

Wildlife Pond Pack

Designing, building and maintaining a garden wildlife pond



Gloucestershire

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Welcome to the wonderful watery world of the wildlife pond. This fact sheet will tell you how to enjoy your very own pond for wildlife in the garden, how to maintain it, and about the birds, animals and other pond creatures that may come to visit.



garden pond - R. Burkmar



damselfly - Wildstock

Ponds in the wild

Ponds in the wild may be one of several different types. Brackish ponds form in coastal regions where they receive regular influxes of salt water. Temporary ponds form in winter and dry out completely in the summer each year. Freshwater ponds form inland, fed by a combination of ground water, rainwater or surface water. Each type of pond has very different conditions and supports different kinds of wildlife.

All ponds are temporary and over time will develop into marsh, bog, and eventually wet woodland. This occurs by natural processes of siltation, the growing up of pondside vegetation and consequent drying out of surrounding habitat.

Since 1950, over half of the UK's ponds have been lost, due to large-scale drainage schemes, chemical pollution and neglect through disuse, along with all the wildlife that depended on them. Great Crested Newts have declined by 50% since 1966. Since 1970, 10% of breeding dragonfly species have become extinct.

Ponds in the garden

Of the different pond types, garden ponds are most similar to freshwater ponds and they can provide a refuge and home for many freshwater dwellings creatures. A wildlife pond is one of the single best features for attracting new wildlife to the garden and it is thought that some amphibians, such as frogs, are now more common in garden ponds than in the countryside. Many pond creatures will travel far and wide to find new ponds, discovering a potential new home in no time at all. So a well designed wildlife pond can play a big part in helping to preserve our natural biodiversity, as well as being an attractive garden feature.



frog - R. Burkmar

Designing your wildlife pond

The siting, depth profile and pond surrounds are of great importance if the pond is to be successful at attracting a range of wildlife.



Siting the pond

Where? An ideal place for a pond is on level ground, in an open, sunny area, the sunnier the better, and well away from any trees. To achieve a range of conditions, it may be beneficial to choose a spot that receives a little shade at some point during the day. A location that is already damp or waterlogged is not really suitable, being at risk of constant flooding. An area that is too shady will inhibit the growth of essential oxygenating and other plants.

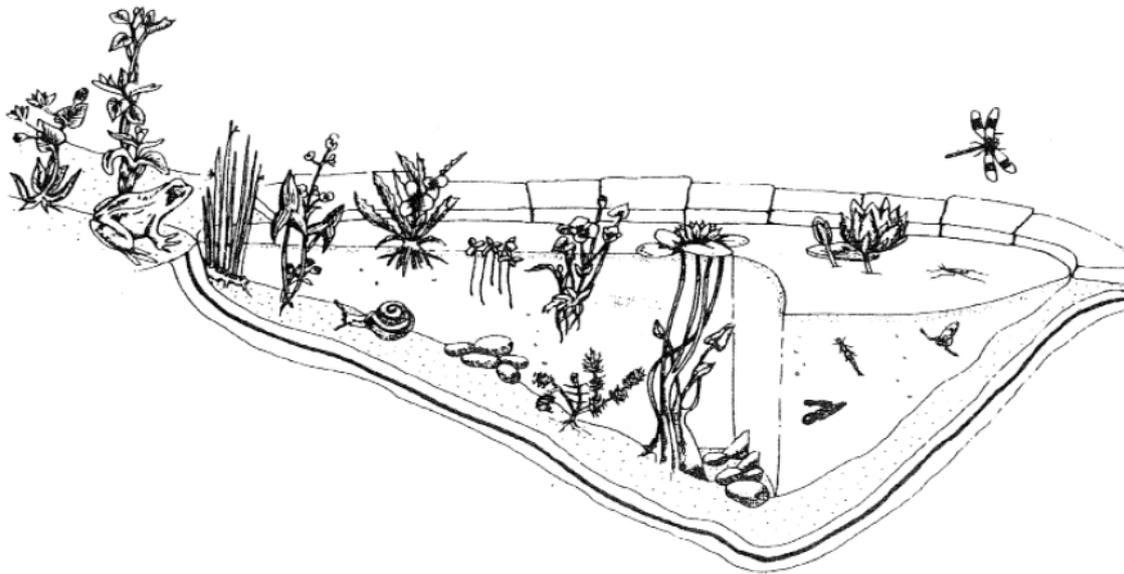
Pond profile

Depth. This is very important. To be attractive to wildlife, a pond should have sides with gentle slopes, not steep ones. If the pond is quite small, shallow sloping edges should be on one side at least. Extensive shallow areas 30cm wide and 4-20cm deep; especially to the south and west. A deeper zone at a minimum 60cm depth and ideally 100cm or more.

