cristatus*.

For centuries, periodic 'blooms' of blue green algae, which may be natural phenomena, have been documented in Llyn Syfaddan (Llangorse Lake), south Wales, and in the meres of the west Midlands. Lakes change naturally over time, slowly filling in with silt and vegetation and usually, in the absence of human impact, gradually becoming less fertile. In water bodies which are heavily enriched as a result of human activity, biodiversity is depressed because planktonic and filamentous algae (blanket-weed) increase rapidly at the expense of other aquatic organisms. Sensitive organisms, such as many of the pondweed *Potamogeton* and stonewort *Chara* species, then disappear and water bodies may reach a relatively stable but biologically impoverished state.

Links with species action plans

Eutrophic standing waters is an important habitat for a number of priority species, and their requirements should be taken into account in the implementation of the plan. They include ribbon-leaved water plantain *Alisma gramineum*, convergent stonewort *Chara connivens*, starry stonewort *Nitellopsis obtusa*, tadpole shrimp *Triops cancriformis*, medicinal leech *Hirudo medicinalis*, pollan *Coregonus autumnalis*, and freshwater white-clawed crayfish *Austropotambius pallipes*.

Current factors affecting the habitat

One or more of the following factors may cause a reduction in biodiversity in a eutrophic standing water. The response of any given water body is unique, as some lakes are relatively resistant to change whereas others are more sensitive. A potential threat which may over-ride all the others is climate change. A substantial change in water supply and throughput would alter the character of water bodies and a rise in temperature would produce wide-ranging effects such as acceleration of plant growth.

Pollutants find their way into these waters not only from point sources, but also from diffuse sources. Organic and inorganic fertilisers and nitrogen-rich gases cause nutrient enrichment (eutrophication) of the water, with consequent damage to plant and animal communities. Diffuse-source pollution generally exceeds that from point-sources.

Changes in land cover can release nutrients from the soil and these may enter water bodies, causing enrichment. The long-term effect of such land-use changes is an increase in the risk of pollution and of siltation, which can smother fish spawning sites and damage aquatic vegetation. These problems are exacerbated by the removal of waterside vegetation and reedswamp, which are effective barriers to particulate matter and act as sinks for nutrients.

Water abstraction for potable supply, industry or irrigation, either directly from a standing water body or from surface feeders or aquifers, can depress water levels and increase water retention time and reduced flushing rate. This may exacerbate nutrient enrichment, cause deterioration of marginal vegetation through drawdown and cause shallow lakes to dry out. For coastal sites, a reduction in the throughput of fresh water could increase the salinity of a water body.

The introduction of fish, the removal of predators, and the manipulation of existing fish stocks for recreational fishing leads to the loss of natural fish populations and may affect plant and invertebrate communities.

Heavy stocking of bottom-feeding fish such as carp *Cyprinus carpio* can cause turbidity and accelerate the release of nutrients from sediments. This has caused major problems of enrichment in some eutrophic water bodies.

Use of standing waters for recreational and sporting purposes may create disturbance which affects bird populations. Marginal vegetation may suffer from trampling and the action of boat hulls and propellers destroys aquatic plants and stirs up sediment, contributing to enrichment and encouraging the growth of algae. The construction of marinas and other leisure facilities may destroy valuable habitat and can lead to increased pollution.

Release of non-native plants and animals can be very damaging. The signal crayfish *Pacifastacus leniusculus*, has had the dual impact of destabilising the biota of some waters by consuming large amounts of aquatic vegetation and eliminating many populations of native crayfish by spreading crayfish plague.