Summary

The Eutrophic standing waters priority habitat includes standing water bodies larger than 1 ha in size, so there is some overlap with the Ponds priority habitat. Eutrophic lakes have high alkalinity and high levels of nutrients. Standing waters of this priority habitat include those that are naturally eutrophic, as well as those that have become eutrophic as a result of human action.

Naturally occurring examples of eutrophic lakes are important for the abundance and variety of the submerged and emergent species of plant that they support, but good examples are rare. Eutrophic standing waters may have extensive stands of fringing vegetation and richer examples of this lake type may support dense algal growth during the summer months, the latter often resulting in green-coloured water. Such sites are common throughout the agricultural lowlands, and although they are scattered throughout Scotland, they occur mainly in south, central and eastern areas.

What is it?

Eutrophic standing waters have high productivity as a result of presence of high alkalinity and nutrient levels; the water column typically contains at least 35 µg P L\(^{-1}\) of total phosphorus (TP) (OECD, 1982) and 500 µg N L\(^{-1}\) or more total inorganic nitrogen (mainly in the form of dissolved nitrate) (Maddock, 2008).

Unpolluted examples of this habitat are often characterised by deep fringes of emergent vegetation comprising common reed *Phragmites australis* or bulrush *Typha* spp., and beds
of floating-leaved species such as yellow water lily *Nuphar lutea*. Submerged species associated with this type of water body include fennel-leaved pondweed *Potamogeton pectinatus* and spiked water-milfoil *Myriophyllum spicatum*. The open water of richer sites may be dominated by algae, which gives the water a green colour.

This habitat supports abundant populations of planktonic algae and zooplankton. Snails, dragonflies and water beetles dominate the benthic fauna. In sites that have suffered from artificial enrichment, the variety of species may be reduced to one or two pollution-tolerant species of leech and chironomid larvae, although the numbers of each species may be high. The abundance of food resulting from the artificial enrichment may support internationally important numbers of birds. For example, Loch Leven supports over 20,000 waterfowl including nationally important numbers of wigeon *Anas penelope*, gadwall *Anas strepera*, Shoveler *Anas clypeata* and large numbers of wintering whooper swan *Cygnus cygnus*. The fish fauna is usually dominated by coarse fish, such as pike *Esox luciatus*.

Eutrophic standing waters are generally shallow, and have bays or shores that are sheltered from wave action. Dark anaerobic muds, rich in organic matter may be the dominant substrates.

**How do I recognise it?**

*Differentiation from other Priority Habitats*

The most similar priority habitats to the Eutrophic standing waters are Ponds, Mesotrophic lakes, and Oligotrophic and dystrophic lakes. There can also be some similarities with the Fen, marsh and swamp broad habitat.

The distinction between the Eutrophic standing waters priority habitat and the Ponds priority habitat is based on size and the quality of habitats and species present, although there is some overlap between the two. The lake priority habitats have a surface area of 1 ha or more, whilst the Ponds priority habitat covers water bodies less than 2 ha in size, which meet at least one of five criteria relating to the presence of habitats or species of high conservation value. Sites which are 1 – 2 ha in size and are eutrophic in character, but which do not meet the quality criteria for Pond priority habitat, are likely to be considered as Eutrophic standing waters priority habitat.

Eutrophic standing waters priority habitat is distinguished from other lake priority habitats on the basis of alkalinity, nutrient levels and the type of vegetation present. Plants indicative of eutrophic habitats include species of pondweeds *Potamogeton* spp. (e.g. *P. crispus*), stoneworts *Chara* spp. duckweeds *Lemna* spp. and water starworts *Callitriche* spp.

The distinction between the Fen, marsh and swamp broad habitat and the Eutrophic standing waters habitat is based on the extent of emergent vegetation present. Any stand of marginal emergent vegetation that is greater than 5 m wide, or areas of wetland habitat adjacent to the water body that are greater than 0.25 ha, are included in the Fen, marsh and swamp broad habitat and the corresponding priority habitat, i.e. Lowland fens, Reedbeds or Upland flushes, fens and swamps. Areas of wet woodland greater than 0.25 ha are included in the Broadleaved, mixed and yew woodland broad habitat and the Wet woodland priority habitat, unless the cover of the canopy is less than 30% (Jackson, 2000).
**Definition in relation to other habitat classifications**

<table>
<thead>
<tr>
<th>Classification scheme</th>
<th>Habitat types belonging to this UKBAP priority habitat</th>
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</thead>
<tbody>
<tr>
<td>NVC Aquatic Communities:</td>
<td>A2, A5, A8, A9, A10, A11, A15, A16, and A19.</td>
</tr>
<tr>
<td>NVC Swamps and tall-herb fens</td>
<td>S2, S3, S4, S9, S10, S11, S12, S14, S19 &amp; S22.</td>
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<tr>
<td>Phase 1</td>
<td>G1.1 Standing Water - Eutrophic</td>
</tr>
<tr>
<td>UKBAP Broad Habitat</td>
<td>All examples of this priority habitat are associated with the broad habitat - Standing waters and canals</td>
</tr>
</tbody>
</table>

