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ISBN 978-1-84754-009-6

Catalogue code NE27

Written by Dr Steve Head. Designed by RR Donnelley

Front cover image: The kingfisher is an unlikely visitor to most ponds but can turn up almost anywhere near water. Chris Gomersall

Garden ponds and boggy areas: havens for wildlife



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Water forget-me-not. Chris Gibson/Natural England

Why have a garden pond?

Most people are fascinated by water, and a garden pond is an excellent way of having it close to home. Garden ponds provide beauty and interest, and if well designed can be of real benefit for wildlife.

Ponds and biodiversity

England is damp and cloudy, and naturally full of ponds, wetlands and the plants and animals they support. But the drive to intensify agriculture has hit hard. By 1890 land drainage had reduced the number of ponds to about 1,250,000: today only around 400,000 remain.

Most of these ponds were man-made: created as drinking places for cattle, or to store water for industry – iron foundries, mills and the like. Although some ponds are in good condition, many are now polluted by run-off from roads and agricultural fields. Others are changing naturally through lack of management and becoming overgrown by trees or filling with silt. While still important for many species of wildlife, these ponds rarely contain an abundance of common species.

Garden ponds help to reduce this loss. Few will be suitable for endangered or highly specialised freshwater species, but they can be a real haven for many others. For example, frogs today are certainly doing better in suburban gardens than they are in much of the wider countryside, where suitable habitat no longer exists. As well as



Top: Frog with reflection. Andy Sands
Bottom: Starling. Paul Keene

providing a refuge for many freshwater plants and animals, a well-designed garden pond can be valuable for other wildlife too. Birds drink and bathe in the shallow margins, or eat the autumn seed heads of reeds. Ponds will attract



Formal ponds like this one are not built with nature in mind. Bob Gibbons

insect life which, in turn, will provide food for creatures such as house martins and bats. If you want to see plenty of wildlife close to home, put a pond in your garden.

Ponds and garden beauty

Ponds can look marvellous in gardens. They create a natural, peaceful atmosphere, and the reflections from the water add brilliance, colour and movement. A pond – with an attached bog garden if possible – allows a greater variety of plants to thrive in your garden, and even in the driest summer will remain a lush and refreshing oasis. The birds and insects a pond attracts animate the summer garden, and there is joy and fascination in watching the character of a pond change through the seasons. For older

children, there can be few better introductions to the natural world than discovering the extraordinary wild creatures that lurk in and around garden ponds.

Formal ponds, fish and exotic plants

Formal garden ponds are rarely good for wildlife. They are often concrete, with vertical sides and overhanging flagstone surrounds. These steep sides make them dangerous for small mammals such as hedgehogs and even cats and small dogs may fall in and be unable to climb out. Frogs and toads can get trapped in these ponds, and may drown once they grow past the tadpole stage.

If you already have a formal pond there

are many ways in which you can make it more wildlife friendly, see Frequently asked questions, page 21.

Many people want to keep fish in their pond. Unfortunately, fish often dig up bottom-rooted vegetation and most will eat tadpoles and other pond animals. If you regularly feed pond fish, the nutrients added to the water will encourage green algae and blanket weed that can rapidly smother a pond. Most ponds with large fish need to have expensive pumps, filters and aerators, all of which may be disruptive to wildlife. Most fish just don't mix well with wildlife so it may be best to exclude them from a wildlife pond. If you want both, one answer is to have two ponds, one mainly for fish and the other for wildlife.

Some gardeners add exotic plants to

their ponds. These will not prevent interesting native animals colonising a pond, but native plants normally support a greater variety of invertebrates which, in turn, will attract a greater variety of other wildlife. For this reason wildlife ponds should contain mainly native plants. There is a wide choice and many are very attractive. (See Native plants for your pond, page 12.)

Siting your pond

Take some time to choose the best site for your pond. Once dug, it can't be moved! If it can be seen from the living room or kitchen, you'll be able to watch birds, bats and other visitors from the comfort of your home. If the pond is away from the house, it may attract more timid species. Perhaps



Even very small ponds can be rich in wildlife. Bob Gibbons

you'd prefer to plan your garden so the pond is a surprise hidden in a private corner. Mark out the outline of your proposed pond with canes and see how it will look before you start digging.

Aim to have part of the pond in full sunlight. This allows the water to warm up quickly in the spring, so encouraging plant growth. Some wildlife species prefer shaded water, but avoid digging a new pond near a large tree as you may damage its roots. Worse, new roots may penetrate your liner, and your pond may fill with leaves in the autumn.

