

A preliminary assessment of Important Areas for Ponds (IAPs) in Wales

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Cover photograph by Tristan Hatton-Ellis: a pond in Illtyd Pools SSSI

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SUMMARY

Ponds are an important freshwater habitat and play a key role in maintaining biodiversity at the landscape level. However, they are vulnerable to environmental degradation and until recently, have received relatively little protection at international and national level.

Ponds have recently been added to the list of UK BAP Priority Habitats. The Habitat Action Plan currently being developed will require each of the UK countries to identify ponds of conservation importance.

The Important Areas for Ponds (IAPs) project was set up to identify, and so help protect, networks of the most important ponds for their biodiversity. In Wales, the identification of IAPs is an essential precursor to effective practical pond conservation initiatives, including development of a national pond monitoring programme, protection of high quality ponds and a programme of high quality pond creation. The IAPs project in Wales has also provided the first test of this new approach to pond conservation in the UK.

IAPs are geographical areas which support significant numbers of High Quality Ponds (HQP). High Quality Ponds are identified using a standard set of biological criteria, using available data held by a wide range of pond stakeholders. The criteria are similar to those used to identify priority ponds for the UK BAP Priority Habitats review. Within each Important Area for Ponds, individual ponds have been further classified as being of either European or national importance according to the species or assemblages they support.

In this preliminary IAP assessment in Wales, six areas were identified for IAP status. These are:

- The Isle of Anglesey IAP
- North-east Wales IAP
- Radnorshire and Brecknock IAP
- South Wales Dune Slack Ponds IAP
- Pembrokeshire IAP
- Glamorgan IAP

Another five potential IAPs were identified which seem likely to support significant concentrations of important ponds but which could not be confirmed at present because of lack of data from these areas. These were:

- Llŷn Peninsula pIAP
- Severn Valley pIAP
- North Ceredigion pIAP
- Snowdonia pIAP
- Inland Gower pIAP

Overall, this preliminary assessment of IAPs in Wales has highlighted the importance of the pond resource. This is, however, only a partial assessment: a number of

potentially important datasets could not be included either because of the short timescale of the project, or because they were not accessible in electronic format.

In order to complete the identification of the remaining IAPs in Wales, we recommend that a second phase of the project is used to:

- Obtain and analyse harder-to-access datasets (e.g. paper records) that were not accessible to phase 1 of the project
- Carry out standardised surveys to fill the main data gaps

Once completed, the Welsh IAPs will provide the framework to deliver the Pond HAP through practical ‘on the ground’ conservation action that will protect and enhance the pond resource, and facilitate the use of ponds in strengthening freshwater biodiversity more generally.

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1 Introduction

1.1 The Important Areas for Ponds (IAP) concept

Ponds are increasingly recognised as important freshwater habitats that play a significant role in maintaining freshwater biodiversity at a landscape level. Individually ponds have, on average, lower site (alpha) diversity than rivers or lakes, which has led to the general assumption that they are less important than these larger habitats. However, the value of ponds lies particularly in the varied network of habitats that they provide, such that in terms of regional (gamma) diversity, there is good evidence that they can be more important in maintaining the regional freshwater species pool than other more extensive freshwater habitats (Williams et al., 2004; Davies et al., submitted).

Ponds are also a very vulnerable habitat. Ponds experience all of the impacts that affect other freshwaters, and additional local pressures specific to small waterbodies. For example, ponds near to urban areas are particularly exposed to the introduction of non-native organisms (Copp et al., 2005); ponds are more likely to be damaged than larger waterbodies by the artificial feeding of waterfowl, either for attracting ducks to shoot or on the village duck pond. Ponds on nature reserves with public access may be seriously damaged by the apparently trivial pressures of dogs swimming in them and constantly disturbing sediments. More generally, ponds are particularly vulnerable to pollution stresses because of their small size, which gives them limited buffering capacity compared to rivers or larger lakes. Thus, although the best ponds are amongst the richest freshwater habitats, highly polluted ponds are of lower quality than the worst rivers or lakes (Williams et al., 2004). As a result of widespread destruction, pond numbers are now probably at an all time low across Europe (Hull 1997), and the majority of our remaining ponds are at least partly damaged by pollution (Williams et al., 1998).

Together, the fact that the biodiversity interest of ponds can be widely geographically distributed and the exceptional range of threats they face, makes them challenging for policy makers and managers to protect. Ponds are generally too small to fit the standard model of site-based protection (e.g. SSSIs) and they do not fit the standard model of consent-based protection applicable to lakes and running waters since they are not usually exposed to large, industrial discharges. Despite much interest in the management of catchments, effective protection of ponds through landscape wide protection measures is rarely achieved. For example, small waterbodies have been largely omitted from the recent proposals to protect surface waters under the Water Framework Directive. For all these reasons, new models of protection are required if we are to protect small, vulnerable freshwater habitats, such as ponds, which collectively have high biodiversity value.

To address this concern, the Important Areas for Ponds (IAP) concept has been proposed and developed by Pond Conservation. This is conceptually similar to initiatives developed by Birdlife International (Important Bird Areas (IBAs): Heath et al., 2000) and Plantlife International (Important Plant Areas (IPAs): Anderson, 2002; Important Stonewort Areas (ISAs): Stewart, 2004). The widely distributed nature of

pond interest leads to IAPs generally being concerned with relatively large areas of the landscape, and requiring landscape level solutions to their protection. The present project is the first in which the concept has been developed in detail, making Wales the first area in which the IAP concept has been applied.

The Important Areas for Ponds (IAP) project was set up to identify, and so help protect, a network of the most important ponds and their biodiversity. In identifying IAPs it is anticipated that awareness of the importance of the network of ponds, as well as individual sites, will be increased in order to stimulate better protection and enhancement of pond biodiversity. The current report, and its use, will therefore act both as a template for future IAP initiatives, and as a test of the effectiveness of the concept.

This project is of particular relevance at the current time because of the addition of ponds to the UK BAP Priority Habitat list. The pond Habitat Action Plan currently being developed will require each of the UK countries to identify ponds of conservation importance. For Wales, the first step of this work, collation of existing data to identify the known resource and data gaps, will be well underway as a result of this project.

1.2 Value of IAP project

The current study aimed to identify Important Areas for Ponds (IAPs) in Wales in order to increase awareness of the value of ponds and to aid their monitoring, protection and appropriate management. Specifically, knowledge of IAPs will:

- Highlight IAPs for practitioners (including Conservation Agencies, Local Authorities, Defra and Non-Governmental Organisations) creating a better understanding and recognition of the high quality pond resource.
- Increase awareness of the importance of special and often overlooked pond types (e.g. temporary ponds and mawn pools).
- Act as a focus for pond creation and management, thereby strengthening the existing resource.
- Help in the development and the delivery of the Pond HAP which is due to be approved in 2007.

