

Pond restoration & management for wildlife

A Suffolk pond in good health is an incredibly rich and varied habitat for wildlife. When the environmental conditions are right, an array of different plant species grow in abundance, creating a spectrum of aquatic zones in which a myriad of different creatures manage to find the right kinds of spaces to flourish.

Pond plants help clean the water by absorbing nutrients and even pollutants as they grow, and a host of filter-feeding invertebrates vacuum up tiny particles and break down rotting matter. Ponds in different situations vary enormously in the wildlife they support and even weather conditions can affect the dominance of certain pond plants in a given year, and therefore its appearance and associated wildlife.

However, the condition or health of a pond can be affected by a number of factors.. Water can become murky or smell foul, become shaded by surrounding trees or shrubs, or get taken over by invasive emergent vegetation which effectively dries out the open water. These changes will inevitably lead to a reduction in the wildlife – both population size and diversity of species.

To successfully restore a pond to a healthy state, it is important to establish what factors are affecting it.

Diagnosing pond problems

The primary indicator of pond health is an abundance of underwater vegetation composed of several different plant species. The most important single factor contributing to a pond's health is an abundance of varied plant cover, both underwater and growing out of it, but particularly under water. It is the plants that attract animal life and create favourable conditions for it. However improving the health of a pond is not a matter of planting more plants but of maintaining the right conditions for natural plant growth to thrive. The optimal amount of



Common newt

Bill Stevenson

plant cover in a pond during the summer is considered somewhere between 60 and 85% of the water volume. Plants naturally colonise ponds with clean, well-lit shallow water.

Nutrient build-up

Excess nutrients can cause imbalances in a pond. Good indicators of high nutrient status or a pond in poor health might be dominance by algae, duckweed or simply, rotting, oozing black mud with no plant growth.

Algae

Whilst unattractive and potentially harmful, algae are important members of a healthy, well-balanced pond

ecosystem, providing food for species at the lower end of the food-chain. There are many different types and species of algae which tend to present seasonal problems, depending on the pond type, but all indicate enriched water. Less than 5% algal cover should not have an adverse affect. There are three main algae types:

- Filamentous algae (multi-cellular 'blanket weed' which germinate in February and become established and dominate before other species can get a hold. As the algae plants mature they float to the surface forming unpleasant smelling algal mats of decaying algae.
- Planktonic algae (single-celled) which prefer organic, enriched turbid waters – such as those inhabited by duck or fish, making the water brown or green.
- Blue-green alga (single or multi-celled) which resemble spilt green paint on the pond surface.

Duckweed

Duckweeds are tiny free-floating plants consisting of one or two tiny leaves with little roots dangling off them. Like algae, they have their place in healthy well-balanced ponds. However, where they dominate, they tend to indicate heavily silted ponds or those with very deep leaf litter where higher plants cannot root – and often occur in very sheltered situations.

Sources of problems and nutrient build-up

Try to establish how an excess of nutrients have built up – a single pollution event or gradual build up? The source of the nutrients may be close to the pond (as in a septic tank overflow) or far away (as in agricultural rainwater run-off carried to the pond via a ditch). Investigate where the water which fills the pond comes from to see whether the water is picking up nutrients before it gets to the pond. A nutrient build-up may be associated with one of following factors:

Trees

Unless your pond is a long established woodland pond, trees can hinder plant growth in two ways:

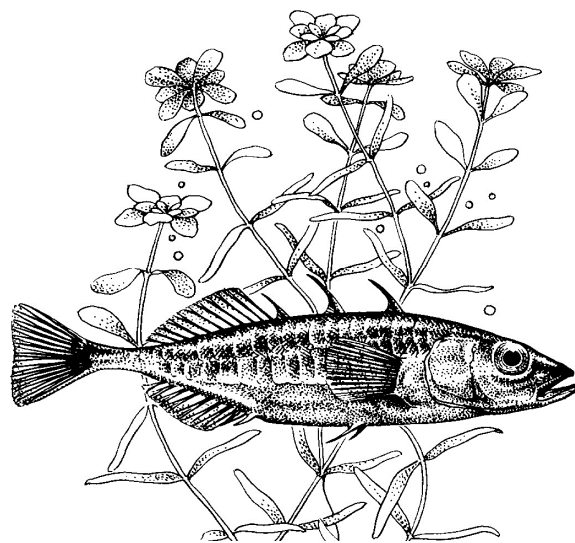
- Shading reduces available light for plant growth and makes the pond surroundings a colder habitat, making it a less attractive site for creatures such as frogs. As a guide, problems tend to occur if more than 20% of the southern side of the pond is overshadowed by trees, or if more than 50% of the total pond edge is overshadowed.
- Add to the nutrients in the pond, especially tannins released from rotting dead leaves which acidify pond water – some species, such as oak and sycamore, have a more adverse affect on the quality of the water than finer-leaved species such as willow.

Duck & geese

Whilst these birds have their place, they can create significantly impact on ponds and pond wildlife when present for long periods in any large numbers. They enrich the water with their droppings and stir up enriched sediment as they up-end and search for food, destroying plant communities and leading to algal blooms. Ponds are often left bare, murky and largely lifeless. Encouraging duck by feeding them should be avoided. (See factsheet on duck.)

Fish

Fish – even small numbers of tiny stickleback – can significantly reduce the wildlife value of a pond and effectively remove breeding great crested newt. Invertebrate-feeding fish (bream, carp, pike, perch, trout) can deplete insect populations, such as dragonflies and daphnia that feed on algae, and lead to an increase in algae. The cyprinids, especially the large carp, tench and bream, feed by sifting and stirring the bottom mud which causes turbidity which inhibits aquatic plant growth and destabilises the pond substrate to the point where the behaviour can completely eliminate aquatic plant growth. Short of really thoroughly draining and dredging a pond, total fish removal is virtually impossible. (See factsheet on fish.)



Stickleback

English Nature

Arable field edges

Pesticide and fertilizer often drift from field margins during application affecting delicate pond plants and invertebrates. Grass buffer strips that can protect ponds are now an option for farmers under agri-environment schemes.

Invasive non-native plants

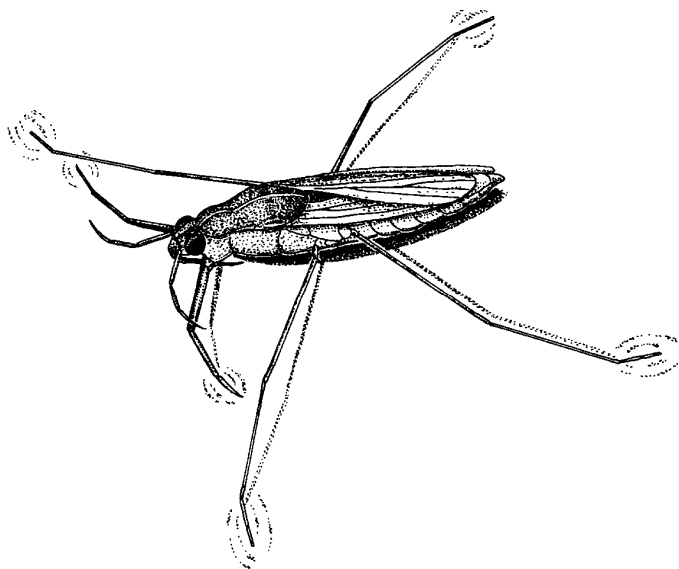
Several non-native plants, such as parrots' feather, fairy moss, Canadian pondweed, floating marsh pennywort and New Zealand pygmyweed, are sold at garden centres

as oxygenating plants (or have inadvertently got into pots of others) but can be extremely invasive, out-competing our native plants and providing little habitat for wildlife. Avoid introducing plants to ponds – they will soon colonise – by wind or long dormant seeds in the substrate. (See factsheet on invasive plant control.)

