

Best Practice for the Identification and the Assessment of UK BAP Priority Ponds

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Introduction

Our attitude towards the conservation of ponds is changing. As little as a decade ago, the typical approach towards any development affecting ponds was to focus effort on surveys for great crested newt (GCN) or other suspected protected species that might inhabit the pond. Indeed, for ponds located outside of statutory designated sites, the legislative framework offered little protection, and their saving grace typically came in the form of a breeding population of GCN. Where supported by locally derived policy in relevant development control planning documents, or where ponds fell within non-statutory sites, better informed ecologists were able to persuade the developer of the need for more detailed survey, most often focusing on diverse marginal and aquatic vegetation communities and Red Data Book (RDB) and/or Nationally Scarce species of aquatic invertebrate. Nonetheless, there remained no tangible measure by which ponds of high ecological value could be assigned a respective level of importance.

In August 2007, however, following the Joint Nature Conservation Committee's (JNCC) review of priority habitats and species, ponds of high ecological quality were identified as a new UK Biodiversity Action Plan (BAP) priority habitat. This new level of importance assigned to ponds heralds the beginning of a new era for the conservation of ponds, and it is not just the amphibians that will benefit.

Ponds – A New UK BAP Priority Habitat and HAP

The case for the inclusion of ponds as priority habitat in the UK BAP was provided by evidence from national and regional surveys (e.g. Biggs *et al.* 2005, Williams *et al.* 2004, Nicolet *et al.* 2002). This new pond priority habitat sits neatly within the UK BAP Broad Habitat: Standing open waters and canals.

The Pond Habitat Action Plan (HAP) is currently being developed

Box 1 Draft Pond HAP targets

- **Target 1 (maintaining extent): Maintain the number of Priority Pond sites.** Estimates suggest that around 20% of the c. 400,000 ponds outside curtilage might meet one or more of the priority habitat criteria (see Box 2). In addressing this target, particular emphasis should be placed on maintaining functional pond networks and species metapopulations. A pond site is a pond or a cluster of ponds including its surrounds.
- **Target 2 (achieving condition): Maintain quality of Flagship Pond sites.** The aim of this target is to work directly with a sub-set of c.1% of Priority Ponds ("Flagship Ponds") to ensure they are monitored and their quality is maintained. The list of Flagship Ponds is yet to be agreed.
- **Target 3 (restoration): Restore pond sites to priority status to deliver Species Action Plan (SAP) targets.** This target can apply to any non-Priority Pond with good potential for successful restoration for a SAP species, and can be aimed at improving water quality, or directly managing habitats. Invasive habitat management (e.g. plant clearance or dredging) should be undertaken only where there is little risk of damage to the existing biodiversity value of the pond site.
- **Target 4 (expansion): Create new pond sites of high quality potential.** The aim of this target is to create a new network of ponds with clean water and high biodiversity potential. The provisional definition of 'high quality potential' is 'Ponds located in areas where they drain a semi-natural surface-water catchment, which are unlikely to be significantly impacted upon by their after-use (e.g. stocked with fish, used to treat contaminated runoff)'. Creation of (a) pond mosaics/complexes, (b) new ponds that increase landscape connectivity or form protective networks, and (c) new sites that are targeted to support pond-associated BAP species are particularly encouraged. Ponds cannot be counted against this target if they are created to compensate for the destruction of existing high quality ponds.

¹Curtilage is defined as the area of land surrounding a dwelling within the property boundaries, including gardens.