The identification of IAPs in Wales will be an essential precursor to effective practical pond conservation initiatives, including the development of a Welsh pond inventory, establishment of a national pond monitoring programme, and the building of a vision for pond creation.

Datasets collated in this study will be made available to the Welsh biodiversity record centres and the National Biodiversity Network Gateway if not already held by them. The dataset will also be made publicly available through the National Pond Monitoring Network website.

1.3 The National Pond Monitoring Network

The National Pond Monitoring Network (NPMN) was established in 2002 by Pond Conservation and the Environment Agency to obtain the data needed to protect and enhance the UK's ponds. The NPMN now also has the support of Defra, the Countryside Council for Wales, Natural England, the Scottish Environment Protection Agency, a range of non-governmental organisations and representatives from the water industry.

The main aim of the NPMN is to establish a formal programme for assessing the ecological state of the UK's ponds and how their condition is changing through time. Until this is in place it is difficult to formulate appropriate policies to ensure protection and enhancement of the freshwater resource that ponds support. In addition the NPMN aims to create a focus for UK pond data collection and analysis by bringing together all organisations involved in pond conservation by:

- collating all available pond survey data on an internet accessible database (www.pondnetwork.org.uk), including a UK pond inventory
- promoting pond survey work and developing new NPMN projects
- promoting the use of standard methods
- raising awareness and sharing survey findings through newsletters, reports and an annual meeting.

As an ongoing initiative with wide partner support the NPMN is now being developed as the data infrastructure for developing and reporting on the forthcoming Pond HAP. It will provide a suitable structure for taking forward future data gathering and other work focused on IAPs.

2 Conservation of ponds in Wales

2.1 Importance of ponds for biodiversity

In recent years the value of ponds for biodiversity has begun to be better understood. In particular, there is now greater recognition of the wide range of rare and endangered species these habitats support. In Wales, at least 34 Biodiversity Action Plan (BAP) species are associated with ponds, including plants, invertebrates, amphibians, birds and mammals (Appendix 2). Species with a particular Welsh stronghold include: Dwarf Stonewort (*Nitella tenuissima*), Floating Water-plantain (*Luronium natans*) and Great Crested Newt (*Triturus cristatus*). Ponds are commonly used by other BAP species such as Water Vole (*Arvicola terrestris*) and Otter (*Lutra lutra*), and as feeding grounds by bats and birds.

Ponds are also important for the conservation of more widespread species. A recent review of habitat preferences of aquatic fauna and flora demonstrated that most freshwater species (c. 70%) use pond habitats, with a significant proportion unique to this habitat type (Oertli et al., 2005). Ponds are also important for many semi-aquatic invertebrates and plants that occupy ‘ecotones’, on the boundaries between land and water.

At the landscape level, ponds are remarkably important for freshwater biodiversity, sometimes contributing more to the regional ‘species pool’ than larger waterbodies. Recent studies at the catchment level in southern England have shown that ponds support up to 70% of aquatic plant and macroinvertebrate species across the landscape, more than river, lakes or streams (Williams et al., 2004). Studies of this kind are few, but similar patterns have been found in other parts of Europe (Davies et al., submitted). The role of ponds as stepping-stones, increasing the connectivity between freshwater habitats, is also recognised by the Habitats Directive (Article 10, Council Directive 92/43/EEC).

Both single sites and pond networks can be important for biodiversity. Single ponds can act as biodiversity ‘hotspots’ and refuges for both terrestrial and aquatic organisms, particularly within intensively farmed landscapes. Networks of ponds are a critical component of the habitat of amphibians, plants, and fish on river floodplains, and for wetland mammals and birds that range over large areas. Many invertebrates almost certainly require networks of still water habitats including ponds, although specific data documenting such freshwater invertebrate meta-populations are extremely rare.

2.2 The pond resource in Wales

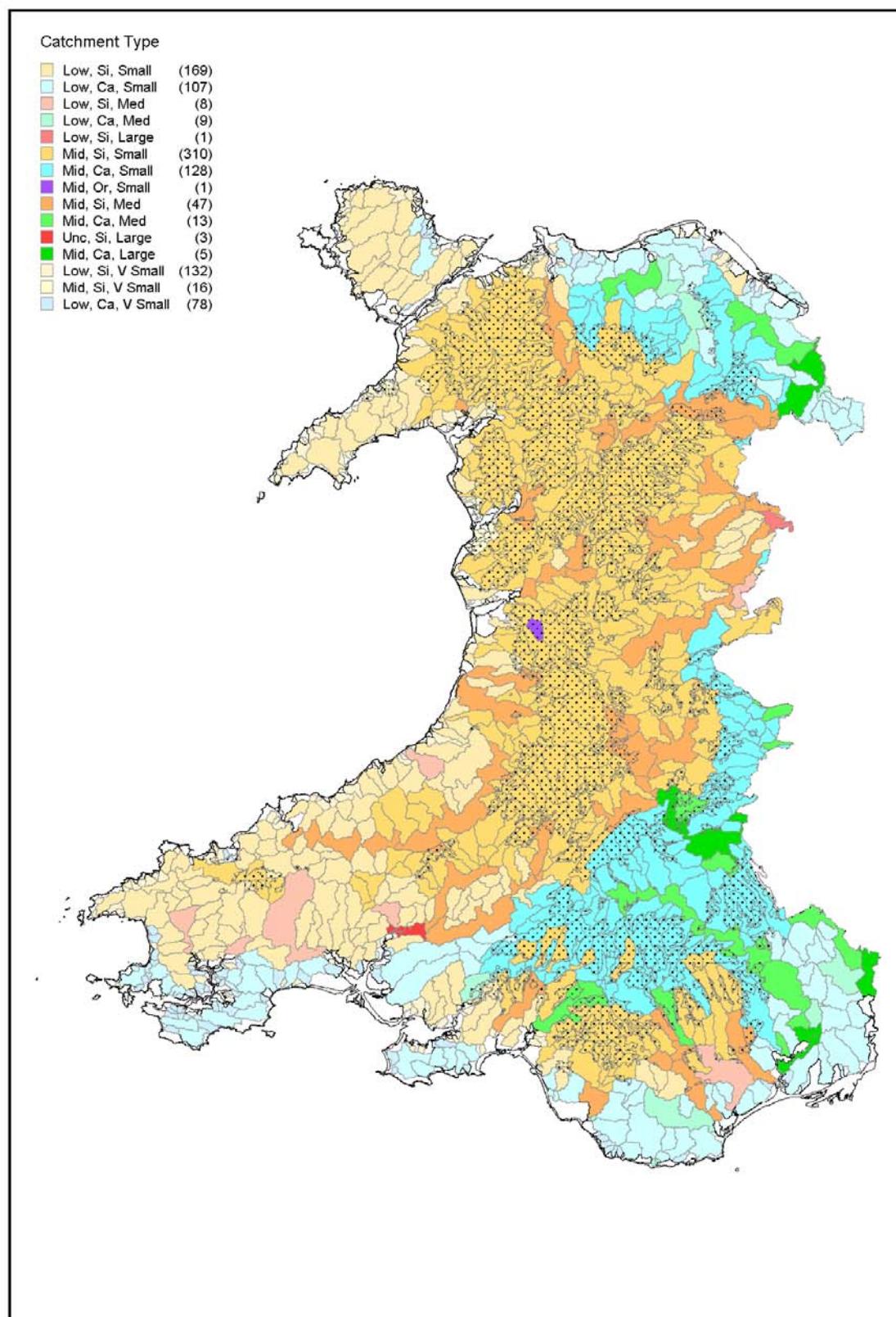
Wales covers an area of approximately 21,225 km², of which around 3,873 km² consists of semi-natural habitats (Jones et al., 2003). Upland areas in Snowdonia, the Cambrian Mountains and the Brecon Beacons form a spine down much of the country which divides the west coast, with a strong maritime influence, from the east. The geology is predominantly acidic (Figure 1). Catchments over much of north and west Wales are small and siliceous, but in the south and east the geology is typically more base-rich. Calcareous strata also occur in north Wales, especially Flintshire, Denbighshire and Anglesey.