**Definition in relation to legislative classifications**

<table>
<thead>
<tr>
<th>Classification scheme</th>
<th>Habitat types belonging to this UKBAP priority habitat</th>
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</table>
| Annex I | H3140: Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. (part)  
H3150: Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation. |
| Scottish Biodiversity List | Whilst there is no clear link between SBL types and this priority habitat type, communities which may be present include: A2, A5, A8, A9, A10, A11, A16, and A19, S2, and S4. |
| SSSIs | Includes examples of meso-eutrophic (part) eutrophic lochs; machair (part), base-rich lakes (part) and loch trophic range (part). |

**Where is it?**

Natural Eutrophic standing waters are associated with base-rich rocks or sites near the sea that are influenced by deposits of shell sand. In Scotland, the habitat is found in the lowlands, and areas of the Highlands where base-rich rocks occur, for example in Caithness and parts of Inverness-shire. It has been estimated that 15% of the Scottish standing freshwater resource is naturally eutrophic.

**What is special about it?**

Species of special conservation status recorded in this priority habitat in Scotland are listed below. Species not native in Scotland have been excluded from the Table.

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<tbody>
<tr>
<td>amphibian</td>
<td>common toad</td>
<td>Bufo bufo</td>
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<td></td>
<td>Sch5</td>
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<td>zircon reed beetle</td>
<td>Donacia aquatica</td>
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<td>bird</td>
<td>greater scaup</td>
<td>Aythya marila</td>
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<td>y</td>
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<td>bird</td>
<td>tundra swan</td>
<td>Cygnus columbianus subsp. bewickii</td>
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<tr>
<td>bird</td>
<td>herring gull</td>
<td>Larus argentatus</td>
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How do we manage it?

Pressures most commonly occurring with respect to all lake types are nutrient enrichment, alteration of hydrological regime and introduction of invasive non-native species. Management for conservation is generally focused on the land within the catchment area, use of the water resource and measures for control or eradication of invasive, non-native species.

Management measures for Eutrophic standing waters may include the following:

- **Maintenance of a natural hydrological regime**

  Plants and animals within lochs are adapted to fairly stable conditions, with some fluctuation in water levels caused by high rainfall or periods of drought. The scale and frequency of these fluctuations needs to be maintained alongside any use of the site that has the potential to alter hydrological regime, e.g. potable water supply, irrigation and hydro-power generation. The through-flow of water (flushing rate) is an important element in regulating the accumulation of nutrients within a site and there may be occasions when an artificially enriched site may benefit from a temporary increase in flushing rate, to remove nutrients from the site.

- **Maintenance of water quality**

  The Eutrophic standing waters priority habitat is characterised by high nutrient levels, but is vulnerable to increases in nutrient concentrations resulting from enrichment from anthropogenic sources. Such enrichment may lead to eutrophication. Elevated nutrient inputs promote algal growth, which reduces the light available in the water column for bottom-rooted plants, and which may lead to other problems with water quality. The source of these nutrients may be direct, for example discharge of sewage, or indirect, for example agricultural run-off.

  Management of naturally eutrophic sites is aimed at maintaining water supply and quality, and focuses on limiting changes in hydrological regime and loss of nutrients from catchment land use to the receiving water body. The approach is to prevent difficulties from arising by limiting change and/or ensuring that mitigation is implemented. Hydrological regime and nutrient loadings from the catchment area of sites that have been artificially enriched are also important factors to deal with, but limitation of new pressures on lakes may be insufficient to allow improvement in condition. Emphasis on reducing nutrient loadings and restoring appropriate hydrology may be necessary to improve the water body and foster a more natural ecosystem. In certain cases, efforts may be made to remove or immobilise nutrients, where a high loading of nutrients is coming from the sediment of lakes, as a consequence of excessive enrichment from external sources. However, it is necessary to consider whether the management...
measures would be sufficiently effective and whether such measures could in themselves be damaging to the site.

- **Maintenance of native species assemblages**

There are a number of invasive non-native species of plant and animal which out-compete native species. Some of the plant species, such as Canadian waterweed *Elodea canadensis* and Nuttall's waterweed *Elodea nuttallii* may be able to exploit conditions in richer sites, which may result in the exclusion of native species. New Zealand pygmyweed *Crassula helmsii* is also a species of particular concern. Management should aim to ensure that these species are not spread within or between sites and to contain or eradicate them where possible.

### References, Links and Further Information