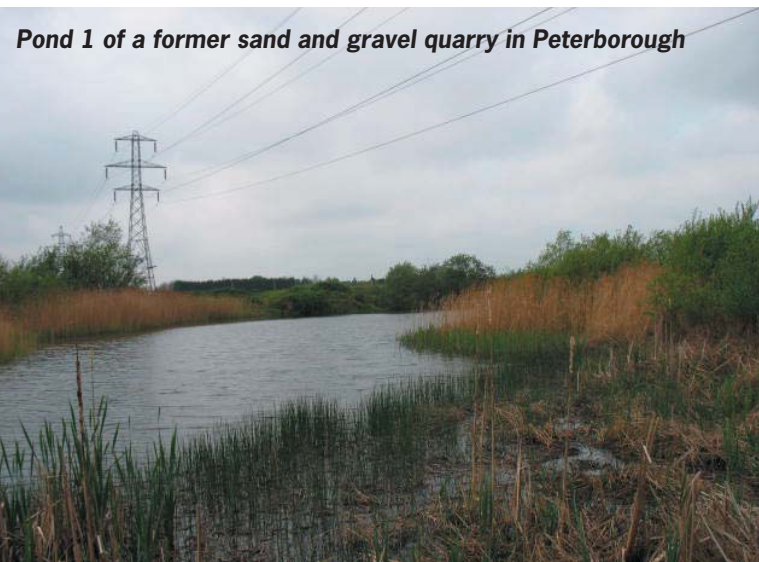
Box 2 What makes a Priority Pond?

UK BAP Priority Ponds are defined as permanent and seasonal standing water bodies up to 2ha in extent which meet one or more of the following criteria

- **Criterion 1: Habitats of international importance.** Ponds that meet criteria under Annex I of the Habitats Directive (see Table 1).
- **Criterion 2: Species of high conservation importance.** Ponds supporting RDB species, UK BAP species, species fully protected under the Wildlife and Countryside Act Schedule 5 and 8, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species.
- **Criterion 3: Exceptional assemblages of key biotic groups.** Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (i.e. supporting > 30 wetland plant species or > 50 aquatic macroinvertebrate species).
- **Criterion 4: Ponds of high ecological quality.** Ponds classified in the top PSYM category ('high') for ecological quality (i.e. having a PSYM score > 75%).
- **Criterion 5: Other important ponds.** Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type, historical or landscape context e.g. pingos, dune slack ponds, machair ponds.

By this definition and these criteria, any ponds can potentially be Priority Ponds, even small or temporary ponds, or those which are unsightly.

Pond 1 of a former sand and gravel quarry in Peterborough



and is jointly led by the Environment Agency and Pond Conservation. Four targets have been agreed by the HAP steering group which aim to maintain the extent and the quality of Priority Ponds in the UK (see Box 1). These are defined as pond sites which fulfil one or more of the Priority Habitat Pond criteria (see Box 2). The HAP targets address the primary reasons for the recommendation of ponds as priority habitat, which are:

- Habitat for which the UK has international obligation.** Six Habitats Directive Annex I types are included within this habitat (either entirely or in part, see Table 1). The importance of ponds as a 'stepping stone' habitat is recognised in Article 10 of the Directive. Freshwater habitats within the BAP did not adequately meet the UK's obligations under the Directive because the majority of designations covered lakes.
- Habitat at Risk.** Ponds are vulnerable to loss and damage from a wide range of factors including nutrient enrichment, diffuse pollution, and the spread of exotic species. There is also a growing concern that shallow or temporary ponds may be particularly vulnerable to climate change. Every year, about 1% of ponds are created or destroyed, but evidence suggests that the quality of new ponds does not compensate for pond losses.
- Habitat important for key species.** Ponds support a considerable number of key species, including at least 65 UK BAP species, at least 28 animals and plants listed under the Wildlife and Countryside Act (WCA, Schedule 5 and 8), and six Habitats Directive Annex II species (e.g. GCN, white-clawed crayfish, and otter in larger ponds). Ponds have also been shown to support at least 80 aquatic RDB species. The number of RDB species using the damp margins and drawdown zones of ponds (e.g. Diptera, ground beetles) is also likely to be considerable. Furthermore, it is being increasingly recognised that ponds are an important feeding resource for bats and farmland birds (e.g. tree sparrow and yellow wagtail).