The coverage and distribution of semi-natural, cultivated and developed habitats within Wales largely reflects the topography and geology. Much of the semi-natural habitat consists of acidic upland habitats such as upland heathland, blanket bog and upland oakwood, but coastal and floodplain grazing marsh also cover significant areas. Lowland areas are frequently intensively farmed for dairy cattle or sheep; arable cultivation is not extensive in Wales but can be locally abundant in Pembrokeshire and parts of Powys. The main centres of population lie around the M4 corridor in the south and Wrexham / Chester in the north

Reliable data on pond numbers in Wales are not currently available because estimates made for the Countryside Survey have not yet provided separate values for Wales¹ and mapped counts (based on Ordnance Survey data) are unreliable because of the irregularity with which maps are updated. However, ponds are a common and abundant element of many Welsh landscapes, from low-lying river valleys to upland heaths and coastal dune slacks. If we assume that the Countryside Survey average density for Great Britain (c. 1.75 ponds/km²) is applicable to Wales then there would be about 36,000 ponds in Wales.

Some impression of the relative density of waterbodies in Wales can be derived from the UK Lakes database (Hughes et al., 2004). This database shows all the waterbodies mapped on 1:50,000 scale OS maps, including many quite small ponds. Pond occurrences must be interpreted with care as the total number of sites in the database is only about 10% of the known resource. However, it is likely that there is a reasonably good correspondence between areas with high densities of ponds and the water bodies contained in this database (Figure 2).

¹ However, Wales specific estimates will be made in Countryside Survey 2007.



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Figure 1 Catchment types in Wales

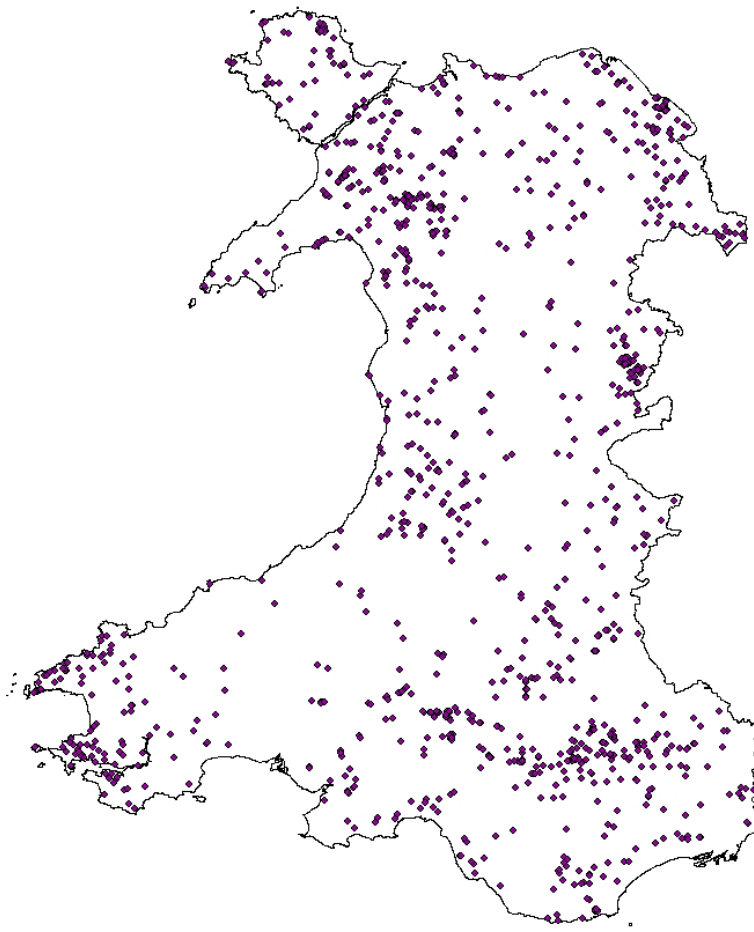


Figure 2 Ponds (waterbodies <2 ha.) included in the UK Lakes dataset

2.3 Ponds and the wider environment

In the present report the standard definition of a pond used in UK studies has been applied (see Section 3.1.1). This includes waterbodies created in a wide variety of ways, through both natural processes and human activities. As a result of this, ponds are an integral component of many terrestrial and aquatic ecosystems.

The small size of ponds means that they can occur in all terrestrial environments, from the coast to the tops of mountains. They can be particularly numerous in predominantly wetland environments where separating them from other habitat units can sometime be difficult. For example, the pools in bog systems are, in effect, ponds of a natural origin, though they would not exist in the absence of the main habitat matrix. Similarly, river systems have many mechanisms by which ponds and pools may be created from the cutting off of meanders to form oxbows, channel switching on active gravel bed rivers, to the pooling of temporary ponds on floodplains. Ponds are also created by succession in lake basins: the latter stages of many successions is a sequence of temporary ponds, and there is evidence that such habitats often outlive the life span of the original lake (Gray, 1988).

Technically, ponds can be separated from other more terrestrial habitats on grounds of hydrology or vegetation structure, although some of the boundaries are necessarily arbitrary. A pond clearly also has to be a basin which retains water, as opposed to a linear habitat with slope-based flow. For example, for the Countryside Survey the difference between a pond and a ditch is pragmatically defined as a waterbody which is 15 times longer than wide; similarly an on-line pond is separated from a widening of a stream when the same ratio is approached.