Size

How big should it be? This is up to you and your budget. The pond should be in scale with the rest of your garden – even tiny ponds can hold a lot of wildlife – but bigger ponds mean more

plant species and the more species you have, the greater the variety of animal habitats they will create. However, doubling the dimensions of your pond means you'll be paying four times as much for the liner, and disposing of eight times the volume of soil!

If you have the space, an excellent arrangement for wildlife is to have one larger pond, several shallow small pools and a bog garden area, allowing some pools to become muddy or dry in the summer. This variety of habitats will ensure a great diversity of species.

Depth

Garden ponds needn't be deep. Most pond animals are found in the shallowest water – a couple of centimetres deep. Deep open water is the most dangerous habitat for small animals, especially if fish are present – so maximise the shallows. For a



Green woodpecker. Chris Gomersall. Right: The cuckooflower is one of the main food plants of the orange-tip butterfly. Chris Gibson/Natural England



Water boatman *Corixa punctata*. Bob Gibbons. Right: Bogbean. Chris Gibson/Natural England

wildlife pond, 40 to 50 cm is deep enough, and will mean much less soil to remove.

Water

A clean water supply is crucial. If water is contaminated with nutrients, you will struggle to keep the water clear as algae builds up. If your pond is on a slope or in the bottom of a hollow, it will fill from rainwater running off the land around it. For this reason don't apply fertiliser to ground above a pond. Also, don't leave this ground bare, as rainfall will wash nutrient-rich silt into your pond water.

Most people fill their ponds with tap water. This is easy – but rather wasteful. Tap water also often contains high quantities of the nutrients that encourage algal growth. The best

possible source of water is rain. Siting your pond near a rainwater butt (filled by run-off from guttering) means you can easily siphon water from the butt to the pond using a length of hosepipe. Alternatively, you may be able to divert water from a gutter's downpipe directly into the pond.

Margins

The most important design element of your pond is the profile of the sides. Make sure there is a large shallow 'shelf area' where the water is about 1 to 15 cm deep. Water plants will flourish in this zone. The margins should be very gently sloping (in some places at least) so they merge naturally with the land. Ideally, create a 'drawdown' zone, a shallow area you can cover with gravel and round stones to form a 'beach'. Flooded in winter, it will partly dry out

in summer, making a fabulous habitat for many insect species, and a great bathing area for birds. The gravel will protect the exposed liner from the sun.

Shape

What shape should the pond be? Straight edges look unnatural and should be avoided. The pond margin is often the part most-used by wildlife, and creating a wavy-edged oval-shaped pond will maximise the size of this area.

Building your pond

- You can make a pond in any month but early autumn is perhaps the most practical season as the ground is neither too hard, dry nor cold.
- You don't want to put a spade through an underground pipe! Check your site for evidence of

buried cables or pipes. You can usually work out where the drains run by the position of their inspection covers.

- Waterproofing. You can buy rigid preformed pond liners made of plastic or fibreglass, but some of these don't have the gently-sloping sides that animals need to come and go easily. Some gardeners line their ponds with concrete, but this is a major undertaking, and can be very expensive. The best solution is to use a flexible liner made of butyl or EPDM rubber, preferably one guaranteed for 25 years. Don't be tempted by cheap polythene liners as they often split or puncture within a couple of years.
- How big a liner do you need? Measure the greatest length and width of the hole and then the depth. Add twice the depth to both

of the other dimensions. For example, if the length is 3 m, the width 2 m and the depth 0.4 m then you need a liner 3.8 m long and 2.8 m wide just to cover the hole. You need also to allow for extra liner so that the edges can be buried in the surrounding soil.

- When you have dug the hole, remove any sharp projecting stones or roots that could puncture the liner. This is time consuming, but essential. Locating and repairing holes later is extremely difficult! Line the hole with a 2.5 cm layer of

For large and ambitious projects

Most garden ponds don't need planning permission. But if you are making a very large pond, if it is close to a boundary (especially if this is a road or footpath) or on agricultural land, contact your local planning officer and ask for advice.

If you are going to take water from a river or stream or discharge water into one, you will require a licence from the Environment Agency.

You must also consult the Environment Agency if your garden is on the flood plain of a river, especially over the removal of spoil.

