Pond Conservation
For Life in Fresh Waters

Frequently Asked Questions

Falling water levels and leaks

In summer, water levels drop dramatically in my large pond - Is this bad for the wildlife?

Water level fluctuation in ponds

Many pond guides say that a healthy pond needs 'stable' water levels - and because of this people often worry when their pond's water levels fall in summer.

In fact, surveys show that, in natural ponds, a water level drop of at least 0.5 m is typical in summer.

These falling water levels create one of the most biologically rich areas of a pond - the drawdown zone.

Why is the drawdown zone so important?

Almost all the marginal plants start their life in the drawdown zone - because their seeds need exposure to air before they will germinate. This includes tall plants like Greater Pond-sedge and Bulrush, and also low growing herbs like Water Mint. Many of Britain's rarest plants are particularly characteristic of this zone, including Starfruit and the tiny fern Pillwort.

Pond animals use the drawdown zone too: some dragonflies such as the Southern Hawker often lay their eggs in the dry drawdown zone, perhaps because it is free from fish predation. If the drawdown zone is muddy, or has short vegetation, it's used by a wide variety of semi-terrestrial insects like rove beetles and long-legged flies, as well as by small mammals like voles and shrews when they go hunting for food.

Ponds that dry out

One of the biggest myths in pond management is that drying out is always disastrous for wildlife. Perhaps the main reason for this myth is that it can be hard to believe how easily many pond plants and animals survive, and even benefit from, periods of drought.

Surprisingly, about half of all freshwater plants and animals are tolerant of periods of drought. Why? – well, through geological time, many ponds created by natural processes, such as tree-fall pools or meander cut-offs, will always have been shallow and susceptible to drying out in drought years. In addition, most ponds gradually fill in with sediment, ensuring that their mature stages will often be associated with periods of summer drying.

It therefore not so surprising that:

(i) the majority of species inhabiting shallow ponds should be well adapted to temporary drying out;

(ii) although some species may be unable to survive droughts, others will exploit the opportunities it creates.

Studies of ponds that have dried out confirm this (see Box 1).

Adaptations of freshwater plants and animals to drought

Because drought is a natural and broadly predictable phenomenon, a very wide variety of freshwater species are able to cope with periods of intermittent drying.

Indeed some aquatic plants appear to grow better the year after a pond has dried out, perhaps because of their germination needs.

All amphibians except the Common Toad can tolerate occasional droughts, especially if drying occurs late in the year when the tadpoles have emerged.

There are also a wide range of invertebrate animals particularly associated with ponds that dry out from time to time. These include damselflies such as the Scarce Emerald and Scarce Blue-tailed Damselflies, together with snails, such as the Button Ram's-horn, and many beetles and caddis-flies.

The adaptations which help invertebrates to survive droughts are varied. Bugs and beetles can fly away temporarily; some species can dry out and still survive; others burrow, and many live for a

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year or less and wait out the dry phase as resistant eggs.

In addition, a surprising number of aquatic animals like snails, shrimps and caddis-fly larvae can survive for quite long periods in damp mud when the water is gone and the pond has begun to dry up.

It is often said that dragonfly larvae need water in order to complete their development and emergence. However, careful observations show that several species can survive periods of drought and may even emerge the same year (see Box 2).

Of course some individuals and species will perish during droughts, but this may not necessarily be detrimental to pond wildlife in the long term.

Most fish, except perhaps stickleback (as eggs), are unlikely to survive drought. However, for the rest of the pond's wildlife this can provide a real boost.

The loss of top predators may therefore be compensated for by increases in the number of other plants and invertebrates in the following years.

Managing drying ponds

Panic measures to refill ponds which are low in drought years are very rarely necessary for wildlife. In particular, filling ponds with water from the mains is undesirable because in most parts of lowland Britain it will usually add unwanted nutrients, leading to problems in future years.

In general with drying ponds, ensure that the drawdown or drying out is due only to the weather. If not, then further action is unlikely to be needed; the pond will soon refill with the autumn and winter rains.

It is a matter of personal choice whether to let a garden or school pond dry-out. If well designed, a small garden pond should be able to support a good drawdown zone. However, lined ponds may have insufficient depth of sediment to enable animals to survive well if the pond dries out completely. Normally the summer will also be the time when most use is made of garden ponds. A dry pond will have a rich variety of marginal plants, ground beetles, semi-terrestrial bugs, spiders and groundhoppers, but will not be ideal for pond dipping! Establish a rainwater butt to avoid constantly topping-up garden or school ponds with tap water.

Box 1 The effects of drought on Ruscombe Pond, Berkshire

Ruscombe village pond dried out in 1990 for the first time in at least 15 years, leaving no surface water and a layer of mud which eventually formed a semi-solid crust.