Ponds which dry out or have fluctuating water levels

Some old Suffolk ponds appear to dry up whenever there is a dry summer and others have water levels which drop steeply downwards every year and a great empty and unattractive muddy “beach” is left. Some insect species especially need this beach area and others, such as amphibians, beetles and plant communities can actually benefit from ponds drying out occasionally because their main predators are reduced, although amphibian larvae need a pond to hold some water until at least halfway through the summer. Restoring some naturally fluctuating ponds by deepening may not be the best management option.

A shallow pond with an average depth of 1m may lose 0.5m depth due to a dry summer - it may be good for the “beach margin species”, but in nutrient-rich waters this does effectively double the concentration of the remaining nutrients in the water and may lead to other problems such as excessive algal growth and unsuitable conditions for many desirable aquatic species. (See factsheet on ponds with fluctuating water levels.)



English Nature

Pondskater

Deep and shallow water

Very shallow water, ie less than 30cm deep, is where most of the wildlife is found. Plants tend to thrive in warm shallow water and aquatic species such as amphibians develop faster and survive into adulthood better when compared to deep ponds. However, they do become choked with aquatic or emergent vegetation or dry out annually.

Deep water, >1m deep, does not allow light to penetrate as well and remains cooler meaning that amphibians take considerably longer to develop to adulthood. However, the cooler water can help minimise algal growth in hot, droughty years, and provides a watering hole for lots of wildlife in dry weather.

Many ancient farm ponds are historically important as clay pits and changing their shape, water depths and bank profiles with heavy machinery can compromise their historic integrity. If in any doubt about restoration methods, advice should be sought from Suffolk County Council Archaeology Unit before embarking on pond work.

Pond restoration

Pond restoration for wildlife might involve

- Simple, subtle, slow and gentle changes in management such as changing the inflow to reduce nutrients entering the pond
- Coppicing, pollarding, tree felling, stump treatment or removal to let light into a pond
- Use of heavy machinery to de-silt, removing some or all of the nutrient build-up in a pond
- Ongoing gentle management to prevent problems re-occurring such as regular coppicing or regular removal of invasive vegetation

Manage trees and shrubs to maintain an open and sunny pond

Pond size will influence how many trees and shrubs can be left around a pond. Aim to keep 90% of the pond edges open and sunny to allow plenty of sun into the pond and for emergent plants such as water mint to grow in the shallow margins of the pond.

Avoid felling or removing old, historically important or landscape feature trees to open up a pond. It may be better to concentrate efforts on another nearby pond than to harm an ancient tree. Alternatively consider pruning just a few lower branches that cast the most shade and accept that regular leaf removal may be required to avoid the build up of leaf litter if the tree remains.

Coppicing pond margins in late winter could be done on a rotation of several years (say, one third every two years) on a large pond to ensure there is always some shrub growth, but on a small pond the edges may need flailing every other year to keep the pond open and minimise leaf litter.

To reduce the amount of coppicing required, yet provide some standing dead wood and useful system of tree roots next to the pond, consider treating stumps with a herbicide to prevent regrowth. Elsewhere, for young trees

and shrubs only, consider removing stumps when de-silting the pond.

Reduce aquatic vegetation

Regular, gentle thinning out of excess aquatic vegetation in nutrient-rich farm ponds every autumn might be valuable to reducing the progressive build up of nutrients such as nitrates and phosphates. By raking out submerged plants and leaving them on the pond edge overnight for small creatures to crawl back into the water, nutrients can effectively be removed from the water and avoids leaving the aquatic vegetation to rot down over winter, releasing nutrients back into the water to encourage blanketweed or other forms of algae. Aim to leave 25% of the pond dense with plants.

Vegetation should eventually be removed away from the pond to avoid the nutrients seeping back into the pond when it rots. Avoid dumping it on species-rich vegetation nearby.