Ponds also occur in many areas with high water tables: thus they can occur in any landscape which is relatively little drained where there is impervious geology or soils. Indeed many wetlands can be viewed as agglomerations of waterbodies of a variety of sizes. Almost inevitably, such areas which will be richest in the smallest of these waterbodies: ponds.

Although high quality ponds can occur in any habitat type including improved and urban environments, high quality examples are more likely to occur within blocks of semi-natural habitat, where human impacts are generally lower. Moreover, by virtue of their hydrology, some terrestrial habitat types are more likely to contain ponds than others.

Blackstock et al. (2003) summarise the occurrence and distribution of 23 terrestrial habitat types in Wales. Of these, we have identified eleven habitats that are particularly likely to support ponds (Appendix 3). These are: Wet woodland; Lowland meadows; Purple moor-grass and rush-pasture; Lowland Heathland; Reedbeds; Fen; Lowland raised bog; Coastal and floodplain grazing marsh; Upland heathland; Blanket bog; and Coastal sand dunes. These habitats do not occur uniformly across Wales; for example upland heath and wet woodland are particularly common in Snowdonia National Park, Powys and the Brecon Beacons National Park. In contrast, reedbeds are most common on Anglesey, Carmarthenshire and Pembrokeshire. This information is used to provide context for the individual IAPs. If more detailed pond surveys are initiated, it may also be useful to identify pond types within Wales and how these relate to IAPs.

2.4 Threats and opportunities

Ponds are an exceptionally vulnerable habitat type and face many threats. Pond biodiversity is extensively impacted by urban development and agricultural intensification (e.g. drainage and eutrophication). Comparisons of ponds in semi-natural areas from the National Pond Survey and ponds in more intensive landuse from the Lowland Pond Survey show that, on average, ponds in the 'ordinary' countryside support only half of the expected number of wetland plant species found in undegraded ponds (Williams et al., 1998). In upland areas, ponds, in common with other waterbody types, are likely to be widely acidified both by atmospheric deposition and afforestation. However, specific studies of these impacts on ponds are scarce. Ponds may also be affected by agricultural fertilisers and pesticides including sheep dip and avermectins. Inappropriate, or lack of, management can also lead to a loss of pond biodiversity. For example, unpublished data from studies carried out by Pond Conservation show that plant diversity can be affected by (i) an increase in shade in heathland ponds due to the lack of grazing, or (ii) the sudden removal of tree

shade in lightly shaded ponds which can give a competitive advantage to invasive species, both native and alien (e.g. Bulrush, *Typha latifolia*, New Zealand Pigmyweed, *Crassula helmsii*).

In the future, climate change may also exacerbate these threats. Inland, changes in site hydrology may lead to temporary ponds drying out completely and to more permanent ponds becoming shallower perhaps, reducing dilution of pollutants. Rising sea levels may also impact coastal dune slack systems. It is possible that losses of seasonal ponds may be balanced by the shallowing of existing deeper sites; whether such a process will occur, and if it does, whether the 'new' temporary ponds will be good habitats for rare and widely dispersed obligate temporary pond species such as the Fairy Shrimp *Chirocephalus diaphanus*, is unclear. Certainly, given the large number of shallow ponds in the countryside (c. 40% of ponds in the Lowland Pond Survey 1996 that contained water in summer were 10 cm or less deep (Williams et al., 1998)), there is the potential for a very large-scale loss of shallow water habitat. Increasing air and water temperatures may well benefit some thermophiles like dragonflies. However, it is equally possible that dragonflies may follow the pattern shown by butterflies in which widespread habitat generalists are spreading under climate change influences, whereas habitat specialists are declining under the effects of continued unsuitable habitat management, irrespective of the general warming (Warren et al., 2001). Long-term monitoring is needed to assess these changes.

Although there are not yet specific counts of ponds number in Wales, or estimates of changes in numbers, it is likely that patterns in Wales will be broadly similar to those seen in Great Britain as a whole. Comparison of current Great Britain estimates of pond numbers with estimates from the 1920s (Rackham, 1986; Biggs et al., 2005) suggests that numbers in the UK are probably at an all time low, although now relatively stable (Haines-Young et al., 2000). However, turnover remains high, with about 1% of the total pond resource both lost and created each year (Haines-Young et al., 2000). Although national estimates are not available for Wales there is some evidence that pond numbers may be increasing in some Welsh regions, e.g. Cardiff (e.g. Carey et al., 1999).

Ponds are widely threatened but they are also potentially the most easily protected of all freshwater habitats. The creation of new ponds, in particular, potentially provides an important opportunity for landscape level protection of ponds, and also for more general conservation of aquatic biodiversity.

It is clear that new ponds, when well-designed and protected from surface water pollution, can be exceptionally rich and valuable habitats. Thus, at Pinkhill Meadow in Oxfordshire, a series of ponds created in the early 1990s by Pond Conservation, and subsequently carefully monitored, quickly became as rich as the top 5% of sites in the National Pond Survey database of high quality minimally impaired sites (Williams et al., in press).

At present, however, little is known of the value of many new ponds that are created. However, there are strong indications that design and usage is often sub-optimal for biodiversity. For example, a high proportion of new ponds are fed by ditches or streams that are likely to be polluted and anecdotal evidence suggests that large numbers of new ponds are stocked with fish.

Despite these shortcomings in the current design and creation of many new ponds, the relatively small size of ponds and our understanding of the techniques of good pond creation means that they can be easily created at low cost and, using simple design principles, can rapidly attract a wide range of freshwater wildlife, including species of conservation concern. In addition, because pond catchments also tend to be relatively small, and can be more readily protected than entire lake, river or stream catchments, it is quite feasible to create new ponds with entirely semi-natural catchments which will prevent a large component of surface water pollution impacts in the long-term (Davies, 2005).

The low cost of creation and protection, and high biodiversity value of ponds, means that they have the potential to play a valuable role in enhancing aquatic biodiversity at a landscape scale. Overall, the reduction in pond density is technically straightforward to reverse. In addition, new ponds can be strategically sited to create links, or stepping stones, between existing aquatic habitats, both still and running. Conversely, ponds can be sited in more remote areas, providing habitats that encourage colonisation by a different range of aquatic communities, and adding to regional diversity.

2.5 Pond protection

2.5.1 European legislation

Two pieces of European legislation are particularly relevant to ponds: the Habitats Directive (92/43/EEC) and the Water Framework Directive (2000/60/EC). Under the Habitats Directive, the UK has international obligations for a range of species found in ponds (Appendix 2). Annex 1 of the Directive also lists eight “habitats of high conservation importance” that either partly or wholly include ponds (see Table 2, in Section 3.3). In practice, however, most Special Areas for Conservation (SACs) focus on larger waterbodies, so the implementation of the Habitats Directive within UK policy or legislation has, so far, had relatively little direct impact on pond protection. However, the added protection that the Habitats Directive has provided for many wetland habitats is likely to have indirect benefits to ponds within these habitats.