Around the pond edges

Providing extra habitats around the edge of the pond will be of great benefit to wildlife. These can be created by: Placing stones, logs and tall plants in spots all around the pond edges. Allowing some long grass or other vegetation to grow up on at least one side of the pond. Building scalloped pond edges rather than a straight ones - these will provide many different micro-conditions with variations in shade and depth and temperature. Best of all, creating an accompanying unsubmerged bog area to the north-north east side of your pond. (Details are given below)

For ease of maintenance and pond-watching, it is sometimes best to have one relatively formal edge to your pond, with a straighter edge and incorporating paving, gravel path or short turf. The size of the pond is less important than including the features outlined above into the design. Although larger ponds will generally support more wildlife a small garden pond will still be an effective home for many creatures.



Damselfly nymph

Freshwater shrimp

Ramshorn snail

Water boatman



WILDLIFE POND PACK

Problem	Origin	Solution	Wildlife implications?
Duckweed	Chemical or nutrient imbalance - can shade out other plants	Scrape off with a board, or remove weekly with sieve or stock with extra plants to oxygenate and shade out weed; if desperate, try water transfusion	Duckweed attracts frogs in spring
Blanketweed	Increase in light levels in spring before other plants able to grow. Only problematical in small ponds	Twist around a stick and heave out; leave on bank for a few days for pond creatures to escape back into pond	Blanketweed used by newts, tadpoles and invertebrates as hiding place
Green water	Algal bloom; if new pond, occurs naturally due to excess nutrients in tap water; may recur in spring because of increased light levels	If new pond - leave for 1-2 weeks to stabilise, otherwise: add barley straw in hessian bag or old lavender stems	On no account use a chemical control - this will prevent essential microscopic algae grazers from colonising the pond
Brown water	Low oxygen levels and high nutrients causing imbalance - especially if have Water Fern or Typha which produce nitrogen	Add barley straw in hessian bag or old lavender stems, add pollution tolerant oxygenating plants (yellow and white water lily, broad leaved pondweed)	Low oxygen levels will limit variety of pond life
Rampant vegetation	Exotic plants uncontrolled by native fauna	Pull out by hand; if desperate – contact us for further advice	Never introduce unwanted pond plants into the wild
Frogs disappearing	Frogs eaten by fish or others or moved onto land (finished breeding)	Provide habitats such as long grass, logs, stones, mossy rockeries for frogs	
Too much spawn or too many frogs	Frogs producing superabundance of spawn as natural survival method	Problem likely to be seasonal only; will not cause long term harm to pond	Do not remove - this will provoke arrival of more spawn or frogs; do not transfer to wild - this can spread diseases and invasive plants
No newts or toads	Not found pond yet or pond inaccessible because of physical barriers	Wait patiently! Toads and newts are migratory and will try to migrate back to their original pond if moved	Be careful not to introduce diseases or unwanted plants into your pond
Dead frogs	Frogs exhausted after spawning; diseases such as red leg; male frogs overwintered in pond and frozen	Natural occurrence;	
Punctured liner	Sharp stones, roots, dog's feet or hand tool penetrated liner	Epoxy compounds and patches to fix pond liner available from pond suppliers. As a last resort, turn punctured pond into a bog area and build a new pond next to it	Draining and refilling causes huge disruption to wildlife
Grass and leaves blowing into the pond		Cultivate fringe of tall grass or vegetation at pond edge to catch leaves and grass cuttings	Netting over pond may trap frogs and newts
Frozen pond		Float a ball on the pond overnight to be removed in the morning; rest a pan of hot water on the ice (Not boiling!)	

Choosing pond plants

Pond plants will oxygenate the water and keep it clear. Unfortunately many non-native aquatic plants readily obtainable from garden centres are invasive and will soon dominate the pond completely to the detriment of everything else. Carefully selected native species should remain in a relatively balanced state and will support more wildlife. Plants can be introduced to your pond approx. 1-2 weeks after the initial filling with water, when tap water nutrients such as chlorine and fluoride have evaporated. The best time to plant is in spring or summer when plants are actively growing. Plants can be planted into soil held in old string onion bags or baskets.