Reduce invasive, emergent vegetation

Occasional removal of invasive, dominant species in the winter such as reedmace on an opportunistic or little-and-often basis is a good idea and will reduce the need to return for a bigger, more drastic restoration job later. If a digger is employed on the farm elsewhere for winter ditching, it is worth asking the operator to remove a couple of accessible bucketfuls of reedmace stands as this makes way for other less competitive emergent plants that provide good egg-laying opportunities for other creatures such as great crested newt.

Remove excess algae and duckweed

Algal blooms often come and go without management, and certainly in a new or recently restored pond, other plants will establish and often out-compete the algae. However some can get worse over time. Duckweeds/algae absorb phosphates as they grow, so removing some phosphates from the pond system, thereby reducing their regrowth unless more phosphates are regularly coming in. Consider the following:

- Net duckweed with a fine-meshed sampling net. This can be particularly effective in heavy wind when most of the duckweed is swept to one side of a pond.
- Grab, or twist a stick amongst and drag blanketweed when it is in its growing stages to remove large sheaves of it in one go. Avoid removing algae where great crested newt are breeding as their larvae live in the blanketweed. Rest the blanketweed overnight on the pond edge to allow creatures to return to the pond before removing it well away from the pond.

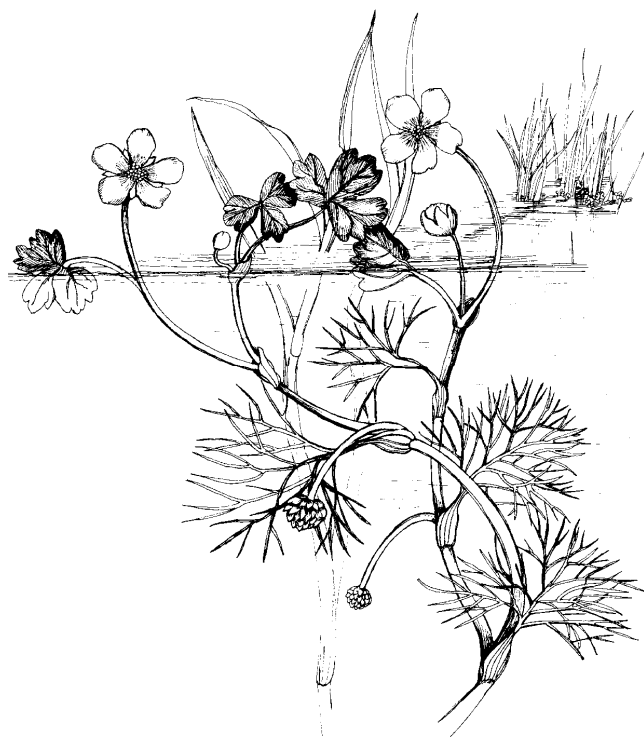
- Consider the barley straw technique to lock up the phosphates and nitrates in the water. (See factsheet on algae as this technique is quite critical to avoid worsening a problem!)

Dredge the pond bottom

The silt at the bottom of a pond is sometimes a lingering store of accumulated pollution or naturally occurring substances, which may prevent aquatic vegetation from establishing and lower the water quality. Usually the only practical solution on a farm pond scale is to de-silt in one phase. Consider timing to minimise damage to any wildlife in the pond:

- Post harvest/September for arable field edge ponds which are effectively dry or completely silted and shaded with little wildlife interest
- Between November and February for ponds where great crested newt might be present to ensure most have left the pond

To minimise damage to surrounding habitat and overwintering wildlife such as newts, aim to work with heavy machinery from as few places as possible. Silt should be removed carefully to avoid smothering species-rich vegetation nearby – ideally off-site onto arable stubbles, or spread thinly over recently coppiced scrub areas where the regrowth will quickly grow through the spoil.



Water crowfoot

**For further advice, contact Suffolk Wildlife Trust on:
01473 890089
wildline@suffolkwildlifetrust.org**