Ponds and safety

It is essential to plan your pond with safety in mind. The following steps will help to reduce risks for young children and pets:

- Keep the pond shallow, and have a wide, very gently sloping margin all round.
- Have plenty of marginal plants, especially where sides are steeper.
- Don't let the pond surface become completely covered with duckweed or other floating species. This can make a pond look like an area of flat ground and encourage children (and dogs) to walk into it.
- Fence the pond securely. The fence should be at least 1.1 m high, and with close vertical posts that can't easily be climbed or squeezed between. However, make sure an adult can get over, or through, the fence quickly in case a child somehow manages to get past.
- Strong plastic or metal meshes can be used to 'cap' a pond, but these are only really appropriate for smaller ponds. They must also be properly installed so children can't get under them.



Pond watching. Bob Gibbons

damp sand as further protection, or use a fabric layer. Old carpets cut to shape will do, although they will eventually rot down and become ineffective. Alternatively, buy thick polyester matting from a lining supplier. If you have created a beach area (see Margins page 7), it's a good idea to put a double layer of liner underneath it. This will help protect this exposed area from people's feet and dogs' claws.

- What to do with the soil? A pond 2 m by 3 m and 0.5 m deep in the middle will create around 2 m³ of loose soil. If the garden is on a slope, use some of this to ensure the sides of the pond are level all round. Many people use surplus soil to make a rockery or an earth bank nearby, and these features can be great winter refuges for amphibians. If you make a rockery, use materials from a sustainable source (not rain- sculptured limestone, for example), and if you create a bank, plant it to provide cover all year round.
- Digging is hard but satisfying work. Digging with a spade and fork makes it easy to make small modifications and adjustments to your design as you go along. However, for big ponds you might have to hire a minidigger or approach a contractor for a quote. A digger and its operator can do a huge amount in a day for a modest rate, but make sure that you agree the plans and costs in advance.

- Hide the edge of the liner. For most of the pond margin, the best way to do this is to use turf. The grass will grow into the pond, making it easy for animals to climb in and out. Beach areas should be covered with fine pea gravel (not sharp-edged pieces) and round or flat stones. As silt collects between the stones, plants will start to colonise it. This plant growth will help protect the liner and create an attractive habitat.
- You don't need to spread soil over the pond bottom to encourage plants. As well as being unnecessary, adding soil to your pond will contaminate the water with unwanted nutrients. For more details, consult one of the guides listed at the end of this leaflet.

The garden around your pond

For many animals, the quality of habitat around the pond is just as



Amphibious bistort.
Chris Gibson/Natural England



Smooth newt. Chris Gibson/Natural England

important as the water itself. This is especially true for frogs, toads and newts, which spend most of their lives on land, and mainly use water for breeding. A very formal garden will have little to offer these amphibians as they need dense cover and a plentiful supply of insects and worms for food. Try to leave some of the garden near your pond un-manicured, for the benefit of wildlife. Allow patches of border to grow dense and shady, and leave areas of grass uncut under trees. You can also create over-wintering habitats such as stone and log piles in quiet shaded areas. Rockeries also make a good amphibian habitat.

Bog gardens

A bog garden is a great wildlife asset, so try and find room for one when you create your pond. A bog garden is permanently damp, and creates an area

in which moisture-loving plants can thrive. Dig a hole about 30 cm deep, line it with butyl and refill it with the extracted soil. Ideally, this area should be sited next to your pond in a position where it will collect surplus water draining from the pond in wet weather. The dense, lush vegetation in bog gardens creates a superb habitat for newly-emerged young frogs and these gardens can also support some very attractive native flowers.



Common toad. Roger Key/Natural England

Native plants for your pond

Plants are vital components of your wildlife pond, providing both habitat and food for a host of animal species. Wildlife ponds should have much of their water surface covered by a good variety of plants. The more complicated the underwater 'architecture' of roots, stems and leaves, the more animal species can co-exist. Very few animals like clear, open water where they can be easily spotted by predators.

Although some plants will naturally colonise ponds quite quickly, many people will want to introduce plants of their own choice. It is better to plant native species, to which our native animal species are adapted. The species listed on pages 14 and 15 are all attractive and easy to establish.

