Avon Wildlife Trust

How to Manage Ponds For Wildlife

Made possible with Heritage Fund

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WEST OF ENGLAND Combined Authority

BRISTOL CITY COUNCIL

MY WILD CITY

About My Wild City

Imagine a city where whole streets and communities get together to transform gardens and open spaces. From planting for pollinators in our gardens to influencing the space around us, we can all help to make a city better for people and wildlife.

With support from The National Lottery Heritage Fund, thanks to National Lottery Players, we've been working over three years with Bristol City Council to focus on eight Local Wildlife Sites across the city, making improvements for wildlife and visitors, and encouraging everyone to get involved in enjoying and caring for these special wild spaces.

Together with local people and volunteers we've restored a historic drinking pond and delivered a 'Managing Ponds for Wildlife' training session at My Wild City site Stockwood Open Space. This document is a summary of the work carried out on the drinking pond and a series of next steps and resources to help you to create, enhance and maintain your own wildlife pond.

Why manage or enhance a pond for wildlife?

Whether found in a garden, a community nature reserve or part of an agricultural landscape, ponds are oases of wildlife. Even small ponds can support a wealth of species and collectively, ponds play a key role in supporting freshwater wildlife. One of the best ways of bringing more wildlife into an area, ponds can be very diverse, supporting similar aquatic plants to lakes, and even more invertebrates than rivers. The best ponds for wildlife have shallow margins with a fringe of vegetation and nearby plant cover for amphibians and insects with terrestrial (land-based) life stages. Adding a wildlife pond into a site is one of the best ways to boost biodiversity. They really are a power house - dragonflies, water boatmen, newts, frogs and toads, to name just a few species which depend on freshwater habitats. Even bats use ponds, swooping over to to catch food like midges and mosquitoes. Birds bathe and drink from them, along with mammals such as mice, voles, hedgehogs, foxes, deer and badgers! All living creatures need water to survive.

What is a pond?

A familiar feature of many field corners, village greens and gardens, a pond can be defined as a body of water (normally fresh water), generally small in size, ranging from one to twenty thousand square metres (or two hectares - equivalent in size to about 2.5 football pitches), and which holds water for four months of the year or more.

Many ponds are artificial and were originally dug for marl (a lime-rich clay spread on fields to reduce acidity) or to provide a water source for livestock. Village ponds were often created for washing off working horses. Some ponds have formed in bomb craters from WWII while others are ornamental, or have been created specifically for wildlife. Unmaintained, field ponds may only last around 100 years, as they gradually fill with silt - fine, sludgy mud that gets swept in by rain and settles at the bottom. Small ponds can be completely transformed in this way by a single spell of heavy rain. However, some natural ponds may be ancient: pools known as pingos were created when ice-hills, formed by trapped water freezing and expanding, eventually melted, leaving water-filled depressions; they may be up to 14,000 years old. Seasonally flooded depressions tend not to silt up (as the silt oxidises when dry).

There are thought to be around 500,000 ponds in Great Britain, plus around three million garden ponds.

Many ponds have been drained or neglected and have filled with silt and vegetation or stagnated under fallen leaves. Some ponds become choked by alien invasive plants such as New Zealand pygmy weed, which is often unknowingly introduced by people emptying ponds or aquaria. Because they are small, ponds are particularly vulnerable to contamination by pollutants that run-off in rainwater from agricultural land and roads. Recreational activities can also adversely affect ponds, such as allowing dogs to swim (which churns up the sediment), and feeding waterfowl (which can result in damagingly high populations and nutrient problems). Half a million ponds have been lost over the last 100 years and one in five remaining ponds are thought to be in poor condition. Initiatives are underway to try and restore lost ponds and create new ones that are not contaminated by alien plants or run-off.

What to look for?