The Water Framework Directive (WFD) is intended to protect the ecological quality of *all* waters in a catchment context. However, the UK, like most other national administrations, has adopted the 50 ha size limit of the WFD System A for the identification of standing waterbodies to which WFD will apply. Waterbodies in protected areas above 5 ha in area will also be included although this will only affect about 250 sites across the whole of England and Wales. Therefore Europe’s most powerful piece of water legislation, as currently being implemented, is likely to bring relatively little additional protection for important ponds.

2.5.2 UK national legislation

At a UK level many high quality Welsh ponds occur within sites designated as Sites of Special Scientific Interest (SSSIs). However, SSSI site selection criteria tend to favour sites with individually high alpha diversity (e.g. using criteria such as plant richness or dragonfly richness, or groups such as birds and otters which require extensive habitats). This inevitably tends to bias the sample against all but the very

richest individual ponds. With the exception of recently designated Great Crested Newt SACs, this means that ponds are typically not the main reason for site designation. Thus, their creation, management and protection tends to be incidental and not a specific requirement for the maintenance of site condition. Fortunately, pond creation or management is a frequent feature of conservation projects in protected sites, sometimes as a by-product of other activities. On National Nature Reserves (NNRs) in particular, wardens often create ponds during larger projects (Table 1). However, these activities are often neither recorded nor monitored, hence their overall value is difficult to assess.

Table 1 Examples of Recent Pond Creation and Management work on NNRs

NNR	Habitat	Activity	Purpose
Cors Bodeilio	Fen	Pond creation	Maintenance of Lesser Bearded Stonewort <i>Chara curta</i>
Cors Caron	Lowland Raised Bog	Pond creation	Water level management
Cors Erddreiniog	Fen	Pond creation	Causeway construction; Water level and quality management for fen features; Stonewort Habitat
Fenns, Whixhall and Bettisfield Mosses	Lowland Raised Bog	Pond creation	White-faced darter habitat management
Oxwich	Reedbed	Reed cutting, silt removal	Maintenance of standing water feature
Rhos Llawr Cwrt	Purple moor-grass (rhos) pastures	Water level management	Maintenance of marsh fritillary habitat
Stackpole	Dune grassland	Silt removal	Maintenance of pool for stoneworts and dragonflies

A range of ponds in Wales are indirectly protected through the UK BAP through the species they support (e.g. Great Crested Newt, some stoneworts), through freshwater habitats which are already designated as Priority Habitats (e.g. lake HAPs) and through Local Biodiversity Action Plans for ponds in some parts of Wales (e.g. Wrexham).

In part because of the many shortcomings of the existing protection system, ponds have recently been identified as a new UK BAP Priority Habitat. The first step in the development of Habitat Action Plan (HAP) will be to obtain information on the most important pond sites and areas across the UK. The IAP project will provide this for Wales.

At a more local level ponds potentially also receive some protection through the local planning process, and through agri-environment schemes, although the effectiveness of these policies has been little evaluated.

3 Selection of Important Areas for Ponds (IAPs) in Wales

3.1 Definitions

3.1.1 Pond definition

Since the beginning of freshwater biology as a science, people have been proposing definitions of ponds based on factors such as the occurrence of rooted wetland plants, light penetration and water depth (see Biggs et al., 2005 for a review). None of these definitions has proved entirely satisfactory in terms of practicality, reliability or ease of use. The main definition now used in the UK is based on waterbody surface area and has been used for all national surveys of pond plant and invertebrate assemblages undertaken in the UK over the last 10 years (e.g. National Pond Survey, Countryside Survey). This definition is:

‘a body of standing water between 1 m² and 2 hectares in area, which usually holds water for at least four months of the year’.

This is a broad and inclusive definition, which includes both natural and man-made ponds. The definition also includes waterbodies across the hydrological gradient from temporary to permanent: the “at least four months of the year” period is the approximate time that water needs to remain in a depression for it to support wetland plants.

3.1.2 Important Area for Ponds (IAP) and High Quality Ponds (HQP) definitions

The definition of an Important Area for Ponds (IAP) used in this study is: a geographical area particularly important because it has ponds that support species of conservation concern, rich assemblages, or unusual or distinctive pond types likely to support special freshwater plant and animal assemblages.

This definition is, like the pond definition above, purposely broad, so that it can be applied at a range of geographic scales, depending on the information available and the characteristics of the ponds within the IAP.

Within an IAP, ponds or group of ponds that qualify under the IAP criteria (Section 3.3) are defined as ‘High Quality Ponds’ (HQP).

3.2 Overview of IAP selection process

The process for identifying Important Areas for Ponds in Wales followed the following steps:

1. Criteria were identified which could be used to identify High Quality Ponds (HQP).
2. A wide range of pond and freshwater specialists were contacted to provide biotic data and expert knowledge.
3. Species and assemblage data held by Pond Conservation and others were collated.

4. Data were evaluated against the HQP criteria.
5. HQP were grouped geographically, to define Important Areas for Ponds (IAPs) based on geographical location, landscape and pond type, and the species or assemblage they supported.

The IAP selection process is described in more detail in the following sections.

3.3 High Quality Ponds (HQPs) selection criteria

The criteria for selecting High Quality Ponds were agreed in discussions between Pond Conservation and CCW and are based largely on the criteria used in the proposal for ponds to become UK BAP Priority Habitats (Appendix 4). There are five criteria in total:

1. Habitats of high conservation importance
2. Species of high conservation importance
3. Exceptional assemblages of key biotic groups
4. Ponds of high ecological quality
5. Other important ponds

Definitions for each criterion are given in Table 2.

The only difference between the pond Priority Habitat proposed criteria and those used to define High Quality Ponds was to Criterion 2, where the qualifying pond threshold was lowered from three Nationally Scarce aquatic macroinvertebrate species for the UK Priority Habitat to one for sites in Wales. Aquatic invertebrate assemblage data are scarce in Wales, and this change was made in order to maximise the use of existing aquatic invertebrate records in defining IAPs. In practice, the nature of the data collected (see Section 3.4) meant that HQPs were identified mainly through Criteria 2 and 3. Criteria 1 and 5 could only be applied to few ponds, and PSYM data were not available for Wales, and therefore no HQPs were identified using Criterion 4.