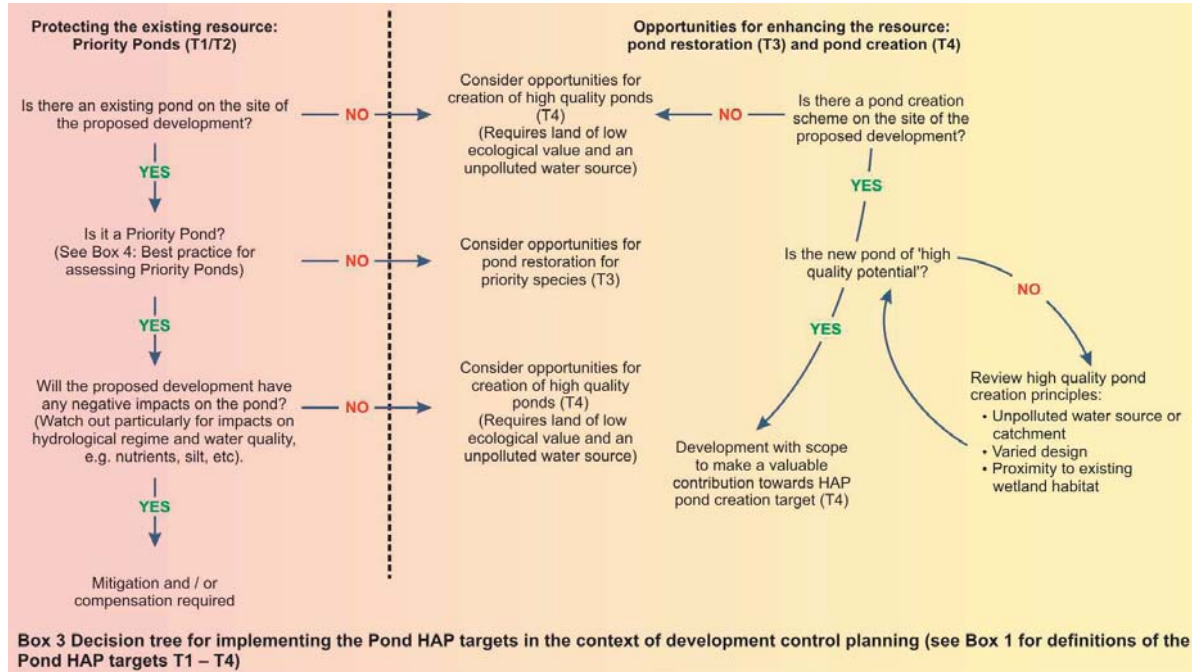


Table 1. Habitats Directive Annex I types which include ponds

Number	Habitat type
2190	Humid dune slacks
3110	Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or the <i>Isoeto-Nanojuncetea</i>
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> species
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation
3160	Natural dystrophic lakes and ponds
3170	Mediterranean temporary ponds
3180	Turloughs

The Pond HAP and Development

The Implementation of the HAP Targets

So how does the Pond HAP affect development and the level of survey associated with it? Under Planning Policy Statement 9 (PPS9), development control planners are now required to adhere to a number of key principles to ensure that the potential impact of planning decisions on biodiversity are fully considered or indeed avoided. Furthermore, PPS9 requires that Development Plan policies are now made which add to biodiversity interests and promote opportunities for biodiversity within the design stage of development proposals. Advice to development control planners is currently being developed which will cover all four Pond HAP targets (see Box 3). The assessment of existing ponds for priority status will be particularly important for their protection (Targets 1 and 2).

Perhaps one of the most fundamental benefits of the priority status for ponds is that it provides clear, primarily quantitative, criteria for assessing the conservation value of a pond, and can provide a valuable tool in demonstrating to stakeholders the level of significance attached to an individual waterbody. The



level of survey required to apply these criteria according to best practice will vary from site to site and may require anything from protected and BAP species surveys, an assessment of the overall ecological quality of the pond using the Predictive System for Multimetrics (PSYM), or a detailed survey using the National Pond Survey (NPS) method (Pond Conservation 1998) (see Box 4).