Water plants fall into four categories:

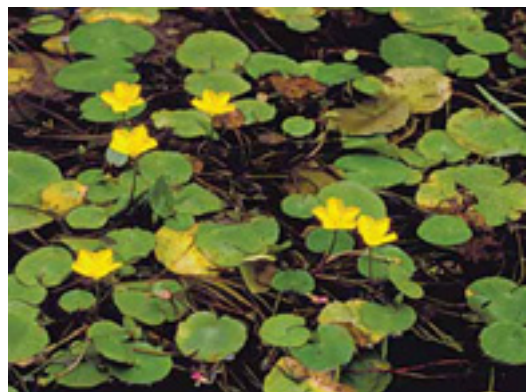
Submerged plants. These live with all

or most of their stems and leaves underwater. They offer a very valuable habitat for animal species in deeper water, and help mop up surplus nutrients.

Floating leaf plants. In summer, their leaves float on the water surface, providing shade and cover. A good example is floating sweet-grass – this provides some of the best habitat, and is excellent for growing over the edge of the liner, giving a natural look.

Emergent plants. This group includes some very attractive species, which help form excellent invertebrate habitats. They prefer shallow water and most of their summer growth emerges from the water into the air. They include rushes and reeds, and some very fine flowering species. However, some are too vigorous for a small pond.

Marginal and bog plants. These thrive at the water's edge or in wet soil. They



Left: Fringed water-lily. Right: Water mint. Chris Gibson/Natural England

Facing page: Parrot's feather. This introduced plant can quickly smother even a large pond.
Bob Gibbons



Native plants for garden ponds

Key:

- 1 appropriate for all ponds, including small ones
- 2 too large or vigorous for smaller ponds
- 3 best reserved for larger ponds

	Suitable for	Comments
Submerged plants		
Curled pondweed <i>Potamogeton crispus</i>	1	Also fennel pondweed <i>P. pectinatus</i>
Water starwort <i>Callitriche stagnalis</i>	1	Floating rosettes of rounded leaves
Rigid hornwort <i>Ceratophyllum demersum</i>	1	Thickly-tufted plant, vigorous
Water milfoil <i>Myriophyllum spicatum</i>	1	Caution! Not <i>M. aquaticum</i>
Water crowfoot <i>Ranunculus aquatilis</i>	1	Partly floating, attractive white flowers. (Most crowfoots do best where the water level drops to expose a muddy margin on which the seeds germinate.)
Floating leaf plants		
Broad-leaved pondweed <i>Potamogeton natans</i>	2	Excellent for habitat
Frogbit <i>Hydrocharis morsus-ranae</i>	1	Attractive white flowers
Floating sweet-grass <i>Glyceria fluitans</i>	2/3	Good habitat; plant at the margin to float out
Yellow water-lily <i>Nuphar lutea</i>	2	'Brandy bottle': smells of alcohol
Fringed water-lily <i>Nymphoides peltata</i>	2	Fringed yellow flowers like buttercup
Water soldier <i>Stratiotes aloides</i>	2/3	Impressive spiky plant that sinks in winter
White water-lily <i>Nymphaea alba</i>	3	Beautiful, but too vigorous for most gardens
Shallow water emergents		
Amphibious bistort <i>Persicaria amphibia</i>	1	Pink flower stalks, dark green leaves
Water forget-me-not <i>Myosotis scorpioides</i>	1/2	Small, pale blue flowers

	Suitable for	Comments
Lesser spearwort <i>Ranunculus flammula</i>	1	Less spectacular, less invasive than spearwort
Spearwort <i>Ranunculus lingua</i>	2/3	Giant water buttercup, up to 90 cm
Arrowhead <i>Sagittaria sagittifolia</i>	1/2	Arrowhead leaves, small white flowers
Brooklime <i>Veronica beccabunga</i>	1	Blue flowers, straggly, good at the pond edge
Bogbean <i>Menyanthes trifoliata</i>	2/3	Beautiful, invasive but easy to control
Tall emergents		
Flowering rush <i>Butomus umbellatus</i>	1/2	Very pretty pink-flowering rush
Branched bur-reed <i>Sparganium erectum</i>	3	Unusual spiky flower, semi evergreen
Water mint <i>Mentha aquatica</i>	2/3	Pretty, scented leaves, invasive, good for bees
Water plantain <i>Alisma plantago-aquatica</i>	2	Small pink flowers, up to 1 m
Greater pond-sedge <i>Carex riparia</i>	2/3	Good invertebrate habitat
Lesser bulrush <i>Typha angustifolia</i>	2/3	Not for small ponds
Common reed <i>Phragmites australis</i>	3	Fine plant, but too big for most ponds
Marginal and bog plants		
Bugle <i>Ajuga reptans</i>	1	Very pretty, deep blue, good for insects
Marsh marigold <i>Caltha palustris</i>	1/2	Superb yellow flower
Hard rush <i>Juncus inflexus</i>	2	Less invasive than soft rush; brown fruits
Lady's smock <i>Cardamine pratensis</i>	1	Pretty pale purple flowers
Yellow flag <i>Iris pseudacorus</i>	2	Superb yellow flowers, red seed capsules
Ragged-robin <i>Lychnis flos-cuculi</i>	1	Pretty, delicate pink flower
Purple-loosestrife <i>Lythrum salicaria</i>	2	Great red-purple spikes
Yellow loosestrife <i>Lysimachia vulgaris</i>	2	Fine yellow-spiked plant
Marsh woundwort <i>Stachys palustris</i>	1/2	Pale purple flower spikes
Great willowherb <i>Epilobium hirsutum</i>	3	Tall red-flowered plant, seeds freely
Hemp agrimony <i>Eupatorium cannabinum</i>	3	Impressive red-purple flowers, seeds freely
Royal fern <i>Osmunda regalis</i>	2/3	Superb native fern, dislikes lime