Selected High Quality Ponds (HQPs) were further divided into two categories according to their importance in a European and national context depending on the species they supported or their pond type. Sites of European importance were those which supported a pond type or species listed in Annex I or II of the Habitats Directive, respectively (see Appendix 2 for a list of species and Table 2 for a list of habitats).

The exception to this was Great Crested Newt (*Triturus cristatus*). Statutory designation of this species, which is widely distributed usually requires information on population size and viability. Only presence absence data was available in the current study. So Great Crested Newts were only given European HQP Status where they were known to be important in SSSI or SAC designation.

Table 2 High Quality Pond (HQP) selection criteria

<p>Criterion 1:</p> <p><i>Habitats of high conservation importance.</i> Ponds that meet criteria under Annex 1 of the Habitats Directive. Those relevant to ponds are:</p> <table> <tr> <th><i>Number</i></th><th><i>Habitat type</i></th></tr> <tr> <td>2190</td><td>Humid dune slacks</td></tr> <tr> <td>3110</td><td>Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)</td></tr> <tr> <td>3130</td><td>Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or the <i>Isoeto-Nanojuncetea</i></td></tr> <tr> <td>3140</td><td>Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> species</td></tr> <tr> <td>3150</td><td>Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i>-type vegetation</td></tr> <tr> <td>3160</td><td>Natural dystrophic lakes and ponds</td></tr> <tr> <td>3170</td><td>Mediterranean temporary ponds</td></tr> <tr> <td>3180</td><td>Turloughs</td></tr> </table>		<i>Number</i>	<i>Habitat type</i>	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
<i>Number</i>	<i>Habitat type</i>																		
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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																		
<p>Criterion 2:</p> <p><i>Species of high conservation importance.</i> Ponds supporting Red Data Book species, 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 at least one Nationally Scarce aquatic invertebrate species (see Appendix 4).</p>																			
<p>Criterion 3:</p> <p><i>Exceptional assemblages of key biotic groups:</i> 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 plant¹ species or ≥ 50 aquatic macroinvertebrate² species)³.</p>																			
<p>Criterion 4:</p> <p><i>Ponds of high ecological quality:</i> Ponds classified in the top PSYM category (“high”) for ecological quality (i.e. having a PSYM score $\geq 75\%$). PSYM (the Predictive SYstem for Multimetrics) is a method for assessing the biological quality of small lakes, ponds and canals in England and Wales. Plant species and / or invertebrate families are surveyed using a standard method. The PSYM model makes predictions for the site based on environmental data and using a minimally impaired waterbody dataset. Comparison of the prediction and observed data gives a percentage score for ponds quality.</p>																			
<p>Criterion 5:</p> <p><i>Other important ponds:</i> Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context e.g. pingos and dune slack ponds.</p>																			
<p>Notes:</p> <p>¹The term ‘wetland plant’ refers to species defined as wetland plants on the National Pond Survey field recording sheet list (Pond Action, 1998).</p> <p>²Macroinvertebrates in the following groups: flatworms, leeches, snails, crustaceans, alderflies, mayflies, stoneflies, water bugs, water beetles and caddis flies.</p> <p>³Species richness thresholds are based on results of the National Pond Survey of undegraded sites, which were surveyed using a standardised 3-minutes sample and laboratory sorting and identification.</p>																			

3.4 Data collection

The existence and availability of Welsh data on ponds was assessed by contacting a wide range of pond and freshwater researchers, practitioners and individuals, both in Wales and elsewhere (see Appendix 6 for a full list). In addition, the Wales LBAP coordinator circulated a project summary and a request for data to all BAP workers in Wales. In total, 55 contacts were made, of which the majority were CCW staff. The organisations contacted included:

- The Countryside Council for Wales
- The Environment Agency
- The National Museum and Galleries of Wales
- Wildlife Trusts
- Biological record centres
- Universities (e.g. Cardiff)
- Non-governmental organisations (e.g. Plantlife and the British Dragonfly Society)
- Local Authorities
- Voluntary organisations (e.g. The Botanical Society of the British Isles)
- Key individuals and national referees for specific groups (e.g. John Bratton and Nick Stewart).

Pond data were gathered for wetland plants, invertebrates, amphibians and mammals (Table 3, see Appendix 6 for more details). Most of the data collected consisted of species records. Unfortunately little data on biological assemblages was available, except Pond Conservation's data and information from studies in South-east Wales. In the latter, standardised plant surveys have been carried out on a large number of ponds under the supervision of the National Galleries and Museum of Wales. The lack of assemblage data limited the range of criteria which could be applied, as noted in the previous section.

The IAP assessment was carried out primarily on data in electronic format, with the addition of sites (ponds or pond complexes) recommended by experts for their conservation interest. Species information for the additional expert-recommended sites is, however, held in notebooks or other paper-based format, and could not be extracted for the current assessment.

Table 3 Summary of data available for the IAP selection (see Appendix 6 for more details)

Biotic group	Data type
Wetland plants	Stonewort species Pillwort and Three-lobed Water-crowfoot records Vascular plant assemblages (emergent and aquatic species)
Invertebrates	Dragonflies records (mainly adults) Fairy Shrimp records Water beetle assemblages Macroinvertebrate assemblages
Amphibians	Great Crested Newt records
Mammals	Water Vole records

Records not already held by Welsh biodiversity record centres will be provided to these centres, and to the National Biodiversity Network Gateway. All the data collected in this study will be made publicly available through the NPMN website.

Inventory data were also collated to provide the National Pond Monitoring Network (NPMN) with information that can be used as part of a UK-wide online pond inventory (www.pondnetwork.org.uk). This included all biological records provided in electronic format, as well as two pond inventory datasets provided by CCW (the Dyfed pond inventory and the Anglesey pond inventory), and the waterbodies less than 2 ha in area included in the UK lakes database (Hughes et al., 2004.)

3.5 Identification of Important Areas for Ponds (IAP)

The process of aggregating High Quality Ponds (HQP) to create a smaller number of Important Areas for Ponds (IAPs) was based on identifying geographically located concentrations of High Quality Ponds. To identify concentrations of ponds GIS-based distribution maps of High Quality Ponds (HQP) were used in conjunction with Ordnance Survey maps to identify two types of areas:

- ***Important Areas for Ponds (IAPs)***, for which clear and unambiguous data was available (e.g. North-east Wales).
- ***Potential Important Areas for Ponds (pIAPs)***, where either (i) few data are available on ponds, but the area is known to support a high density of small waterbodies, and species or assemblages of national or European interest (e.g. Snowdonia), or (ii) location data derive from expert knowledge and detailed information is unavailable in the context of the current study (e.g. North Ceredigion).

In total, 6 IAPs and 5 pIAPs were defined by this means. Within each IAP, either actual or proposed, sites were then grouped in terms of their importance, either European or national and, where possible, in terms of pond type (e.g. mawn pools, heathland pools, coastal dune slacks).