Quite by chance this pond had been surveyed in the year before it dried out.

Surveys before, and one year after, the pond dried up showed no evidence of change or damage to plant or animal communities. All the 31 wetland plant species survived the drought, including aquatics such as Curled Pondweed, Common Water-crowfoot and White Water-lily.

The pond's aquatic invertebrate community was also little affected. Surveys recorded the same number of invertebrate species before and after drying out. Uncommon animals (including the Red Data Book water beetle *Hydrochus elongatus* and the Great Crested Newt) were present in similar, or greater, abundance in the year after drying.

Box 2. Drought - try not to worry!

As long ago as the 1950s in a study of the water snails of 172 Cheshire ponds, Nora McMillan found that no snail species were eliminated by occasional drying out.

However, she did find that, in some ponds, snail species *were* lost as a result of pond management!

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Water levels in our village pond are lower than they used to be – I think it has a leak

There are many reasons why the water levels in a countryside or village pond become permanently lower.

A common assumption is that the problem is a clay-lined pond which has sprung a leak. In most cases this proves not to be true. Clay-lined ponds are found in chalk and limestone landscapes, but very few countryside and village ponds have a puddle clay liner. It is much more likely that the pond has just been dug into underlying clay geology, not specifically lined with clay.

The most likely reason for pond water levels falling is that less water is draining into the pond. This could be due to:

i) less surface water running in through grass or vegetation, or urban surfaces – anywhere uphill of the pond

ii) less water from ditches, drains or streams

iii) lower groundwater levels i.e. water in saturated rocks under the ground surface.

If the pond has a sand or gravel base, it is likely to be fed by a groundwater aquifer[1] If so, a fall in the aquifier[1] level is the most likely reason for the water level to drop. This is not uncommon in Britain and has many causes, including drought or commercial water abstraction. New building and urban areas many miles away can also reduce regional groundwater levels, because the water runs into drains and rivers, rather than seeping into the ground.

Clay based ponds are often affected by the amount of water draining in off the surrounds. So, if land use around the pond changes, or surface water is blocked (by earth piles or new ditches uphill of the pond for example), pond water levels can fall.

[1]Aquifer: any geological formation which contains or conducts ground water especially. one that supplies the water for wells, springs, etc.

What to do?

Dealing with falling water levels in countryside ponds is not easy.

The easiest option is to learn to love your new shallower pond! The lower water levels will not inevitably be bad, and may well benefit pond wildlife. The bare, muddy pond banks will rapidly re-vegetate, and if the pond edges are now too steep, they can be re-profiled to make them shallower.

Other options for getting water into ponds will need more effort, and because pond water source issues can be complex, it would be worth considering getting professional advice from a hydrologist to give you an expert opinion before taking action.

Topping-up: An obvious option to increase water levels is to add water to the pond, though this is only viable in limited circumstances. You can't top up a groundwater fed pond – because the water just seeps away into the regional aquifer. There are cases of sand-based ponds being topped up with hundreds of gallons of water which has gone by the next day!

If the pond is clay based, topping up may be possible, but getting a good source of water can be difficult.

Don't divert road run-off, yard water, stream or ditch water into ponds – they are almost always full of pollutants and silt which will build up in the pond, reducing water quality and wildlife value. Cleaner water, including roof water, is a better possibility, but the amount may be small and may make little difference to water levels if the pond is large.

***Deepening** the pond* is the final option. This could be either by dredging out bottom silts that have accumulated over time, or digging out the pond base itself. In either

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case, however, it's well worth getting advice from a hydrologist first.

This is true even with silted up ponds - some ponds are self-sealed (their accumulated bottom sediments help prevent water draining out), so dredging these can cause water levels to drop further. Similarly, if the geology in the area is variable (e.g. thin layers of clay and sand, one of these layers could be breached by deepening, which might drain the pond.

Key points
1. Consider whether the falling water levels are really a problem – shallow water can be good for wildlife.
2. If you are worried and unsure, it's often best to get a hydrologist to give you specialist advice on causes and solutions.

My garden pond liner has a hole – help!

1. Finding the leak

If your pond has pumps or filters, check the seals and pipework first for leaks. Fountains or cascades are also likely culprits, often because overspray means that water is being lost from the pond's circulation system.

To locate a leak, first wait until the falling water level stabilises. It will ultimately stop just below the level of the leak – like a bath full of water standing at the over-flow level. An exception is during periods of hot weather, when evaporation may cause pond levels to drop below the leak point. If evaporation is a potential problem, top-up the pond and wait for the water level to re-stabilise.