The PSYM Approach

The PSYM method (Predictive System for Multimetrics) aims to assess the overall 'ecological quality' of a pond. The method is compatible with the Water Framework Directive and was developed for the Environment Agency for pond monitoring. PSYM is particularly useful for identifying Priority Ponds (see Box 4).

PSYM is both a pond survey method and a computer model. Predictions of the wetland plant and macroinvertebrate species which should occur in a pond if it was unimpaired, are generated from a small number of simple environmental variables (e.g. grid reference, pH and waterbody area). From the predicted species list, six metrics are calculated (e.g. number of submerged and emergent plants, number of water beetle families) which relate to the overall 'health' of the pond. These predicted metrics are then compared with actual values derived from biotic data collected in the field. A simple Index of Biological Integrity (IBI) is generated by comparing predicted and actual metrics. For a full account of PSYM refer to Pond Conservation (2002).

For the macroinvertebrate survey, PSYM adopts the standard survey technique developed for the NPS, whereby a pond is split into mesohabitats all of which are surveyed using a pond net over a three minute period. Each mesohabitat is sampled for an equal amount of time. A further one minute of hand searching is carried out to seek out the more elusive species that would not normally be netted (e.g. various snails and leeches). Invertebrate samples are sorted in controlled conditions in the laboratory and identified to family level. Wetland plants are surveyed by walking/wading in the pond as defined by the maximum water level, and recording all the species present (using a standard list of aquatic and emergent plants). A grapnel is used to sample deeper water areas.

Assessing Pond Priority Status: PSYM in Practice

In this section a worked example of PSYM in practice is described. Table 2 shows the PSYM IBI scores for five ponds located at a former sand and gravel quarry in Peterborough. Three of these have PSYM IBI scores of $\geq 75\%$, and are therefore Priority Ponds. The two ponds which have PSYM IBI scores below 75% also support water vole and/or GCN, so in fact all five ponds are Priority Ponds and any negative impacts arising from development should be mitigated and/or compensated (see Boxes 2 and 3).

Pond 1 was clearly a pond of very high conservation value, and in fact met several of the Priority Pond criteria. In addition to exceeding the threshold score for Priority Pond criterion 4 (ponds of high ecological quality), it also had two protected species present and supported three Nationally Scarce species of aquatic invertebrate, meeting criterion 2 (species of high conservation importance) on two counts. Additionally, Pond 1 had the greatest taxon richness, albeit less than the 50 species needed to qualify for criterion 3 (exceptional assemblages of key biotic groups). Pond 4 had the highest PSYM score, the second highest taxon richness and also supported one Nationally Scarce species and a breeding metapopulation of GCN. The contrast between the two ponds is quite startling, however, with Pond 1 being much larger, and having a greater

diversity of mesohabitats than Pond 4, which is mid to late successional, shallow and as a result, with an abundance of marginal and emergent vegetation.

Table 2. Summary of results from survey of five ponds at a former sand and gravel quarry in Peterborough

Pond ID >	1	2	3	4	5
PSYM IBI Score (Criterion 4)	83	72	56	89	78
Taxon Richness (Criterion 3)	29	14	11	21	18
No. water beetle species	15	7	9	4	3
No. water bug species	5	3	5	6	6
Rare/scarce species of aquatic invertebrate (Criterion 2)	<i>Berosus affinis</i> , <i>Limnephilus decipiens</i> , <i>Gyrinus paykulli</i>	<i>Berosus signatocollis</i>	<i>Berosus affinis</i> , <i>Berosus signatocollis</i>	<i>Hydroglyphus geminus</i>	<i>Limnephilus decipiens</i>
WCA (Schedule 5 and 8 species) (Criterion 2)	GCN, water vole	GCN, water vole	Water vole	GCN	-

Advantages and Limitations of PSYM

PSYM allows criterion 3 and, for wetland plants only, criterion 4 to be used to assess pond priority status. The main advantages of the PSYM method for ecologists is that it only requires a single survey visit, during a suitable time of year (June to August) and macroinvertebrates only need to be identified to family level, rather than to species level, thus reducing the need for microscope work and significantly reducing the number of specimens to identify.