Floating pennywort *Hydrocotyle ranunculoides* – a plant to avoid! Bob Gibbons

include some real beauties. If you've made a bog garden alongside your pond, you can use these plants to create a very attractive feature that will also provide cover for frogs, toads and newts.

Non-native plants

There is a view that a wildlife pond should only contain native species. But there are many attractive exotics and these can provide excellent cover for wildlife – though they may be less likely to be food plants for insect visitors. It is best to use them sparingly and let natives form the bulk of the planting. Above all, beware of the problem plants listed opposite!

Invasive aliens

Many species of imported plants have escaped from garden ponds into the wild and a few are causing very serious ecological damage to ponds and rivers. Part of the problem is the ability of these plants to reproduce from very small fragments and then form dense choking mats of vegetation. Some of these species are still on sale in garden centres but should never be planted in your pond – they would take it over in no time.

Avoid the following:

- Fairy or water fern *Azolla filiculoides*.

- New Zealand pygmyweed/ Australian swamp-stonecrop *Crassula helmsii*.
- Parrot's-feather *Myriophyllum aquaticum*.
- Floating pennywort *Hydrocotyle ranunculoides*.
- Canadian pondweed *Elodea canadensis*.
- Nuttall's pondweed *Elodea nuttallii*.
- Curly waterweed *Lagarosiphon major*.

If you think any of these species may have colonised your pond, physically remove as much of the plants as you can and then compost them. Keep doing so until you are sure they have disappeared.

Under no circumstances dispose of even a fragment of any of these plants in the wild!

Where to get plants

It's illegal to uproot any wild plant without permission from the landowner. Your best source may be



Above: *Crassula helmsii* – another invasive. Bob Gibbons

Top right: Marsh marigold. Who needs the cultivated variety when the native one is as beautiful as this? Chris Gibson/Natural England

Bottom right: Frogbit. Chris Gibson/Natural England

neighbours, friends or a local gardening club, but watch out for plant cuttings contaminated by alien species! Often, your local wildlife trust will be doing management work on the ponds in a nearby wildlife reserve, and may be able to provide material. Alternatively, a list of specialist native plant suppliers can be found on the Flora Locale website www.floralocale.org (see also Contacts, page 26).

Although many garden centres now sell native pond plant species, these may be 'improved' garden varieties, which are of less use to wildlife. For example, the double-flowered marsh marigold *Caltha palustris plena* is one to avoid as it will provide little, if any, pollen or nectar. Some centres still sell the invasive plants mentioned above, and their native stock may be contaminated with exotic species.

Managing your pond plants

Once established, most water plants grow very fast unless they are in heavy shade. Plants such as bogbean send out long runners and can spread two or three metres in a season. Bogbean is easy to control as it has thin brittle stems that can be snapped off. Others, like the common reed, form dense, tough, root masses that need a saw to cut them back. For this reason, common reed is only suitable for the largest ponds.

Don't over-manage your pond plants. To prevent disturbing your pond's wildlife, leave the plants alone during the summer, especially any lawn grasses growing out over the pond margins. It's best to remove excess vegetation in the autumn, when most amphibians have left the pond. When clearing out your pond, you might find



Great pond snail. Garth Coupland



Water scorpion. Roger Key/Natural England



Migrant hawker dragonfly. Paul Keene

that the submerged plants in particular have grown very strongly. Remove excess vegetation and leave it in a pile by the pond for 24 hours. This will enable some of the wildlife caught amongst the stems, leaves and roots to return to the water. Don't let it rot there however, or it will return excess nutrients to the pond. This pond vegetation can then be composted.