In early spring, look for glutinous masses of frog spawn, or strings of toad spawn. Both common frog and smooth newt colonise garden ponds. Newts are best seen just after dusk in the early summer by scanning the pond margins with a torch – check also for Daubenton's bat, sometimes seen skimming low over the surface at dusk.
Summer is the best time for pond-dipping – expect water beetles, diving beetles, water fleas, dragonfly nymphs, caddisfly larvae and aquatic snails. Look out for the translucent, primitive-looking fairy shrimp in seasonal pools a few weeks after they have re-filled, usually in autumn or winter. In acidic heathland ponds, look for the large raft spiders that sit on the water surface and can catch other invertebrates or even small fish.

Common Frog

Great Diving Beetle

Daubenton's Bat

Raft Spider

Cadis-Fly Larvae

Smooth Newt

The Drinking Pond at Stockwood Open Space

Before

The drinking pond at Stockwood open space lies in a corner of a large swathe of grassland lined with scrub and woodland. The pond had not received any management since 2000 and had become heavily shaded by surrounded hawthorn, blackthorn and willow. Silting succeeded to the point of grass growth across all depths and it held no water for much of the year, with the deepest portion showing cracked heavy clays. An unofficial but well used footpath ran along the northern bank of the pond and was heavily compacted and very uneven with holes and tree roots. Bank slippage and erosion had caused the pond edges to become undefined.

Historical surveys (1999) had found records of great crested newts breeding in this pond, prior to its permanent drying out, however a presence/absence survey carried out in 2019 recorded no GCN's. There is also stone lined cart dip pond nearby, where GCN's were found to be present in 2017. The restoration of the drinking pond would contribute to the long-term survival of great crested newts in the area by re-establishing a functional pond network, allowing newts and other amphibians to breed and disperse freely between them.

Pond Restoration

After tree pollarding and some scrub removal, the work was focused on reprofiling the pond to include a variety of depths, with a deep middle section that allows male newts the open space to perform their breeding dance, and shallower areas around the edge that encourage aquatic plants to grow. The plants provide cover for invertebrates and egg laying sites for newts and frog spawn.

The work also involved creating two 'hibernacula', piles of cut scrub and clay that are the perfect habitat for hibernating slow worm and newts (pic 3). Ideally these piles should be close to the edge of the pond for ease, but not so close that material ends up back in the pond through anti-social behaviour or degradation. Hibernacula can be capped with material from desilting work to minimise public interference and arson as well as improving their refugia value.

We have also installed a new set of gates and fence around the pond, this is to improve the safety aspect, and to discourage any loose dogs from swimming in the pond.

How It's Going - Summer 2023

Left: Plant-life around the Drinking Pond Right: Toads, Stockwood Open Space, C. Ken Hadlow

The drinking pond now supports a diverse variety of wildlife. Toads have bred in the pond this Spring (2023), and great crested newts have once again been recorded. The water level of the pond is low in the Summer months, it is a myth that drying out is disastrous for pond wildlife. Temporary ponds are important for wildlife because the occasional drought gets rid of fish (which are a major predator of insects and amphibians) allowing other species to thrive.

Oasis Academy Pond Planting

The My Wild City team worked with students from Oasis Academy Brislington, a school which backs onto the Open Space, to improve the drinking pond for wildlife. We planted over 15 different wildflower species from Grow Wilder which thrive on pond edges, such as purple loosestrife, marsh marigold and ragged robin. To our surprise, a subsequent survey revealed a great crested newt had used the newly planted watermint to lay their eggs on! All three UK species of newt have now been recorded on the site since the restoration and planting. Adding native plants in and around a pond is great for wildlife. They create shelter above and below the water, offer sites to perch and rest, provide food and spaces for newts to lay their eggs.

Plant Preparation, C. Hannah Lind

Great Crested Newt, C. Rosie Jackson

Great Crested Newt Egg (green dot on the left, pond snail eggs on the right) C. Rosie Jackson

Find out more about newts and how to do a pond survey by clicking here or searching https://freshwaterhabitats.org.uk/wp-content/uploads/2015/03/Amphibian-survey-methods1.pdf.

Please remember - great crested newts are a protected species and can only be handled with a license. Contact your local amphibian group to find out more.