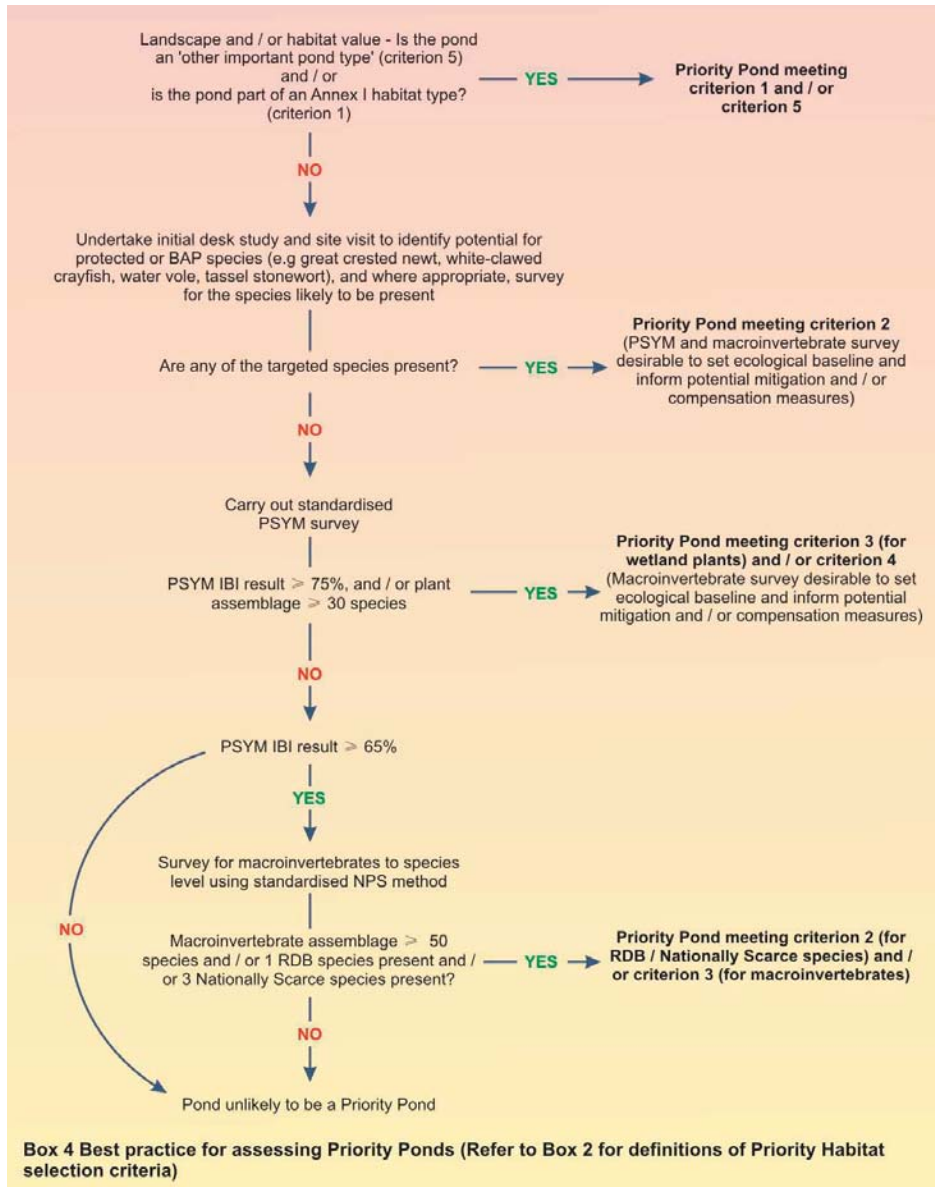
The limitations of PSYM are that the method cannot be used in Scotland or Northern Ireland, and that temporary ponds are not very well represented by the model and, therefore, the PSYM IBI should be interpreted with caution with this pond type (*i.e.* PSYM is likely to predict too high a value for naturally species-poor temporary ponds). The case study above also shows that where important decisions need to be made affecting ponds that have borderline PSYM IBI scores, a cautious approach is recommended (see Box 4). Thus for such borderline cases, where the PSYM IBI score is between 65-74, further, more detailed invertebrate species survey is advised to determine whether the pond classifies under criterion 2 (Species of high conservation importance) by supporting 1 RDB or 3 Nationally Scarce invertebrate species, or criterion 3 (exceptional assemblage of key biotic groups) (by supporting an assemblage ≥ 50 species). Of course, a survey for species of conservation concern (e.g. protected species and UK BAP priority species) would be a requirement wherever there is a likelihood of presence.