Four zones for plants

There are four 'zones' in which pond plants may be grown; try to have plants in each zone. The four zones are:

1. Totally submerged (in deeper water)
- oxygenating plants
2. Submerged but with floating leaves (also in deep water) - oxygenating plants
3. Emergent (in shallower area) and
4. Marginal (growing in the pond edge and bog areas.)

A useful rule of thumb is to provide one oxygenating plant per 100cm² of open water.

The taller, marginal/emergent zone plants are better on the northern edge where they won't cast shade over the rest of the pond. In the wild, the four zones are not really distinct at all but merge into each other. Some marginal and emergent plants therefore are interchangeable.

Plants suitable for each zone, and plants to avoid, are listed below:



water soldier - RP



fringed lily - RP

Pond plant lists



Recommended Plants:

Submerged oxygenators

Spike Water Milfoil *Myriophyllum spicatum*
Hornwort *Ceratophyllum demersum* (pollution intolerant)
Shining Pondweed *Potamogeton lucens*
Horned Pondweed *Zannichellia palustris*
Fennel Pondweed *Potamogeton pectinatus* (pollution tolerant)
Water Starwort *Callitriche stagnalis* (pollution intolerant)

Floating-leaved

Water Crowfoot/Buttercup *Ranunculus aquatilis* (pollution intolerant)
Bladderwort *Utricularia* spp
Frogbit *Hydrocharis morsus-ranae*
Broad-leaved Pondweed *Potamogeton natans* (pollution tolerant)
Curled Pondweed *Potamogeton crispus* (pollution tolerant)

Emergent

Branched Bur-reed *Sparganium erectum* (tall; can be invasive, but a good alternative to Typha)
Amphibious Bistort *Persicaria amphibium*
Arrowhead *Sagittaria sagittifolia*
Water Crowfoot *Ranunculus aquatilis*
Water mint *Mentha aquatica* (can be invasive: also strong scent deters some insects)
Flowering Rush *Butomus umbellatus*
Water Plantain *Alisma plantago-aquatica* (tall)
Water Forget-me-not *Myosotis Scorpiodes*
Marsh Cinquefoil *Potentilla palustris*
Swamp grasses – good for pond invertebrates
Yellow flag *Iris pseudacorus* (can be a little invasive)

Marginals

Lady's Smock *Cardamine pratensis*
Marsh marigold *Caltha palustris*
Purple Loosestrife *Lythrum salicaria* (tall; a wonderful bee plant)
Gipsywort *Lycopus europaeus*
Sedges large and small
Meadowsweet *Filipendula ulmaria* (tallish; good for birds in autumn)
Brooklime *Veronica beccabunga*
Ragged Robin *Lychnis flos-cuculi*
Soft Rush *Juncus effusus*
Bugle *Ajuga reptans*
Water Avens *Geum rivale* (spreading)
Marsh Woundwort *Stachys palustris* (tall)
Great Willowherb *Epilobium hirsutum* (tall)
Hemp Agrimony *Eupatorium cannabinum* (tall)
Fleabane *Pulicaria dysenterica*
Rough grassland with Creeping Bent *Agrostis stolonifera*
Marsh foxtail *Alopecurus geniculatus*
Fool's watercress *Apium nodiflorum*
Common Spike-rush *Eleocharis palustris*
Water pepper *Persicaria hydropiper*
Creeping Jenny *Lysimachia nummularia* (low growing ground cover)
Water Dock *Rumex hydrolapathum* (may be invasive)
Lesser spearwort *Ranunculus flammula*

Plants to AVOID at all costs:

1. Australian Swamp Stonecrop/New Zealand Pygmyweed *Crassula helmsii* aka *Tillaea recurva*
2. Water Fern *Azolla Filiculoides*
3. Parrot's feather/Brazilian watermilfoil *Myriophyllum aquaticum*
4. Floating Pennywort *Hydrocotyle ranunculoides*
5. Himalayan Balsam *Impatiens glandulifera*
6. Canadian Pondweed *Elodea canadensis*
7. Curly (Canadian) Pondweed *Lagarosiphon major* or *Elodea crispus*
8. Nuttall's pondweed *Elodea nuttalli*

Native plants that tend to become invasive; only recommended for larger ponds:

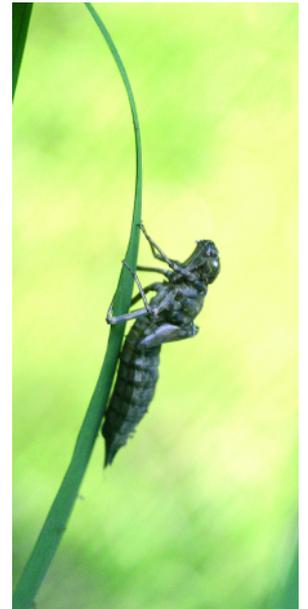
1. Reed sweet-grass *Glyceria maxima*
2. Reedmaces *Typha latifolia* and *Typha angustifolia*
3. White water lily *Nymphaea alba* (pollution tolerant); usually prefers deep water 2m deep (could be grown in submerged pots)
4. Yellow water lily *Nuphar lutea* (pollution tolerant) (could be grown in submerged pots)
5. Fringed water lily *Nymphoides peltata* (could be grown in submerged pots)
6. Greater spearworts, *Ranunculus lingua* *R. flammula* (could be grown in submerged pots)
7. Bogbean *Menyanthes trifoliata*

Pond open for business: attracting wildlife

A wildlife pond may take over 5 years to become fully established. Certain animals can be encouraged to visit by providing particular features:

- A patch of unmown long grass, logs and stones bordering the pond - for froglets, newts also butterflies.
- Floating leaved plants - for dragonflies and damselflies to lay their eggs upon.
- Logs and stones on a sunny open bank - that some dragonflies like to perch upon.
- Tall emergent plants with hollow stems - for damselflies and dragonflies to lay their eggs upon.
These insects may take 3 years to mature, so need a relatively stable habitat with lots of other pond creatures to eat.
- Damp bare earth - which house martins and other birds will use to help build their nests.
- The plant Water Starwort - seems to be favoured by newts for egg laying.
- Shallow areas - for birds to bathe in; the sound of dripping water attracts some warblers.
- A nearby compost heap - may be used by grass snakes to lay their eggs in if you are lucky.
- Night-scented plants like honeysuckle and the provision of batboxes - may attract bats.
- A beach or chicken wire hedgehog ramp - so thirsty hedgehogs can have a drink (or a swim) without getting trapped.
- Meadowsweet - will be perched upon and the seedheads eaten by finches later in the year.
- Duckweed - attracts frogs by smell early in the year .

Important a wildlife pond should NOT have any fish, nor pumps, filters or fountains. Fish will eat all the other wildlife; pumps will suck in and destroy all the smaller creatures that other wildlife depends upon for food.



**dragon nymph
- Wildstock**



**frog in creeping jenny
- R. Burkmar**



**dragonfly
- Wildstock**

Maintaining your pond for wildlife

General rules

1. Avoid chemical treatments at all times.
2. Be careful when digging or raking near or in the pond - an impetuous spade can puncture a butyl rubber liner very easily; if using a rake, make sure the tines are pointing upwards!
3. Avoid disrupting the pond in spring and summer; try to carry out maintenance work in autumn and winter instead.
4. When introducing pond plants, native species are usually of more benefit to wildlife than exotics. For the wildlife pond purist, pond plants could be native not just to the UK but also specifically to Northumberland.

The secret to looking after a wildlife pond is to maintain a stable balance of plants and creatures, similar to what would be found in the wild. This can be achieved by ensuring that sufficient plants are present in each of the four depth zones and that there is a healthy population of pond creatures - both predators and prey. Tiny animals like Daphnia, the waterflea, will graze on plants and algae and be a source of food for all the other pond's inhabitants such as dragonflies, beetles, nymphs, frogs and newts. This is why it is important not to have fish or motorised pumps and filters in a wildlife pond - these will effectively remove whole sections of the pond ecology and make it very difficult to achieve a natural balance.

Practical maintenance of a wildlife pond

If the pond can be kept in this relatively balanced ecological state, it shouldn't need very much maintenance at all. Problems don't usually start until the pond is over 5 - 6 years old. The main things to watch for are:

Build up of dead organic matter such as fallen leaves and dead vegetation at the bottom of the pond. The water turns brown as all available oxygen is used up by the decay process.

Some dead organic matter is useful however as a substrate for other plants. Eventually, a layer of silt accumulates which makes the pond shallower. Again this silt layer can be a useful feature - for overwintering minibeasts and hibernating frogs. Providing there are no other problems, de-silting can be carried out approximately once every 5 years. The best time is in autumn before wildlife and minibeasts go into hibernation and after plants have finished flowering. Leave dredging on the edge of the pond for a few days so that minibeasts can escape back into the pond.