3.6 Data limitation and gaps

The constraints of time, data type and availability meant that some relevant information could not be included in the current assessment. Specifically:

- Many historical and recent records are not stored in electronic format. Particularly valuable data are held by (i) CCW regional offices, (ii) local authorities, (iii) recorders (e.g. BSBI vice-counties) and a range of key individuals (e.g. John Bratton and Arthur Chater).
- Species records from many databases (such as the National Biodiversity Network Gateway) do not have associated habitat data so that it is not possible, without local knowledge, to identify whether records are from ponds or other freshwater habitats.
- A number of potentially important datasets could not be obtained within the short time-scale of the current project. This is particularly relevant to invertebrate records (e.g. CCW, Balfour-Browne Club and White-clawed Crayfish, *Austropotamobius pallipes*).

Data quality also varied geographically. Areas which were particularly poorly represented included Ceredigion, Carmarthenshire, Conwy, Gwynedd and Montgomeryshire.

Finally, there were very few ponds where comprehensive survey data covering a wide range of taxa were available. Most ponds had data only for individual taxa or taxon groups, and this made assessment of the overall conservation value of individual ponds difficult. This highlights the need for a structured pond survey programme in Wales using a standardised technique such as National Pond Survey or PSYM (Pond Conservation, 1998; Pond Conservation, 2002).

Priorities for further work are discussed in Section 7.2.

4 Overview

4.1 Important Areas for Ponds (IAPs)

A total of 6 IAPs were identified in Wales where a high concentration of HQPs occur. These are (Figure 3):

- **The Isle of Anglesey IAP:** situated off the north-west coast of Wales, Anglesey has a high density and a great variety of ponds, with many sites of high conservation value for their species and assemblages.
- **North-east Wales IAP:** this area includes ponds created both as a result of past industrial and agricultural activities, and also by natural processes. This area is a well-known stronghold for Great Crested Newt (*Triturus cristatus*).
- **Radnorshire and Brecknock IAP:** this area is particularly well known for the ‘mawn’ pools, a distinctive type of pond which supports a flora and fauna of national importance.
- **South Wales Dune Slack Ponds IAP:** this is an IAP which includes the main dune slack pond complexes in South Wales and includes sites from several discrete geographic locations. Dune slack ponds are an Annex I habitat which tend to support a rich diversity of plants, particularly stoneworts, and invertebrates.
- **Pembrokeshire IAP:** this IAP includes Ramsey Island and is rich in heathland ponds. The mosaic of semi-natural habitats ensures the persistence of high quality ponds which support a rich fauna and flora.
- **Glamorgan IAP:** this area of South Wales has a high population density but still supports a wide range of ponds, both natural and manmade as a result of past industries. Sites important for scarce plants, invertebrates and Great Crested Newt (*Triturus cristatus*) occur throughout the IAP.

4.2 Potential Important Areas for Ponds (pIAPs)

In addition, another 5 areas of Wales, where data and expert knowledge suggested there might be a cluster of important ponds, but insufficient information was available at this time, were proposed as potential Important Areas for Ponds (pIAPs). These are (Figure 3):

- **Llŷn Peninsula pIAP:** a few pond sites in coastal heathlands and dunes in this IAP support pond species and assemblages of national importance. However, given that this area has a relatively high proportion of semi-natural landuse, it seems likely that the number of high quality ponds will be significantly greater than has so far been identified.
- **Severn Valley pIAP:** relatively few data were available for this area. However, important ponds with Great Crested Newts (*Triturus cristatus*) are scattered throughout the IAP, and ponds on the floodplain of the River Severn or those near the Montgomery Canal may support diverse plant assemblages and uncommon species.

- **North Ceredigion pIAP:** upland ponds in this area support plant assemblages of Annex I type 3110 and 3130, and so may be of European importance. Unfortunately, although data do exist for this area, they are not currently available in electronic format and could not be used in the present study.
- **Snowdonia pIAP:** although ponds are numerous in this area, attention has so far mainly been focussed on larger upland lakes which support plant assemblages of European importance. Further work on smaller standing waterbodies may well reveal their importance for those species and assemblages, as well as for macroinvertebrates, particularly water beetles.
- **Inland Gower pIAP:** this proposed IAP includes ponds on the Gower commons, which include a range of heathland sites with wetland plant and macroinvertebrate species of national importance, and ponds with Great Crested Newts (*Triturus cristatus*). Overall, the data available is insufficient to confirm inland Gower as an IAP, but it is likely that further data would show the importance of this area for pond biodiversity.