Pond Mitigation and Compensation

Having determined that our pond is a Priority Pond, what ramifications might this have for a development in which the pond falls within its footprint? Importantly, the pond must be acknowledged as a significant ecological feature, either in its own right, or perhaps with a suite of other ponds or wetland habitats. Ideally development would seek to protect the pond, for example by maintaining/improving water quality or controlling exotic/invasive species, if present. In order to satisfy HAP target 4 it is also worthwhile exploring opportunities for the creation of ponds of 'high ecological potential' (see Box 3). However, in many cases, avoidance may not be an option and the development will involve the destruction of a pond. In this situation, the fact that the pond is recognised as a priority BAP habitat should typically imply a level of compensation that is appropriate. Taking the guidelines for GCN for example, *'there should be no net loss of sites, and in fact where significant impacts are predicted there will be an expectation that compensation will provide an enhanced habitat (in terms of quality or area) compared with that to be lost'* (English Nature 2001). Accordingly, opportunities for enhancement, such as creating a complex of ponds, would be a suitable level of compensation for the loss of a Priority Pond. Indeed, this is in keeping with PPS9 that makes clear reference to the value of planning applications that provide enhancement of biodiversity interest. Pond HAP target 4 can only be achieved, however, where 'enhancement' can be demonstrated, over and above the normal compensation that would be applicable for loss of a BAP priority habitat.

It is worth briefly noting that, in addition to the general biodiversity criteria noted above, several other considerations would need to be taken into account by the respective Local Planning Authority before the destruction of a Priority Pond could be sanctioned. The most important of these are:

- What is the position of the pond in an ecological unit? For example, does it form part of a network of wetland habitats, and how might a development affect this?
- What stage of succession is the pond in and how readily can it be re-created? Note



A recently created pond on a landfill site in North Yorkshire



- that the creation of a new pond is not a substitute for the loss of a mature pond. Where possible a new pond should be created several years before the development takes place. Certain measures may be taken to 'prematurely age' new ponds for specific species identified during the baseline survey. Thus, translocation of bed material, vegetation and even water may be a consideration where more mature ponds are being lost. (Note however that little information is available on the success of these techniques.)
- What species are associated with the pond? Certain, often rare species, are associated with very specific conditions and are likely to be the most difficult to mitigate. Expert guidance may be required for such instances.
- Is a method statement being prepared that considers all aspects of pond creation, from the soil properties and new pond contours to the volume of translocated material and time scale across which pond creation will take place?
- Is a monitoring programme in place to evaluate the rate of establishment of a new pond? This should include a contingency strategy if the rate/direction of establishment is not as intended and further measures are required. The results of the baseline survey, such as the PSYM IBI score can be a useful yardstick against which the rate of establishment of the pond is gauged, thus demonstrating the application of PSYM as a monitoring tool.

Ponds are an important habitat for freshwater biodiversity and it is hoped that their new priority status will help better protect them from loss and degradation, by promoting and developing the use of existing and new tools to assess their ecological value.

For further information about the Pond HAP, survey methods, PSYM training courses and pond creation and management, visit: www.pondconservation.org.uk

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