Eutrophic standing waters

Introduction

These are water bodies whose naturally high nutrient status makes them very productive, with dense populations of algae in mid summer often making the water green. Anaerobic mud rich in organic matter supports abundant bottom-dwelling invertebrates such as snails.

These water bodies are also important for dragonflies and water beetles, and calcareous sites such as marl lakes, which are relatively silt-free, may support large populations of the native freshwater White-clawed crayfish (*Austropotamobius pallipes*). In addition to *A. pallipes*, this habitat supports a number of Priority invertebrate species such as the Tadpole shrimp (*Triops cancriformis*) and the Medicinal leech (*Hirudo medicinalis*).

Threats

- **Pollution**

Nutrient enrichment caused by organic and inorganic fertilisers and nitrogen-rich gases (cultural eutrophication) damages plant and animal communities and results in a loss of biodiversity

- **Changes in land-use**

Changes in land-cover can result in increased siltation and release of nutrients into the water body, causing increased eutrophication. Removal of waterside vegetation and reedswamp is damaging, as they act as barriers to particulate matter and absorb nutrients

- **Loss and isolation of habitat**

Infilling of farm ponds and the end of traditional use of dew ponds has led to a reduction in the number of ponds in the countryside, as well as increasing isolation of those remaining, making colonisation by less mobile species more difficult. Siltation also accounts for the loss of many ponds

- **Water abstraction**

Abstraction for drinking water, irrigation or industry can depress water levels, increase water retention time and reduce flushing rate. It can also exacerbate nutrient enrichment, cause deterioration of marginal vegetation and cause shallow lakes to dry out. At coastal sites, increased salinity may result

- **Manipulation of fish stocks**

Vegetated open pool © David Pryce

Introduction of fish or removal of predators 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

- **Recreational and sporting use**

This may create disturbance: marginal vegetation may suffer from trampling and the action of boat hulls and propellers destroys aquatic plants and stirs up sediments, 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**

The American signal crayfish *(Pacifastacus leniusculus*) consumes large amounts of aquatic vegetation, disrupting the ecological balance of some water bodies. It has also spread crayfish plague, eliminating many populations of the native crayfish

Habitat Management

Maintain natural processes

Eutrophic standing waters are a prime example of a habitat where active management may be extremely beneficial, but an all-or-nothing approach is likely to prove highly damaging for many of the species that are members of the marginal fauna. A balanced approach is required to maintain and enhance the conservation value of ponds and other water bodies.

The guiding principle is continuity of habitats, including the variety of niche conditions required for the survival of a rich invertebrate fauna. Thus maintenance of mosaic is best achieved by phased treatment. Blitz management on a small or large water body can have devastating affects, risking considerable impoverishment of the invertebrate fauna. Water margin/terrestrial transition zones can be among the richest for invertebrates so it is essential not to focus on the aquatic fauna alone.

Maintain habitat heterogeneity

Sites with a full range of successional stages will support the largest number of invertebrate species, so it is important to maintain this diversity. The marginal zone of standing water bodies will usually have a more abundant invertebrate fauna than areas of open water. Well-structured ponds should have a mixture of both dense and shorter marginal vegetation, bare marginal substrate and large beds of submerged vegetation.

At the margins of large water bodies, allowing the development of a complete hydrosere from marginal vegetation through to scrub and woodland or to grassland at grazed sites will provide the widest range of sub-habitats.

The management of the immediate surroundings of a water body should be considered as an integral part of its management and sudden or dramatic changes to the vegetational structure should be avoided. A variety of semi-natural vegetation types including scrub, tall herbage and permanent grass will provide foraging and roosting areas for the adult stages of aquatic invertebrates.

Before carrying out any large-scale management, it is important to determine the conservation value of a site. Removing vegetation purely for the sake of creating diversity may not be the best option, as a large area of a single margin type is more likely to support a characteristic fauna, which may then be lost.

Do not over-manage

Over-managing a lake or pond can be detrimental to the invertebrate fauna; all successional stages are of value and while some species require unshaded conditions, others thrive in shaded ponds. If a pond has become heavily silted, allowing natural succession to take place and creating a new pond nearby on a site of low conservation interest may be preferable, as restoration is likely to destroy an interesting wetland community. Another option may be a small silt-trap pond up-stream which can be regularly cleared without interfering with the main pond.

Maintain water quality

Desmoulin's whorl snail (Vertigo moulinsiana) © Roger Key

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 invertebrate species present. Diffuse pollution from agricultural practices can also threaten the survival of aquatic species. White-clawed crayfish are particularly susceptible to increased ammonia levels and reduced oxygen levels resulting from spills of organic material such as cattle slurry or silage; they are principally found in clean, alkaline waters. Similarly, an unpolluted calcareous water supply should be maintained at sites supporting the rare Desmoulin's whorl snail (*Vertigo moulinsiana*) There are eutrophic waters even in the uplands where sheep-dip pollution via inflow streams is a potential hazard.

