



Ponds and Lakes Habitat Action Plan

1. Introduction

Five habitat types relevant to this Action Plan were included within the UK BAP and subsequently Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006: Aquifer Fed Naturally Fluctuating Water Bodies; Eutrophic Standing Waters; Mesotrophic Lakes; Oligotrophic and Dystrophic Lakes; Ponds.

2. Current Status

2.1 Description of habitat

The conservation value of ponds and lakes lies in both the role they play in the landscape and cultural heritage of the British Isles and in the high levels of biodiversity a functioning freshwater ecosystem can contain. They are a significant feature in terms of local distinctiveness and in many areas form a parish or village focal point. The value of ponds to wildlife is immense and it has been suggested that a pond supports a greater diversity of species per cubic metre than any other habitat in Britain. A huge variety of invertebrate, plant, amphibian and bird life is dependent on still, enclosed water bodies for part or all of their life cycle. In addition a number of mammal species depend on or use still open water bodies.

The UK's 14,000 lakes can be divided into three categories:

- Oligotrophic: usually found on old, hard rocks in upland areas, with naturally very low nutrient levels and supporting only very limited biological production.
- Mesotrophic: usually found on softer, more easily eroded rock with naturally low nutrient levels supporting a wide range of plant and animal species including many that are nationally scarce or rare.
- Eutrophic: hard calcareous water in lowland areas, with naturally high nutrient levels supporting prolific and often diverse aquatic plants.

Ponds and lakes can also be described ecologically according to their aquatic vegetation composition. Table 1 describes the National Vegetation Classification (NVC) communities of open water that occur in Worcestershire.

Table 1. Open water NVC occurring within Worcestershire (Liley, 1999).

NVC community	Description
A2	<i>Lemna minor</i>: Common duckweed. Vegetation community of the water surface or sub-surface, found in moderately-rich to eutrophic standing waters.
A8	<i>Nuphar lutea</i>: Yellow Water-lily. One of the rooted water-lily and pondweed communities, found in still or slow-flowing water.
A9a	<i>Potamogeton natans</i>: Broad-leaved pondweed (species-poor sub-community). One of the rooted water-lily and pondweed communities, found in still or slow-flowing water.
A10	<i>Polygonum amphibium</i>: Amphibious bistort. Community dominated by this rhizomatous perennial herb which may be

	fully aquatic or found in water margins or damp grassland.
A15	<i>Elodea canadensis</i>: American pondweed. One of the rooted, fully submerged pondweed communities, found in ponds, canals and slow-flowing rivers.
A19	<i>Ranunculus aquatilis</i>: Common water-crowfoot. One of the communities of rooted pondweeds with floating leaves.

Worcestershire has a variety of pond and lake features, ranging from areas with a noticeably high density of small ponds to historically significant medieval fish pools and moats, all contributing to the distinct character of the landscape. From a regional perspective the presence of this unique "pondscape" sets Worcestershire apart from its West Midland neighbours, with an average pond density in the county of 2.9 per km², rising to between 5-10 per km² in 'core pondscape' areas. This is higher than the estimated density of 2.16 ponds per km² for England (Wilkinson *et al*, 2011). The landscape connectivity provided by pondscapes is vital in the meta-population ecology of the great crested newt (*Triturus cristatus*), where geographically separate populations interact genetically as individuals move between ponds. The typical Worcestershire heavy clay soils and dense network of watercourses are fundamental to this pondscape, acting as a network linking freshwater bodies, and their associated marginal and terrestrial habitats, together into a continuous mosaic across the countryside.

The urban landscape can also make an important contribution in supporting pond habitats. Ponds are a prominent ornamental feature in many gardens and parks and even the smallest can support a wealth of wildlife if managed appropriately, acting as a reservoir for the expansion and movement of species throughout the urban area. With careful town planning existing ponds and lakes can be incorporated into development in a way that not only makes the area more attractive for residents and workers but also ensures that habitat connectivity is maintained across the townscape. A good example of this in Worcestershire is Redditch, whose expansion during the 1960s was designed to incorporate many existing semi-natural habitat features including around 130 ponds: this urban pondscape today supports good populations of great crested newts.