We used the drinking pond as the location for a 'Managing Ponds for Wildlife' training session guided by John Dickson from Somerset Amphibian and Reptile Group.

Where local residents, Council staff, community groups and land management contractors came together to learn more about caring for these biodiverse fresh-water habitats.

Frog, Stockwood Open Space, C. Ken Hadlow. Session Photos C. Sophie Bancroft

For top pond management tips, you can find John's hand-out notes on the next few pages...

Principles of Pond Management - Part 1

Management of ponds requires an understanding of how the process of succession proceeds in ponds and how water quality is stabilised in a pond.

Succession:

From their inception, ponds progress through a predictable series of successionary stages eventually returning to dry land. The principle drivers of succession in ponds are silt deposition and removal of water by transpiration, primarily by trees.
The early stages of succession, before the pond matures, are usually characterised by heavy algal growth, particularly blanket weed and duck weed. Eventually, macrophytes, both oxygenators and marginal plants, colonise the pond and begin to compete with the algae for available nutrients, reducing algal growth. In time, equilibrium is achieved between the macrophytes and the algae and a period of stability ensues: the mid-succession phase.
Gradually, however, silt builds up in the pond as the plant life dies back each year and leaf litter accumulates and breaks down. This reduces depth of open water enabling marginals to spread across the pond creating dense rhizome mats, further reducing depth and squeezing out oxygenators. The pond is now entering the late stages of succession.
Left to its own devices, the additional die back from the increased volume of marginals accelerates the accumulation of silt. Furthermore, trees will find it easy to take root in the shallow water and rich silt, drawing the remaining water from the depleted pond and increasing silt accumulation further. Soon after this the pond becomes marsh, and later still returns to dry land.
Maintaining a pond is in part an exercise in arresting the process of succession at your preferred phase, usually the mid-successionary phase.

Water Quality:

Water quality consists of two things: chemistry and clarity. Chemistry is the most important of these although if chemistry is stable, clarity is usually good, perhaps with some seasonal variations.
The nitrogen cycle in ponds is primarily responsible for maintaining water chemistry, and is regulated by two types of bacteria, Nitrosomonas bacteria and Nitrobacter.
Ammonia is produced as organic matter decays, or animals excrete waste materials in the water. Ammonia is highly toxic to living organisms and needs to be removed as quickly as it is produced. Nitrosomonas bacteria are able to metabolise ammonia converting it to another nitrogenous compound, nitrite. Nitrite is less toxic to life than ammonia, but is nevertheless

toxic, and likewise needs to be removed before it builds up any significant concentration in the water. Nitrobacter is able to metabolise nitrite, converting it to nitrate. Nitrate is often referred to loosely as 'nutrients' in a pond as nitrate is essentially plant food. Nitrate is taken up by the aquatic plants, removing it from the water, but when those plants die and decay they then release ammonia, closing the cycle.

The cycle is tightly regulated. The concentration of Nitrosomonas bacteria is correlated to the amount of organic decay, and the amount of plant (and algae) growth is correlated to the amount of nitrate available in the pond. So long as the amount of decaying matter remains reasonably stable, equilibrium is reached, although there may be small, natural, seasonal fluctuations, particularly in early spring as the pond awakens from winter dormancy. This balance, once established is very stable. However, it can be disrupted.

Both nitrosomonas and nitrobacter are aerobic bacteria, only able to function in the presence of oxygen, which naturally occurs in considerably lower concentrations in water than it does in air. The process of decay can also only occur in the presence of oxygen and is a significant consumer of oxygen in a pond. Therefore a large and rapid spike in the amount of decay in a pond can utilise all the available oxygen in the pond, resulting in a phenomenon known as eutrophication: the complete deoxygenation of the pond and the subsequent death of living organisms, including that of the bacteria themselves. Consequently, management of a pond is largely about reducing the amount of nutrients in the water.