Having narrowed the search down to the area just above the water line, look carefully around the pond edge. You may need to remove vegetation, or clean areas to see the liner surface more clearly. With flexible liners like butyl, don't forget to check stress points around and under liner folds.

2. Mending leaks

Flexible liners

You can buy materials for resealing most PVC and Butyl liners, but since many liners are guaranteed for 5 years or more, check your receipts – you may already be covered

If you have a record of the liner manufacturer or retailer, you can go back to them to find the products recommended for your liner type. However, a wide range of repair materials are easily available from on-line retailers and shops, including many larger garden centres.

Undertaking repairs is relatively easy, and will either involve applying a patch with water-resistant glue or a strip of flexible high-adhesive tape.

Most repair products are moderately expensive however, and you may want to consider replacing the liner if it looks in poor shape (cheaper liners often crack with age and exposure to light)..

You can recycle your old liner as part of the underlay for the new liner.

Pre-formed fibreglass ponds

Locating holes in preformed ponds can be tricky. But once identified they can be mended using specific repair kits available to seal fibreglass and plastic-based pond types.

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Concrete ponds

There are a range of proprietary products available for sealing obvious cracks in concrete ponds. Some can be applied wet, so that the pond doesn't necessarily need to be drained.

However, small cracks and holes can be difficult to locate in a concrete pond, and may be numerous. In many cases it is necessary to drain the pond and either re-render it or apply a waterproofing sealant

Clay, bentonite and geotextile linings

Larger garden and countryside ponds are sometimes lined with clay, or proprietary clay products like the swelling clay, sodium bentonite. More frequently, these days, bentonite is laid sandwiched between geotextiles (bentomat or rawmat).

If the clay liner has been recently installed, go back to the manufacturer for analysis and repairs. If the problem is a hole, and this can be located, repairs can be as simple as placing a patch over the breach. In older ponds originally lined with puddle clay, it is sometimes possible to use powdered bentonite clay to plug leaks, but if damage is extensive, the pond will need to be re-lined. If clay or bentonite is your choice, once again use an experienced contractor to do the work.

I've got to drain-out my garden pond – how can I save the wildlife?

Here are some of ways to minimise damage to the existing wildlife communities if your garden pond needs to be drained-down for a period of time..

Leave a little water

If you can manage it, the best option is to leave at least a few centimetres (1 inch) of water in the bottom of your pond. Most native wildlife will survive for days or weeks in just a little water. Drying-down is a very natural thing for small ponds to do, and most species in a garden pond will be well adapted to surviving in shallow puddles. Fish, however, will need to be re-housed.

Rescue and self rescue

If the pond needs to be completely drained, you can do a couple of things to help the existing inhabitants.

1. Let animals fly off. Most adult water beetles and water bugs (like backswimmers) can fly in warm weather. So, through the summer months, if you first draw the pond down to a very low level(more or less damp mud), and *leave the pond for a day*, many of animals will fly-off to find new homes.

2. Provide temporary accommodation. You can save some of the pond animals whilst you drain the pond by creating temporary mini ponds. The larger the containers the better: an old children's swimming pool filled with a few inches (10 cm) of water or plastic storage boxes work well, or you can mock-up a mini pond by lining wooden crates with thick plastic sheeting. Fill the containers with pond water rather than tap water, and make sure that there are plenty of plants in the water, so the animals can find shelter and food when you transfer them to your mini-pond. The plants may also have eggs attached, since many animals including damselflies, lay their eggs on and in plants.

If you want to save additional plants from your pond, most aquatic plants will survive for long periods in buckets or other plastic containers, as long as they don't dry out completely. Marginal species can be dug

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out and their roots kept wet in buckets or plastic refuse sacks. In sunny weather, keep them shady.

If you have frogs or newts in your pond, any adults you come across can be removed and placed in a dark, damp area in your garden (such as a log pile), as they will be fine out of the water. Tadpoles or newtpoles can be placed in your temporary pond; they will be happiest with some plants to hide among. Make sure there are shallow areas or rocks emerging from the water surface where the adults can sit. And have a ramp or other structure to enable them to climb out of your container if they wish. Please note, if you have great crested newts in your pond you are not legally allowed to move them or change their habitat without a license.

The best time of year

There's no best time of year to drain a pond down: animals at different life-cycle stages are in there all year round and, whenever you do it, some will suffer more and some less.

However, if you are interested in particular species, this might influence your decision.

Late summer is likely to be a good time to drain ponds for water beetles and bugs, because most adults can easily fly away in warm weather,

Autumn is often preferable to help insects like damselflies, and amphibians like frogs and newts, since most young will have emerged from the pond.

However, if you have fish, avoid warmer summer months when oxygen levels in the water will be lower and the fish more susceptible to stress from handling and being moved to another habitat.