2.2 Distribution and extent

There are very few large natural open water bodies in Worcestershire. There is an extant ox bow lake on the River Teme near Leigh and an acid pool at Hartlebury Common SSSI on peat dating back 7000 years. A Phase 1 survey of the county in 1978 analysed 417 pools of 0.25 ha and above and at that time there were 13 water bodies over 5 ha and 2 over 20 ha. The Worcestershire Habitat Inventory (WHI), completed in 2008, mapped 125 water bodies over 1 ha including 21 water bodies over 5 ha, 6 water bodies over 10 ha and 2 water bodies over 20 ha.

A study in 1982 on behalf of Worcestershire Wildlife Trust estimated the loss of smaller field and garden ponds using current and historic OS maps and survey data of approximately 1500 ponds. Between 1920 and 1972 30% of Worcestershire ponds were lost through intensive agricultural practices, urban development or general lack of management and by 1982 this figure had risen to 49%. Work in 1982 by John Day (a summary of which can be found in Green and Westwood, 1991) estimated that there were around 5000 ponds remaining in the county. In 1998 a student project supervised by Worcestershire County

Council surveyed a sample area of 1km² north of Redditch and compared results of the ground survey with OS maps. The project identified that around 45% of all ponds shown on the maps had been destroyed.

Artificial open water habitat has been created for a variety of reasons:

- **Mineral extraction**, for example: clay extraction along the Severn Valley has led to the development of valuable sites such as Shrawley and Grimley Brick Pits and Northwick Marshes Site of Special Scientific Interest (SSSI); hard rock extraction has created pools such as Gullet Quarry on the Malvern Hills and Rodge Hill Quarry north of Martley; sand and gravel extraction has resulted in pools at Upton Warren, Grimley, Beckford, Lower Moor, Retreat Farm and Kemerton; sand extraction has resulted in Larford Pool near Stourport; the historic extraction of lime rich marl for application to arable fields has resulted in small ponds in the corner of many fields: most mineral workings will create ephemeral bodies such as silt ponds, some of which last a considerable time.
- **Maintenance of canal levels** such as Upper and Lower Bittell and Tardebigge Reservoirs.
- **Landscaping purposes** such as Pirton Pool, Croome River and Westwood Great Pool.
- **Reducing flood risk** within urban areas by providing or increasing storage capacity for floodwater and run-off.
- **Nature conservation purposes** such as Hill Court Farm reservoir, created in 2005 by Worcestershire Wildlife Trust as part of a long-term project to re-wet part of the Longdon and Eldersfield marshes.
- **Brine pumping and salt extraction** has resulted in subsidence in the Bromsgrove / Droitwich area and the appearance of open water habitats at Upton Warren and Oakley Pools. These pools have developed with a surrounding saltmarsh community and such habitats are found in only a few sites in Britain.
- **Millponds, cart ponds and field ponds** for the watering of stock may survive in farmyards or the wider farmed landscape.
- **Water bodies created for recreational fishing or other amenity use.**
- **Ponds as ornamental features** in private gardens and public parks can be significant breeding areas for common frog (*Rana temporaria*), great crested newt and other amphibians.

2.3 Protection for the habitat

- Ponds and lakes fall within the remit of the Water Framework Directive (WFD) which was transposed into UK law in 2003. The WFD establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which aims to prevent further deterioration, and to protect and enhance the status of aquatic ecosystems and the terrestrial ecosystems and wetlands directly

dependent on them. The Environment Agency is aiming to achieve 'good status' in at least 60% of waters by 2021 and in as many waters as possible by 2027.

