The value of ponds for wildlife

Why are ponds important?

There are currently estimated to be about 478,000 ponds in England, Wales and Scotland. Together they provide:

- a unique biodiversity resource,
- an important part of our history and culture,
- a visual focus in many landscapes,
- an amenity for many communities.

Wildlife importance of ponds

It has often been assumed (especially by biologists!) that large waterbodies, like rivers and lakes, have a higher conservation value than ponds. In fact, new evidence shows this is not true. A comparison of the number of invertebrate animal species collected from 600 rivers and 150 ponds across Britain showed that, in total, the ponds supported more invertebrate species than rivers. The ponds also had a greater number of rare animals (see Box 1).

We now know that nationally, about two thirds of all Britain's freshwater plants and animals can be found somewhere in permanent and temporaryponds.

The Natterjack Toad, with its distinctive yellow back stripe, is one of the many rare species found in temporary ponds

This includes many threatened freshwater species such as: Great Crested Newt, Natterjack Toad, Pillwort, Starfruit, Marsh Clubmoss and Medicinal Leech. Other uncommon species, whose populations have been under threat, such as Reed Bunting and Otter, use the resources that ponds provide as part of their larger habitat requirements. For some species, ponds are fast becoming a last refuge. The native freshwater White-clawed Crayfish, for example, has been almost completely lost from many rivers as a result of 'crayfish plague', which was brought in with imported crayfish.

Box 1. What is a pond?

Ponds are defined as:

Man-made or natural waterbodies between 1m^2 and 2 ha in area which hold water for 4 months of the year or more (Pond Conservation Group, 1993).

This definition is deliberately broad and includes even very small waterbodies, which can sometimes have a high conservation value.

The definition also specifically *includes* semi- seasonal and temporary ponds, which often dry up in summer, but can support both specialised and valuable pond communities.

Otters often visit riverside ponds, using them as a rich source of fish and amphibians to help feed their young

Crayfish plague is a disease which is highly virulent and easily spread downstream by river currents. Ponds, because they are usually more isolated, now provide one of the last strongholds for our vulnerable native crayfish species in some parts of Britain.

Why are ponds so good for wildlife?

One of the reasons that ponds are such rich habitats is because they provide a very *natural* type of habitat. Ponds have been around commonly and continuously for millions of years, and during this time many species of plants and animals have become well-adapted to the conditions that they provide.

Fortunately ponds (although now mostly man-made) are still quite common features, even in our modern landscape. This is just as well, because many freshwater species now depend on ponds for their survival.

Box 2. How many freshwater invertebrate species are found in ponds and rivers?

Even freshwater biologists have often assumed that since ponds are small they cannot be particularly important. Indeed, many textbooks on freshwater biology barely mention ponds at all. Recent information suggests that this is misleading; ponds can be extremely biodiverse habitats. They support at least as many species as rivers and are especially important for rare species. The table below uses data from one of the largest surveys of British river invertebrates (614 sites) and information from the National Pond Survey (156 sites) to compare the numbers of species found in ponds and rivers in Britain.

Invertebrate Groups	Number of species		Nationally Scarce species		Red Data Book species	
	Ponds	Rivers	Ponds	Rivers	Ponds	Rivers
Flatworms	8	9	1	0	0	0
Snails and orb mussels	34	33	1	2	4	2
Leeches	10	14	1	0	0	0
Shrimps, slaters and crayfish	6	10	0	0	0	0
Mayflies	19	37	0	1	1	3
Stoneflies	7	27	0	1	0	0
Dragonflies	26	13	4	2	1	0
Water bugs	45	27	2	0	1	0
Water beetles	170	100	60	27	13	4
Alderflies and Spongeflies	2	3	0	1	0	0
Caddisflies	71	95	3	7	1	4
Total number of species	398	368	72	41	21	13

Sources: National Pond Survey unpublished data; Wright *et al.* (1996). The comparison is based on all invertebrate groups sampled in both surveys for which reliable published national distribution and status data are available.

Invertebrates

Invertebrates (animals without backbones), include dragonflies, mayflies, snails, water fleas and many others. There are at least 4000 species of freshwater invertebrate in the UK, about two thirds of which can live in ponds (Institute of Freshwater Ecology, 1999). Amongst these are many rare, vulnerable and endangered species. The *British Red Data Books* list about 300 threatened freshwater invertebrate species, over two thirds of which are found in ponds. This includes two of the rarest animals in Britain today, the Tadpole Shrimp and the Glutinous Snail.