Never put any material from your garden into a wild pond. You could unknowingly be releasing a problem species or diseases into the wild.

Animals in your pond

There can be dozens of animal species in a good large garden pond, although some will be too small to see without a microscope. Getting animals into your

pond is easy – they find their own way, provided the water quality is good and the right plants are established. Frogs, toads and newts will discover your new pond quickly, usually within a season and even in most heavily urbanised areas. Flying insects will turn up within days. Other animals, such as snails and small crustaceans, will also arrive, often travelling on the feet of ducks or bathing birds, or attached to introduced plants.

Animals play many roles in ponds. Freshwater shrimps eat organic debris and rotten vegetation. Water fleas and others consume bacteria and tiny single-celled organisms living in the bottom sludge or open water. Herbivores, including snails, mayflies, caddis-flies and some beetles, eat



Emperor dragonfly. Dave Sadler



Great diving beetle.
Roger Key/Natural England

larger algae and plants. Other species are predators of other animals. Some live all their life in the pond, while others, such as dragonflies, stay there for several years as flightless larvae, before enjoying a brief period as flying hunting adults, then returning to the pond to lay their eggs.

Birds, bats and beasts

Once your pond is established, it will be a magnet for other animals. Many garden birds such as blackbirds and starlings will bathe at the edges, and others will come down to drink. You may see house martins and swallows dipping for drinking water in flight or landing to collect mud for their nests. Garden ponds are often staked out by herons on the look out for prey. If you are very lucky, you may see the whirring blue flight of a kingfisher. Grass snakes may visit your pond or even take up residence for the summer if there are plenty of frogs to eat.

If you watch a pond at dusk you are likely to see bats, probably pipistrelles, flying over the water, attracted by emerging insects. Hedgehogs and even badgers may stop for a drink, though you will be fortunate to see them.



Thirsty hedgehog. Mike Powles

Frequently asked questions

I have a formal pond – what can I do to make it more wildlife friendly?

Formal ponds are not designed for wildlife. They tend to have steep sides without extensive shallow areas. Concrete fish ponds can be difficult for animals to escape from and few have the extensive vegetation cover that wildlife needs. To help wildlife, first ensure that frogs and hedgehogs can leave the pond. You can do this by creating a ramp using rocks, stones or paving slabs.

Most pond wildlife prefers shallow water. To create shallow water habitat, build a retaining wall inside the pond near its edge. The wall can be made

from sandbags, old bricks or building blocks (there's no need to mortar them together). The space between this wall and the pond edge can then be backfilled using stones, gravel or subsoil (don't use topsoil as this will add nutrients to the water). Backfilling to within 5 or 10 cm of the surface will create a shallow water habitat where a variety of native plants can establish themselves.

Finally, do you really want those fish? A pond without fish will support far more wildlife than one with. Don't release ornamental fish into the wild! Instead, find them a good home with a fish enthusiast or just wait until your fish population diminishes naturally.



House martins collecting mud for nests. Bob Gibbons

Should I put in a fountain and filter to keep the water clear and oxygenated?

These aren't needed in a wildlife pond. Pond filters take out suspended particles, but also remove the plankton that is essential to the life in a healthy pond. Fountains help maintain oxygen levels in crowded fishponds, but oxygen isn't a problem in a balanced wildlife pond. On the other hand, fountains and waterfalls are attractive features that do no harm at all to wildlife.

Should I put a net over my pond to keep out autumn leaves?

A moderate input of leaves does no harm, so it isn't necessary to net a pond unless it is under a large tree. Leaves have little fertilising ability, but are food for many small organisms. Use a rake to remove excess leaves, and put them into the compost heap. Netting a pond can harm wildlife as

nets often trap frogs, grass snakes, birds and small mammals.

I'm finding dead frogs in and around my pond – what's the problem?

There are many reasons why frogs die in ponds. If you find the bodies of frogs floating to the pond surface in spring, they may have been killed as a result of winter ice. Although most frogs hibernate on land, a few over-winter in the bottom of ponds. If the pond water is frozen for a long period, some frogs may be killed by a lack of oxygen and a build-up of toxic gases. Some frogs die in the mating season when female frogs are drowned by over-attentive males. There are also a number of frog diseases. One of the most infamous, *Ranivirus* (also known as 'red-leg') causes starvation, unpleasant ulceration and death. For more information go to the Froglife website www.froglife.org (see also Contacts, page 26).