Maintain water levels

The water levels of smaller water bodies such as ponds are likely to be subject to some seasonal fluctuation. This may be advantageous to some species as it promotes a diversity of marginal sub-habitats, including early succession conditions. However, excessive draw down of water levels as a result of abstraction for water supply or hydro-electric generation should be avoided. Fluctuating water levels are thought to be deleterious to some weevil species, and in sites supporting Desmoulin's whorl snail the ground water table should be at or close to the surface for most of the year; raising water levels could possibly be as damaging to this species as drought.

Retain temporary pools

Some species such as the endangered Tadpole shrimp (*Triops cancriformis*) and the Fairy shrimp (*Chirocephalus diaphanus*) are found in temporary water bodies that are subject to seasonal drying. This regular desiccation eliminates predator populations that would otherwise eat the invertebrates. Temporary pools have great conservation value and should not be filled in or excavated to create permanent water bodies.

Maintain natural bank profiles

Tadpole shrimp (Triops cancriformis) © Roger Key

In general, 'hard' edged water bodies support less rich invertebrate assemblages than ones with at least some gently sloping margins and for this reason, pools and lakes with banks profiled to be suitable for angling may

provide poor habitat for many species. However, extensive steep banks in the marl lakes, reservoirs and water-filled quarries where White-clawed crayfish are found are important for them to excavate their burrows.

Adopt small-scale rotational management

Whether dredging, removing weed, clearing banks, tree felling or bank profiling, measures taken should be piecemeal and not affect all of the water body at any one time. Work liable to damage marginal vegetation should aim to leave a mixture of species and sward heights. Such work should be undertaken on short stretches such as 50 metres in each 200 metres in any one year. Damage to the terrestrial transition zone can be minimised by confining access and raking out points to the minimum: water margin banks should not be built-up by depositing sediment of vegetation directly on the transition zone.

Many species require solid objects in the habitat such as submerged timber or stones, including man-made bricks and fishing piers. It is important to appreciate that existing material has probably added to habitat diversity and assisted some species, including uncommon ones. If such material must be removed then a good month is August as over-wintering and pupating individuals will not be present, but there will be loss at any time; April to June are probably the worst months for such work.

Minimise disturbance resulting from recreational use

Intensive use of water bodies for angling may damage the habitat through trampling of the marginal marsh, removal of waterside and aquatic vegetation and re-profiling of banks. Over-stocking with fish can result in excessive predation of invertebrates and artificial feeding can lead to a reduction in water quality. The presence of some water birds may be a natural feature but increasing numbers by feeding can rapidly leading to excessive fouling of the water; adoption of water bodies by flocks of gulls or geese can have the same deleterious affect on the ecology. Wave erosion by boats is a particular problem in some water bodies of this type.

Manage grazing carefully

Light grazing at sites where there is a long history of such management may benefit some species by preventing the invasion of scrub and keeping down more competitive species. In fact many insects prefer open structure vegetation exposing bare marginal sediment rather than dense vegetation. The Beaulieu dung beetle (*Aphodius niger*) is dependent on cattle dung trodden into the water's edge. If this species is present, it is important to continue grazing stock on the site. Dosing of livestock with broad-spectrum wormers is damaging to insect development and alternative treatments should be sought wherever possible.

Some sites may not be suitable for grazing. Cattle poaching on the banks of water bodies can cause turbidity and decreasing dissolved oxygen concentrations as a result of sediment and excrement entering the water. Grazing at sites supporting Desmoulin's whorl snail may also disturb the marginal vegetation on which the species depends. A site survey to determine the potential effects of grazing should be carried out before any radical changes in management.

Manage overhanging scrub

Scarce chaser (Libellula fulva) © David Pryce

If a pond has recently become shaded as a result of growth of trees and scrub, these should be removed, at least from the southern side, to benefit species preferring open conditions. Sites supporting Desmoulin's whorl snail should not be allowed to become over-shaded and overhanging scrub should be controlled.

However, ponds in woodland which have been shaded for some time should not be opened up without good reason, as there are some invertebrates such as the water beetle *Hydroporus incognitus* that are confined to shady ponds. Woody vegetation at a pond margin may be an important habitat in its own right; neglected willow pollards should be re-pollarded rather than removed. The insect fauna of shaded marginal vegetation is quite different from that of open sunny margins.

Overhanging vegetation more than 0.5m above the water provides shade, food and cover for White-clawed crayfish, which also thrive in sites with tree root systems projecting into the water. Such bankside features should be retained, enhanced or restored where the crayfish is to be protected or reintroduced.

Avoid siltation at crayfish sites

Land-use changes, the draining of lakes or ponds and lowering or widening a stream or river bed can increase siltation and reduce water flow, resulting in a change in the channel flora and creating unsuitable conditions for crayfish.

BAP species associated with eutrophic standing waters:

White-clawed crayfish (*Austropotamobius pallipes*)
Tadpole shrimp (*Triops cancriformis*)
Medicinal leech (*Hirudo medicinalis*)
Lesser water measurer (*Hydrometra gracilenta*)
Beaulieu dung beetle (*Aphodius niger*)

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

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