"Ponds have been around commonly and continuously for millions of years"

A good pond might have over 100 of the larger invertebrate species (like beetles, dragonflies, snails and caddisflies); exceptional ponds could support over 150 species.

At present we know little about how many species of *micro*invertebrate animals – such as water fleas and rotifers – there might be in an individual pond, but there are likely to be at least as many kinds as the larger invertebrates.

Added to this are many wetland invertebrates, particularly beetles, bugs and true flies, which live *around* the margins of ponds in the zone between the water and dry land. There have been surprisingly few studies of these damp ground communities. However, work carried out in the last few years suggests that they sometimes include very uncommon animals. The rarest bugs and beetles are often found in habitats that appear unpromising to the human eye, for example: wooded and/or seasonal ponds, ponds with floating mats of rushes and reeds, or muddy, damp ground at the water's edge.

Exceptional ponds can have over 15 species of breeding dragonfly

Amphibians

All of our native amphibians – frogs, toads and newts, are pond specialists, and use these small waterbodies as their main breeding habitat. One of our native reptiles, the grass snake, also loves ponds, mainly because frogs and sometimes fish are amongst its favourite foods.

Adult amphibians spend most of their time on land, but many individuals remain close to their home pond, particularly when young, and some hibernate in ponds over winter.

Different amphibians need different pond types. Common Toads survive well in deep, fishy ponds because their tadpoles are distasteful to fish. Other species are not so tolerant. Great Crested Newts, for example, often do best in ponds which dry out occasionally since this gets rid of fish which prey on newt larvae. Recent evidence suggests that some amphibian species are able to sense chemicals released by fish into the water, and will avoid ponds where these chemicals are present.

©Derek Parker

Great Crested Newts often use ponds which dry out occasionally. This gets rid of fish, which can devastate larval newt populations.

Plants

Most of Britain's larger wetland plants (around 400 species) can be found in ponds, and some of the rarest depend more or less exclusively on them. About half of the most threatened wetland plants (e.g those protected under the Wildlife and Countryside Act), are found in ponds. These include species such as Starfruit and Adders-tongue Spearwort.

Like the smallest invertebrate animals, most of the smallest plants, the algae, are unknown to all but a few specialists. So far there have not been any studies to find out how many species are present in ponds across Britain, but it is undoubtedly many hundreds.

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Sticklebacks are small but voracious pond predators

Fish

Fish are a natural part of the fauna of some permanent ponds – particularly those on river floodplains – and perhaps half of all freshwater plants and animals can co-exist with *natural* densities of fish. Deeper permanent ponds often support species such as Rudd, Perch and Pike, and even tiny ponds can support the Three-spined Stickleback. The Crucian Carp is a pond specialist, although is becoming increasingly uncommon through hybridisation with Goldfish dumped in the wild. Ponds well connected by ditch or stream systems can be important for Eels, which although once a common species, are now undergoing a catastrophic global decline.

However, this does not mean that all ponds should have fish; more isolated ponds, such as those on hillsides or moorland, ponds which are naturally acid, and shallow ponds which dry out occasionally are all naturally fish-free zones. These provide important habitats for the 50% or so of species which *cannot* easily tolerate the predation pressure and other impacts of fish.

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Yellow Flag, a wild iris, is one of the many native plants found at the edges of ponds. A good pond can support at least 25 wetland plant species, and exceptional sites may have up to 50.

Box 3. Rare and restricted plants and animals found in ponds

The Joint Nature Conservation Committee (JNCC) maintains a list of the national rarity designations for UK plants and animals (http://jncc.defra.gov.uk/page-3408). Species which are particularly rare or threatened are listed as Priority Species under the NERC Act, and are a priority for protection and action by government bodies and conservation organisations.

There are around 80 pond-associated Priority species in England alone, and additional species in Scotland, Wales and Northern Ireland. You can find out which pond-associated Priority plants and animals occur near you by using the Species Mapping tool on our website: http://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit/

Examples of rare and threatened species which occur in ponds

An extended list of pond-associated priority species can found on the Freshwater Habitats Trust website.

The list includes some species now living only in ditch systems and other pond-like habitats (e.g. in the Somerset Levels), though all were found in ponds in the past (e.g. the Little Whirlpool Ram's-horn Snail).