The grass snake is the largest British snake. Harmless to humans, it can spend much of its time in water, often feeding on frogs. Andy Sands



The linnet is one of many bird species that may drop in for a quick drink. Chris Gomersall



An established pond can be a superb garden feature and wildlife haven. Bob Gibbons



However much frogspawn you have in your pond, only a tiny number of eggs will develop into adult frogs. Bob Gibbons

How can I stop my pond freezing over in winter?

Frozen water isn't really a problem unless you are keeping fish, or the pond is home to many over-wintering frogs (see opposite). Even then, you only need a small hole to allow gases to escape. Float a large ball on the surface to keep a vent open. Alternatively, make a hole by resting a saucepan of hot water on the ice to melt through. Don't break the ice with a hammer – the shock-waves can kill sensitive animals.

There are no frogs or newts in my pond. Where can I go to get some?

If your pond can support amphibians, and if there is another pond within half a kilometre or so, they will usually find their own way to your garden. The process can take up to a year but is normally much quicker. Alternatively, collect a couple of masses of frogspawn from other garden ponds. Ideally, get spawn from more than one

source to avoid inbreeding. Never take spawn from the wild and avoid any garden pond where there is a history of frog or fish disease. Newts are best introduced as adults but great crested newts are protected by law – it is illegal to interfere with them at any stage of their lifecycle.

For more detailed information consult the Natural England publication *Amphibians in your garden* (see Contacts, page 26).

I have too much frogspawn in my pond, where should I put it?

The amount of frogspawn will vary according to the number of frogs surviving in and around your pond, so there will never be 'too much'. Nearly all tadpoles die and are eaten each year, the huge numbers hatching in early spring dwindling to only a few young froglets by the summer. Clearing frogspawn from your pond will also increase the survival chances of the



Foxes occasionally visit garden ponds but you may need to be an early riser to see one. Mike Lane



The larvae of dragonflies are fearsome predators taking tadpoles and even small fish. Roger Key/Natural England

remaining eggs, meaning you may end up with more, rather than fewer frogs! If you have to remove frogspawn, don't take it to a wild pond as you may inadvertently spread diseases.

My pond develops a thick layer of blanket weed or duckweed. What's wrong?

In moderation, both blanket weed and duckweed help create excellent wildlife habitats. However, duckweed can spoil the appearance of a pond and is almost impossible to eradicate completely. These weeds can also be dangerous: if a pond surface is completely covered in green it can look like a solid surface and encourage young children and pets to try and walk on it.

A heavy build-up of blanket weed or duckweed usually means there is too much fertility in the water. Filling or topping up your pond with tap water

will add unwanted nutrients to your pond, as will the run-off from a fertilised lawn or flowerbed. If you can't improve the water supply, there are other ways to reduce the problem. Remove all blanket weed with a lawn rake as it builds up, and compost it. Duckweed can be skimmed away. To reduce nutrients in the pond, remove dying vegetation each autumn so it can't rot down in the water, and cut back living plants hard to encourage new growth next year. Creating this new growth will help use up nutrients. Placing a small bag of barley straw in the pond is an effective temporary control for blanket weed. As it decays, the straw releases chemicals that inhibit weed growth.

My old pond dries out in the summer. Does it need digging out?

Drying out is common in older ponds as a build-up of silt and organic matter

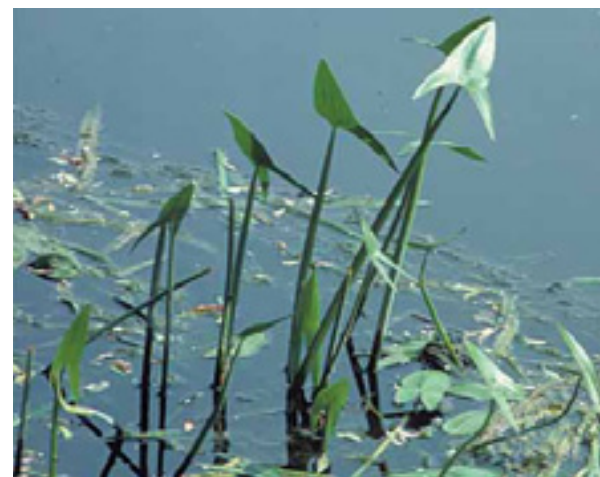
often reduces the water depth. However, these 'temporary' ponds can be extremely good for wildlife. They usually hold water for long enough for successful amphibian breeding, and acquire a special set of plant and animal species which will tolerate occasional drying out. If you have one of these ponds, why not dig a new pond next to it, to restart the succession process? If there isn't space for this, and you want some standing water all year, dig out only part of the old pond, to preserve some of the valuable 'drying' habitat.