- Ponds and lakes designated as a SSSI receive protection under the Wildlife and Countryside Act 1981 (as amended). National protection under the Wildlife and Countryside Act is also afforded to ribbon-leaved water plantain (*Alisma gramineum*), found at Westwood Great Pool SSSI.
- Sites not meriting SSSI status can be listed as a Local Wildlife Site (LWS). Although not a statutory designation LWS status does confer some protection through the planning system.
- Open water bodies classed as Large Raised Reservoirs need to be maintained in accordance with the Reservoirs Act 1975 (as amended by the Flood and Water Management Act 2010) and this places particular burdens on owner/operators. Pools that are not classed as reservoirs may be impacted by the requirements of the Act where they form part of a reservoirs 'cascade'.
- Aquifer Fed Naturally Fluctuating Water Bodies, Eutrophic Standing Waters, Mesotrophic Lakes, Oligotrophic and Dystrophic Lakes and Ponds are all habitats included within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.
- International protection under the European Habitats Directive (transposed into UK law as The Conservation of Natural Habitats and Species Regulations 2017) is given to one pool species, the great crested newt, which is widespread in Worcestershire.
- Modern mineral planning permissions have comprehensive conditions attached to them relating to the restoration of the land and schemes often contain detailed proposals for nature conservation and other end uses that incorporate open water features. Unique to minerals planning is the ability to undertake a periodic review of the conditions attached to permissions under the provisions of the Environment Act 1995, as amended by the Growth and Infrastructure Act 2013, to ensure that modern standards are set. Such reviews should be at least 15 years after the date of planning permission or the last review. Mineral planning authorities should usually only seek a review of planning conditions when monitoring visits have revealed an issue that is not adequately regulated by planning conditions, which the operator has been made aware of and has not been able to address.

2.4 Summary of important sites

The north east of the county is characterised by high densities of small pools (often between 5 and 10 per square km). These landscapes are described as 'core pondsapes' and examples include the countryside surrounding Hanbury, in particular across Hanbury Park, where old brick and marl pits have developed into pools of some importance for great crested newt populations. The medieval fish pools and moated sites at Feckenham are also significant.

Lyppard Grange Ponds SSSI / Special Area of Conservation (SAC) is located within the Warndon Villages development on the outskirts of Worcester. It consists of several former field ponds with surrounding associated terrestrial habitat that now serves as public open space within the housing development.

The ponds are eutrophic with well-established submergent vegetation and were designated for supporting one of the largest known breeding colonies of great crested newts in the country. The population is now much reduced however due to pressures of surrounding land use and because the ponds are now ecologically isolated within the development. A substantial population of smooth newt (*Triturus vulgaris*) also exists on the site, grass snake (*Natrix natrix*) has been recorded and the ponds support a rich and diverse variety of aquatic invertebrates including the nationally rare *Hydrochus elongatus*, a scavenger water beetle.

Bittell Reservoirs SSSI lies in the Upper Arrow Valley of north Worcestershire. The series of three reservoirs together form the largest area of open water in the county and represent one of the most important sites in the West Midlands for passage and wintering waders as well as other waterfowl, with over 200 species recorded. Breeding birds include great crested grebe (*Podiceps cristatus*) and little ringed plover (*Charadrius dubius*).

The marginal communities present include a rare silt shoreline community in the draw down zone of Upper Bittell where the nationally rare slender spike-rush (*Eleocharis uniglumis*) and mudwort (*Limosella aquatic*) are abundant. The open water community is also very diverse with small pondweed (*Potamogeton bertholdii*), blunt-leaved pondweed (*Potamogeton obtusifolius*) and horned pondweed (*Zannichellia palustris*), all of which are scarce in Worcestershire. The invertebrate fauna includes 5 species of dragonfly and the rare mud pond snail (*Lymnaea glabra*).

Westwood Great Pool SSSI is a man-made lake originally constructed as a major landscape feature. The site represents one of the largest areas of open water in Worcestershire and is important for both its plant and bird communities. Amongst the aquatic flora present are the yellow water lily (*Nuphar lutea*) and two national rarities, eight-stamened waterwort (*Elatine hydropiper*) and ribbon-leaved water plantain. The latter was discovered at Westwood Great Pool in 1920 and was the first record for Britain: it is still known from only four sites in the country.

The northern and eastern margins of the Lake support extensive beds of common reedmace (*Typha latifolia*) and bulrush (*Schoenoplectus lacustris*), which support the largest colony of reed warbler (*Acrocephalus scirpaceus*) in the county. Other breeding bird species include great crested grebe, tufted duck (*Aythya fuligula*) and pochard (*Aythya ferina*). This is also one of the most important sites for over-wintering waterfowl in Worcestershire.