Encroaching vegetation. After a while, some pond plants may be growing too abundantly; these can be pulled out or divided once every year or once every two years, reducing their presence by about one fifth to one third/one half. Once again, this should be done in the autumn before minibeasts go into hibernation. Some plants can be grown in pots, which limits their

spreading. Aim to make sure that at least 10%, but less than 30% of the pond surface is open. Once again leave vegetation on the banks of the pond for a few days so that minibeasts can escape back to the pond.

Winter and summer. It is important that the pond does not become completely frozen solid in the winter. Ponds deeper than approximately 60cm do not usually become frozen right to the very bottom and should be safe. However, it is still necessary to provide some open water so that oxygen can diffuse into the pond. An easy way is to float a ball on the pond that can be removed, leaving a hole in the ice. Or rest a hot pan on the surface (remove before the ice melts completely!) Using hammers and boiling water is not recommended, as this sets up shock waves or boils wildlife.

In summer the pond may need to be topped up in hot weather. Tap water is the most convenient source, but the high level of nutrients such as fluoride and chlorine may induce algal blooms, whereby the water turns a vivid green pea soup colour. This should fade after a few days as the pond recovers its balance. Rainwater is preferable if you have a water butt. It is better to refill little and often rather than in one go. If you have an adjacent bog area, this may also need to be watered in summer.

Caring for creatures.

Make sure there are sufficient areas of habitat such as logs, stones and rough vegetation at the pond edge, especially during winter when these will be used as hibernation sites by frogs, newts and others.

A note about bog habitat areas. In the wild, bogs are usually kept damp not only by inhibiting drainage from above but also by drawing up water from underneath. This is very unlikely to happen in the garden, which means that over time the bog may become progressively more acidic. One way to counter this is to bury a perforated hose under bog area. This can then be connected to a water supply so that the bog can be watered from below.

Building the pond

1. Choosing a pond liner. There are many different sorts of pond liner - plastic, fibre glass, clay and concrete, each with its own advantages and disadvantages. Overall, we would recommend a liner made of butyl rubber, which is durable, flexible, moderately cheap and easy to work with. The size of butyl liner you will need for your pond can be calculated as:

Width + (2 x max depth) x **Length** + (2 x max depth)

2. Mark out your pond on the ground with a rope or hosepipe first.

3. Get digging! Dig the hole, ensuring the sides are level with a spirit level on a plank spanning the pond. Dig an extra 25cm depth to accommodate the liner 'under-cushion' (see below) and height of the flagstones at the pond edge. Finally, dig a trench around the perimeter of the pond for the over-hanging pond liner to drop into. If you are building an accompanying bog area, also dig out a saucer shaped depression 60cm deep on the appropriate side of the pond.

4. Lining the pond. Remove any sharp stones or other objects from the bottom of the hole and first put down a 5cm+ layer of sand, old carpet or newspapers (or try loft insulation material!) as an 'under cushion' for the liner proper. Unroll the butyl liner over the top with the over hanging edges falling into the trench. Any extra excess liner can be snipped off with scissors.

You will need to add a substrate for plants and animals. Sand is excellent because it is sterile and will not harbour any undesirable seeds or microbes. Spread a thin layer over the bottom of the pond.



A boggy area can be lined with liner off-cuts, over-hang liner, old plastic sacks or bags, or all of these, basically anything that will help impede drainage. If using over-hanging liner, punch some holes 20cm apart in the bottom of the bog (not the pond!), then cover over with crocks and fill in the bog area with soil. To make watering the bog easier in the future, you can bury a length of perforated hose into the soil so that this may be connected up to an external water supply via a hose.

5. Filling with water. If possible, use collected rainwater to fill your pond; for most people however, filling from the tap with a hose is usually the most practical method. To stop the sand substrate dispersing, rest the nozzle on a plastic bag to absorb some of the energy. Filling may take much longer than you think so now is the time to put the kettle on for a well deserved cup of tea.

Back fill the trench with soil; as the pond fills up, the liner will stretch. As the pond is filling, place turf, soil or flagstones over the exposed liner at the pond edges. Butyl liner degrades in sunlight so try not to leave areas of uncovered liner exposed for too long.

6. Waiting ... If you used tap water to fill your pond, in the early stages the water may turn a vivid green colour. Do not worry - this is because tap water is full of nutrients. The colour will fade gradually as nutrients are used up and microscopic plant-eating animals start to colonise the pond. For this reason it is best to wait a week or two before planting any pond plants. In the meantime, place stones and logs around the edges to create some habitats for all those future pond visiting creatures.

butomus umbellatus - RP