Enjoying your pond

Don't spend all your 'pond time' on maintenance – take a break and enjoy it. There's plenty to see. All sorts of birds can visit ponds, including pied wagtails and their beautiful cousins, grey wagtails. In the early morning you

may glimpse a fox coming to drink. Later, in the heat of the day, watch the dragonflies and other insects flying over the pond, hunting, mating and laying eggs. From late May onwards, look out for dragonfly larvae emerging and hatching into winged adults – one of the most extraordinary events you can witness in a garden. In the evening, you might see bats hunting for flying insects over the water.

Many useful books on ponds and pondlife are listed on page ?? and these will help you identify the plants and animals in and around your pond. The easiest way to study small invertebrates is to catch them with a fine kitchen sieve and study them in a white plastic tray. Why not record your finds and build up a list of species from season to season and year to year? Eventually, you may become a pond expert yourself!



Arrowhead. Chris Gibson/Natural England



The grey heron may not always be a welcome visitor. Bob Gibbons

Contacts

Natural England

1 East Parade
Sheffield, S1 2ET
Enquiry Service: 0845 600 3078
enquiries@naturalengland.org.uk
www.naturalengland.org.uk

Pond Conservation

School of Life Sciences
Oxford Brookes University
Gipsy Lane
Oxford, OX3 0BP
info@pondconservation.org.uk

Pond Conservation is the national charity working to conserve and protect ponds and small water bodies through research, training and practical management and creation projects.

Froglife

9 Swan Court
Cygnet Park
Peterborough, PE7 8CX
www.froglife.org

The Herpetological Conservation Trust

655A Christchurch Road
Boscombe
Bournemouth
Dorset, BH1 4AP
www.herpconstrust.org.uk

Flora Locale

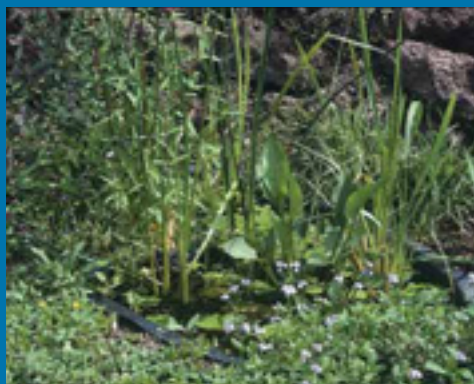
Denford Manor
Hungerford, RG7 0UN
www.floralocale.org

Plantlife

14 Rollestone Street
Salisbury, SP1 1DX
www.plantlife.org.uk

Royal Horticultural Society

80 Vincent Square
London, SW1P 2PE
www.rhs.org.uk



Small wildlife pond. Bob Gibbons

Further information

This is one of a range of wildlife gardening booklets published by Natural England. For more details, contact the Natural England Enquiry Service on 0845 600 3078 or e-mail enquiries@naturalengland.org.uk

Natural England also produces *Gardening with wildlife in mind*, an illustrated wildlife reference. Originally on CD but now also available online, *Gardening with wildlife in mind* has detailed information on 800 plants and animal species often found in our

gardens, and shows how they are ecologically linked. See www.plantpress.com

Other titles

Louise Bardsley. *The wildlife pond handbook*. New Holland. 2003.

Trevor Beebee. *Pond life*. Whittet Books. 1995.

P.S. Croft. *A key to the major groups of British freshwater invertebrates*. Field Studies Council. 1986.

D.G. Hessayon. *The rock and water garden expert*. Transworld Publishers. 1993.

Freshwater name trail (wall chart). Field Studies Council.

L-H. Olsen, J. Sunesen & B. V. Pedersen. *Small freshwater creatures*. Oxford University Press. 2001.

Pond Conservation. *The pond book: a guide to the management and creation of ponds*. Oxford. 1999.
(Available through info@pondconservation.org.uk)

Peter Robinson. *RHS water gardening*. Dorling Kindersley. 2003.



Azure damselfly. Robin Chittenden