Upton Warren SSSI consists of a series of shallow pools: two that formed as a result of subsidence associated with salt extraction and the third a flooded gravel pit. The southern pools are significantly saline due to ongoing brine seepage, creating a habitat unique in Worcestershire. The River Salwarpe and the Hen Brook also run through the site. Upton Warren has considerable ornithological value with the pools important for wintering and passage waterfowl and wader species. The bare mud and saltmarsh of the southern pools are particularly

important in this respect. Over 60 breeding bird species have been recorded including mute swan (*Cygnus olor*), tufted duck, ruddy duck (*Oxyura jamaicensis*), great crested grebe, little grebe (*Tachybaptus ruficollis*), avocet (*Recurvirostra avosetta*) and common tern (*Sterna hirundo*).

Upton Warren also has considerable botanical importance. The halophytic (salt loving) plants round the southern pools represent one of the few inland areas of saline vegetation in Britain. These include plants more usually found at the coast such as sea spurrey (*Spergularia marina*) and reflexed saltmarsh-grass (*Puccinellia distans*). The fen and wet grassland areas support common spotted orchid (*Dactylorhiza fuchsia*) and southern marsh orchid (*D. praetermissa*) as well as their hybrids. Apple mint (*Mentha suaveolens*) is also found.

Hewell Park Lake SSSI is a shallow artificial lake surrounded by ornamental woodland lying in the grounds of HM Prison Hewell Grange. The lake margin has extensive areas of reed, which support one of the largest colonies of reed warbler in Worcestershire and the locally distributed sweet flag (*Acorus calamus*) and yellow loosestrife (*Lysimachia vulgaris*). The lake and its margins have considerable ornithological importance in a local context, providing breeding habitats for waterfowl including great crested grebe. The lake is also interesting for its amphibians and reptiles.

Oakley Pool SSSI is surrounded by reedswamp, fen and grassland. The pool appears to have been formed by subsidence following underground brine extraction and is thought to be still extending due to continued subsidence. Besides common reedmace the marginal vegetation includes meadow-sweet (*Filipendula purpurea*), great pond sedge (*Carex riparia*), lesser pond sedge (*C. acutiformis*) and great willow-herb (*Epilobium hirsutum*). The submerged plants include the locally uncommon rigid hornwort (*Ceratophyllum demersum*).

The secluded nature of the area provides a valuable breeding site for a number of birds including a large breeding colony of reed warbler. The margins of the pool support breeding little grebe, tufted duck, pochard and ruddy duck. Grasshopper warbler (*Locustella naevia*) has been recorded in the tall vegetation. The site is regularly used for bird ringing and other ornithological research, which adds to its scientific importance.

3. Current factors affecting the habitat

Pollution and waste disposal

The authorised and unauthorised tipping of inert wastes is a factor in the loss of many ponds on agricultural land, in particular old marl pits. Since the implementation of the Landfill Tax there is evidence that some inert waste is not being disposed of at licensed landfill sites as a means of tax avoidance. Ponds can also be damaged by fly-tipping. Old quarry workings with ponds in them have often been filled with rubbish or are restored to non-conservation end uses such as agricultural land.

Small farm ponds are vulnerable to eutrophication and pollution from agricultural runoff and drainage particularly if surrounded by intensively farmed land with no buffer zone. Urban runoff affects some open water habitats: oils, metals, grit and solids or foul water from connections such as washing machine discharges may contaminate ponds. Salt from road runoff is particularly toxic to amphibians.

Development

Housing and infrastructure development often results in the fragmentation and isolation of pond habitats or the outright destruction of ponds. Retaining existing water bodies within new developments has become more accepted in recent years but the importance of retaining sufficient surrounding terrestrial habitat is often ignored or forgotten, as are the wider hydrological needs of the pond itself.

Development usually leads to the creation of large impermeable surfaces draining into piped drainage systems. Natural infiltration into the ground is inhibited with a corresponding reduction in ground and surface water recharge. The incorporation of Sustainable Drainage Schemes (SuDS) into development design to balance or attenuate surface water runoff is now more accepted but there is still often resistance to the creation of open water habitats.