Mosses

Violet Crystalwort (*Riccia huebeneriana*)

Sea Bryum (*Bryum warneum*)

Long-leaved Threadmoss (*Bryum neodamense*)

Vascular plants

Pillwort (*Pilularia globulifera*)

Ribbon-leaved Water-plantain (*Alisma gramineum*)

True Fox-sedge (*Carex vulpina*)

Starfruit (*Damasonium alisma*)

Pygmy Rush (*Juncus pygmaeus*)

Floating Water-plantain (*Luronium natans*)

Pennyroyal (Mentha pulegium)

Slender Naiad (*Najas flexilis*)

Grass-wrack Pondweed (*Potamogeton compressus*)

Three-lobed Water-crowfoot (*Ranunculus tripartitus*)

Greater Water-parsnip (*Sium latifolium*)

Stoneworts

Convergent Stonewort (*Chara connivens*)

Lesser Bearded Stonewort (*Chara curta*)

Slender Stonewort (*Nitella gracilis*)

Dwarf Stonewort (*Nitella tenuissima*)

Starry Stonewort (*Nitellopsis obtusa*)

Tassel Stonewort (*Tolypella intricata*)

Great Tassel Stonewort (*Tolypella prolifera*)

Invertebrates

Donacia aquatica (a reed beetle)

Donacia bicolora (a reed beetle)

Badister collaris (a ground beetle) *Pterostichus kugelanni* (a ground beetle) *Bidessus minutissimus* (a diving beetle)

Bidessus unistriatus (a diving beetle)

Spangled Water Beetle (*Graphoderus zonatus*)

Helophorus laticollis (a water scavenger beetle)

Lesser Silver Water Beetle (*Hydrochara caraboides*)

Hydroporus cantabricus (a diving beetle)

Hydroporus rufifrons (a water beetle)

Laccophilus obsoletus (a diving beetle)

Paracymus aeneus (a water scavenger beetle)

Melanapion minimum (a weevil)

Eristalis cryptarum (a hoverfly)

Little Whirlpool Ram's-horn Snail (*Anisus vorticulus*)

Sandbowl Snail (*Catinella arenaria*)

Glutinous Snail (*Myxas glutinosa*)

Fine-lined Pea Mussel (*Pisidium tenuilineatum*)

Shining Ram's-horn Snail (*Segmentina nitida*)

Medicinal Leech (*Hirudo medicinalis*)

White-clawed Crayfish (*Austropotamobius pallipes*)

Freshwater Tadpole Shrimp (*Triops cancriformis*)

Lophopus crystallinus (a freshwater bryozoan)

Fen Raft Spider (*Dolomedes plantarius*)

Lesser Water Measurer (*Hydrometra gracilenta*)

Vertebrates

Natterjack Toad (*Bufo calamita*)

Pool Frog (*Rana lessonae*)

Great Crested Newt (*Triturus cristatus*)

Reed Bunting (*Emberiza schoeniclus*)

Water Vole (*Arvicola terrestris*)

Otter (*Lutra lutra*)

Bats: Seven species of bats have Priority status. Ponds can be an important resource for all of these species by providing drinking surfaces, and in some cases emergent insect food - such as caddisflies, crane flies and mosquitoes.

Birds

The birds which people most commonly associate with ponds are Mallard, Moorhens and Coots. However, ponds can be attractive to many other species.

Waders like Snipe, Greenshank and Redshank, feed, and sometimes breed, on pond margins. 'Scrapes', which are often dug for waders, are, after all, simply shallow muddy ponds. Many birds, including Swallows and House Martins, hunt over ponds, picking off insects as they emerge from the water, whilst terns and grebes use them as a source of fish. Even very rare breeding birds, like Goldeneye, nest beside secluded ponds in Scottish pine woodlands.

Greenshank and other wading birds probe for food in mud at the edge of shallow pools

Mammals

Ponds can be an important habitat for wetland mammals. For Water Voles, ponds have become an increasingly valuable refuge now that Mink haunt so many rivers and streams, devastating vole populations.

Surprisingly, even that most riverine of British mammals, the Otter, makes considerable use of riverside ponds as easy sites to catch fish and amphibians to feed their young. Bats, too, hunt around ponds, drinking and picking off emerging insects. Other mammals, like deer, simply use ponds as a watering hole.

Birds and mammals, such as this Roe Deer, often use ponds as a watering hole

Freshwater Habitats Trust

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