The surrounding land is as important as the water body itself in preventing eutrophication. A pond located in an area of intensive agriculture where the soils are maintained for high fertility will experience a spike in nutrients with each heavy rainstorm, as nutrients run off the surrounding land into the pond. Ensure that there is a sufficient buffer zone (>10m wide) of unmanaged rough grassland or similar habitat around the pond to absorb nutrient run off before it spills into the pond. If run off cannot be avoided, a strategically placed bund may divert it around the pond.

Management and Maintenance:

All of the above informs our management of ponds. Key to successful management is 'little and often'; large scale intervention which drags the pond back to earlier phases of succession will alter the equilibrium resulting in increased algal blooms, potentially causing eutrophication. The first principle is to reduce, as far as possible, the amount of organic material decaying in the pond , both to reduce the nutrients in the pond but also to reduce

silt deposition. Marginal plants dying back in autumn can be cut and removed to prevent them falling down into the water, while trees should be excluded from the pond area to reduce leaf fall into the water.

The second principle is to provide good conditions for macrophytes, particularly oxygenators, to grow. This means allowing ample light to reach the pond, once again by excluding trees from the vicinity of the pond, particularly the southern aspect.
If the pond is to be managed as a wildlife pond, fish must be excluded. Fish turn the silt reducing oxygenator growth and reducing the clarity of the water, as well as impoverishing the faunal community by predation. If the pond is to be a fish pond, specialist filtration equipment may be required to substitute for the equilibrium reached in a wildlife pond. Periodically, silt will need to be removed to maintain open water. If you have excluded excessive leaf fall and have been removing the annual marginal vegetation as it dies back each autumn, then this will probably only need to be done once every decade or so in a discrete pond, i.e. one unattached to any stream or moving water. This should be done gradually; removing too much silt in one event will revert the pond to an earlier stage of succession and cause subsequent algal blooms. Remove silt on a two/three year cycle. This 'light touch' maintenance regime will ensure a healthy pond arrested in a mid-succession phase.

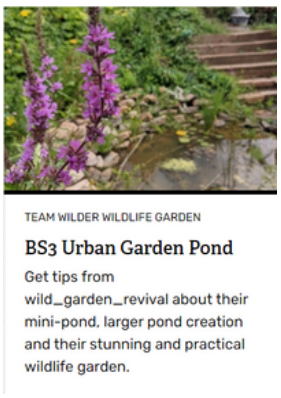
Clarity of the water will fluctuate seasonally, but is not important. As the pond emerges from dormancy in spring the macrophytes take a little longer to respond to the additional light than algae will. Often at this time the water will turn pea green. Green water is still chemically stable water, the green colour is caused by microscopic algal cells free swimming in the water column. Usually this period is shortly followed by an increase in a species of crustacean called Daphnia, which thrive on these algal cells and they will quickly restore clarity while themselves providing a feast for all the other animals in the pond.

This text belongs to John Dickson of The Reptile and Amphibian Group for Somerset.

Tops Tips and Resources

For a comprehensive guide to managing and maintaining a wildlife pond, Freshwater Habitats Trust has a wealth of resources available to download from their website. From risk assessments, managing trees around ponds, to conducting a pond survey.
Pond management overview
https://tinyurl.com/47vzaycz

For advice on creating a mini wildlife pond in a garden download The Wildlife Trusts 'Wild About Gardens' Ponds leaflet - complete with pond plant species lists and a handy wildlife ID sheet!
Wild About Gardens Ponds Leaflet
https://tinyurl.com/3k82rat8



For inspiration from local people doing amazing things for nature including creating ponds, across Bristol and the Avon region check out the Team Wilder resources webpage.
Team Wilder Ponds
https://tinyurl.com/5ehhz5cn

Pond creation and restoration workshop

Not a fan of reading?! Listen to this online talk by John Dickson from the Somerset Reptile and Amphibian Group and learn how to create or restore a pond to maximise its value for wildlife.
Pond creation and restoration workshop
https://www.youtube.com/watch?v=uLDG-VgDDSw