Neglect and or natural succession

Ponds not actively managed are vulnerable to silting up, becoming overgrown and drying out. Management of many ponds in advanced stages of succession has tended towards indiscriminate clearance of all vegetation, which can do significant damage to the wildlife value of the pond. Most ponds have never been subject to a strategic evaluation or management plan. The removal of large volumes of silt from a pond in an attempt to restore it can create its own problems in disposing of the dredged material.

Alien or damaging species

A number of alien flora and fauna cause problems for pools. New Zealand pigmyweed (*Crassula helmsii*) occurs at a number of pools in Worcestershire and can form near monocultures, thriving at the expense of native flora. Water fern (*Azolla filiculoides*), creeping water-primrose (*Ludwigia pepioides*) parrot's feather (*Myriophyllum aquaticum*) and floating pennywort (*Hydrocotyle ranunculoides*) are other problematic invasive, non-native aquatic plant species. The sale of these five plants is now illegal in the UK. The creation of ornamental ponds and bog gardens using alien non-natives can lead to accidental escapes or the deliberate discarding of plant material into the natural environment. Himalayan balsam (*Impatiens glandulifera*) also poses a threat to many wetland habitats within the county.

Large numbers of introduced waterfowl can cause a loss of aquatic vegetation through grazing and/or nutrient enrichment via faeces. This is exacerbated where birds are fed by the public. Canada geese (*Branta Canadensis*) are a problem in many areas, for example on Arrow Valley Lake in Redditch. Two species of non-native shrimp (*Dikerogammarus villosus* and *D. haemobaphes*) are also found in the UK and can significantly alter natural ecosystems.

Recreational and amenity pressures

Recreational uses of a water body can conflict with conservation interests. At Westwood Great Pool the use of motor boats causes disturbance to wildlife and the wash damages marginal swamp vegetation. Upper Bittell Reservoir and one of the lakes at Upton Warren are used for sailing. The intensive stocking of fish reduces the conservation value of a water body to other species and inappropriate introduction of fish can adversely affect amphibian populations. Fishing can also cause disturbance through the creation and use of access and fishing pegs. Litter including discarded lines and hooks can be a problem.

Policy and legislation

The management and maintenance requirements for open water bodies classed as Large Raised Reservoirs or those within the cascade of such structures place a burden on owner/operators. There have been historic instances in Worcestershire of pools being reduced in volume or drained entirely to avoid the resulting financial implications.

Planning permission is not always obtained for the construction of pools, or in the case of small garden ponds permission is not needed, and the provision of conservation advice rarely occurs. This may result in the creation of an ornamental pond that has little or no wildlife value.

Abstraction

Abstraction from ground and surface waters can adversely affect open water habitat. In Worcestershire groundwater aquifers provide the majority of the public water supply but these aquifers also need to provide flow or baseline capacity for wetland habitats, including ponds and lakes. The Triassic sandstone aquifers in the north of the county are described as 'grossly over-abstracted' by the Environment Agency, which is impacting a number of important wetland sites. Unsustainable abstraction affecting the water table can be a reason for surface water bodies failing to meet WFD standards.

4. Current Action

4.1 Local protection

Bittell Reservoirs, Hewell Park Lake, Hurcott and Podmore Pools, Oakley Pool, Upton Warren Pools, British Camp Reservoir, Shrawley Wood New Pool and Westwood Great Pool are all designated as SSSIs. Other SSSIs that have aquatic interest include Castlemorton Common, Monkwood Green and Ipsley Alders Marsh. There are 86 Local Wildlife Sites that contain open water either as the primary habitat or as part of a habitat mosaic.

4.2 Habitat management and programmes of action

- The **Severn River Basin District Management Plan** provides a framework for protecting and enhancing the benefits provided by the water environment and for the achievement of WFD targets.
- The **Freshwater Habitats Trust** is the UK's leading centre for information and practical advice on the conservation of all freshwater habitats. They carry out a programme of research, policy development, advice provision and practical work on rivers, lakes, ponds, canals and drainage ditch systems.
- **Advice** on managing or eradicating invasive, non-native plant species from freshwater habitats is available from organisations including the Environment Agency, Natural England and Plantlife.
- **Agri-environment grants** have supported the maintenance of ponds of high wildlife value, the buffering of in-field ponds, provided capital payments for pond creation and restoration and have supported the maintenance, restoration and creation of associated wetland habitats such as reedbed and fen.

- **Planning and Development Control** provides opportunities for the creation and management of water bodies. The National Planning Policy Framework (NPPF) 2018 directs local plan documents to identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including 'wildlife corridors and stepping stones that connect them'. The Warndon Villages development in Worcester was a success story in pond retention and management post-development through section 106 agreements, which saw 24 ponds restored. Other opportunities could arise from:
 - The increased use of Sustainable Drainage Systems (SuDS) in development.
 - Future county minerals planning policy outlined in the forthcoming Minerals Local Plan (in preparation, 2018).
- **Worcestershire Wildlife Trust** manages a number of open water sites including Upton Warren Pools and Broadway Gravel Pit. A small reservoir has been constructed at Hill Court Farm nature reserve. There are also smaller isolated ponds on a number of reserves including Ipsley Alders, Feckenham Wylde Moor, Monkwood, Chaddesley Wood, Beaconwood and the Winsel, Broadmoor Wood, Spinneyfields, Hunthouse Wood, Grovely Dingle, Wilden Marsh and Pipershill Common.

4.3 Survey, research and monitoring

- In 1986 the **National Amphibian Survey** stimulated a great deal of work on the distribution and abundance of amphibians, in particular great crested newts, in Worcestershire. In 1987 an amphibian survey was conducted of the Warndon Parish in Worcester City of which 410ha of land had been scheduled for development. The 45 ponds present within this area continued to be closely studied over the 10-year period of the development and great crested newts were recorded from 25 (Watson, 2001). The ponds at Lyppard Grange, with 187 individual adult newts recorded in one evening, were subsequently designated as a SSSI and SAC. From the mid-1990s onwards attention was focused on other parts of the county to find out if this high rate of occurrence was repeated elsewhere. In total, between 1987 and 2000, 387 Worcestershire ponds were surveyed at least once for amphibians. A total of 335 of those ponds contained one or more species of amphibians, representing 86% of the total. 190 of those ponds surveyed contained great crested newts: a 49% occurrence rate for the species.
- **Worcestershire Wildlife Trust** carried out a botanical survey in 2002 of 42 standing water bodies in the county over 1ha in size. Surveys involved the assessment and mapping of both bank-side and aquatic vegetation. Samples of aquatic invertebrates were also collected and sightings or evidence of other species recorded including birdlife, mammals and dragonflies. Many of the pools surveyed were found to have deteriorated through eutrophication and inappropriate management/lack of management.
- The **National Amphibian and Reptile Recording Scheme** (NARRS), led by Amphibian and Reptile Conservation (ARC), began in 2007 and uses

volunteer-based efforts to monitor and report on the status of amphibians and reptiles.

- The **Freshwater Habitats Trust** runs a number of practical survey projects to gather information about the condition of ponds and the species they support, many of which are accessible to volunteers or the owners of individual ponds.

5. Associated Plans

Rivers and Streams, Reedbeds, Fen and Marsh, Wet Grassland, Canals, Otter, Water Vole, Great Crested Newt, White-clawed Crayfish.

6. Conservation Aim

Worcestershire's pond network has increased in density and in habitat quality.

7. Conservation Objectives

- Map county 'pondscape' areas, both current and historic
- Promote the 'pondscape' concept and use mapped areas to guide landowner engagement and advice and to focus pond creation and restoration effort
- Promote the restoration of neglected or degraded small farm ponds
- Promote the conservation and the recording of stoneworts in the county and work with Plantlife to ensure important sites are assessed and recognised under the Important Stonewort Areas criteria
- Promote the use of wildlife-friendly SuDS through local plan policy and development management decisions
- Prioritise the tackling of eutrophication of ponds and lakes from agricultural diffuse pollution
- Eradication of New Zealand pigmyweed (*Crassula helmsii*) from key sites

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