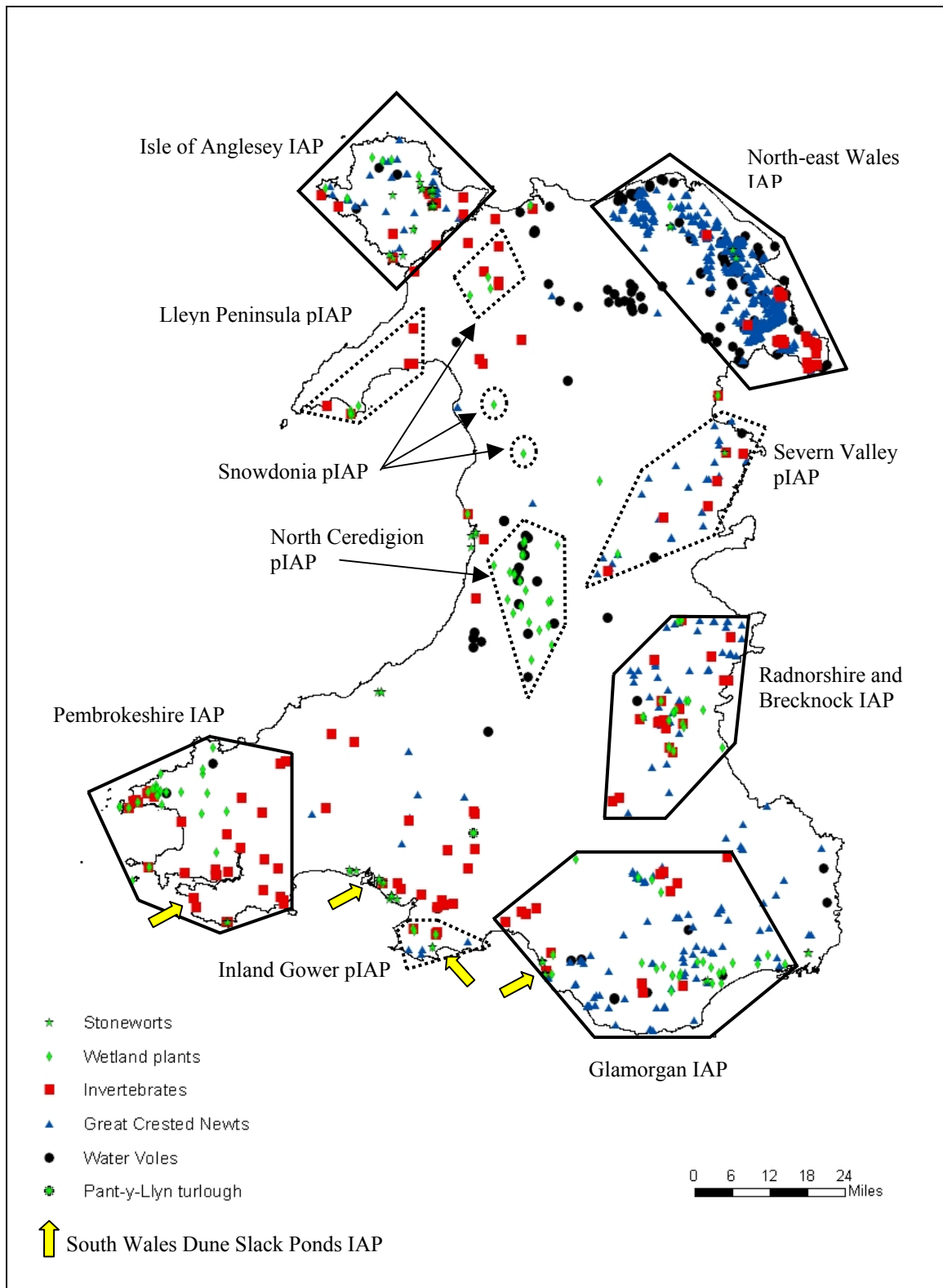


Figure 3 Overview of IAPs and potential IAPs in Wales (please refer to IAP accounts for more details)

5 Important Areas for Ponds (IAPs) in Wales

5.1 The Isle of Anglesey IAP

LBAP Area:

- Ynys Môn / Anglesey.

5.1.1 Site description

The Isle of Anglesey, off the north west coast of Wales, is particularly important for its standing freshwater habitats (Duigan et al., 1996; Burgess et al., 2006). The island includes three SACs notified for freshwater habitat and one for Great Crested Newt, as well as a further 10 SSSIs notified for one or more freshwater habitats or species. Anglesey contains a wide range of BAP habitats, but has significant areas of sand dune and reedbed.

Anglesey also has a particularly high pond density. A recent inventory of ponds collated by Anglesey County Council reported that there were 3150 ponds on Anglesey, a density of 4.4 per square kilometre. This is well above the national average of 1.7 ponds per square kilometre for Britain as a whole (Haines-Young et al., 2000).

Not surprisingly, the island includes a wide range of pond types: fen ponds, dune-slack pools and heathland ponds. The rich diversity of pond types and species found on Anglesey is linked to its complex geology, and its high pond density. Two groups of High Quality Ponds (HQPs) are identified as of European importance for their stonewort assemblages, and for the presence of Great Crested Newt (*Triturus cristatus*): the Anglesey Fens SAC, and the Newborough Warren and Glan-traeth SACs. Many other HQPs, both inside and outside protected areas, support species and assemblages of international and national importance, and the island as a whole qualifies as an Important Area for Pond (IAP).

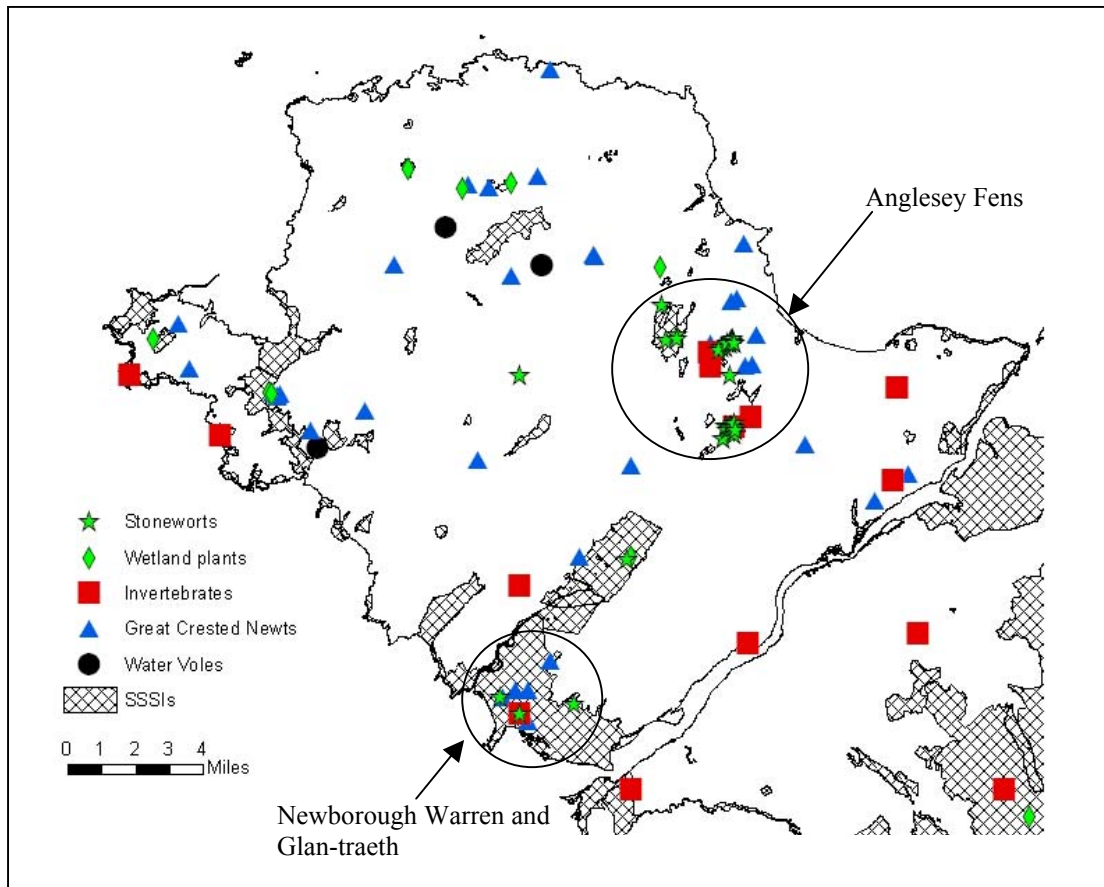


Figure 4 Isle of Anglesey IAP: ponds with vertebrate, invertebrate or plant records which meet the HQP criteria



Figure 5 A small, shallow pond dug in fen habitat on Cors Erddreiniog NNR (photograph by Anita Weatherby)

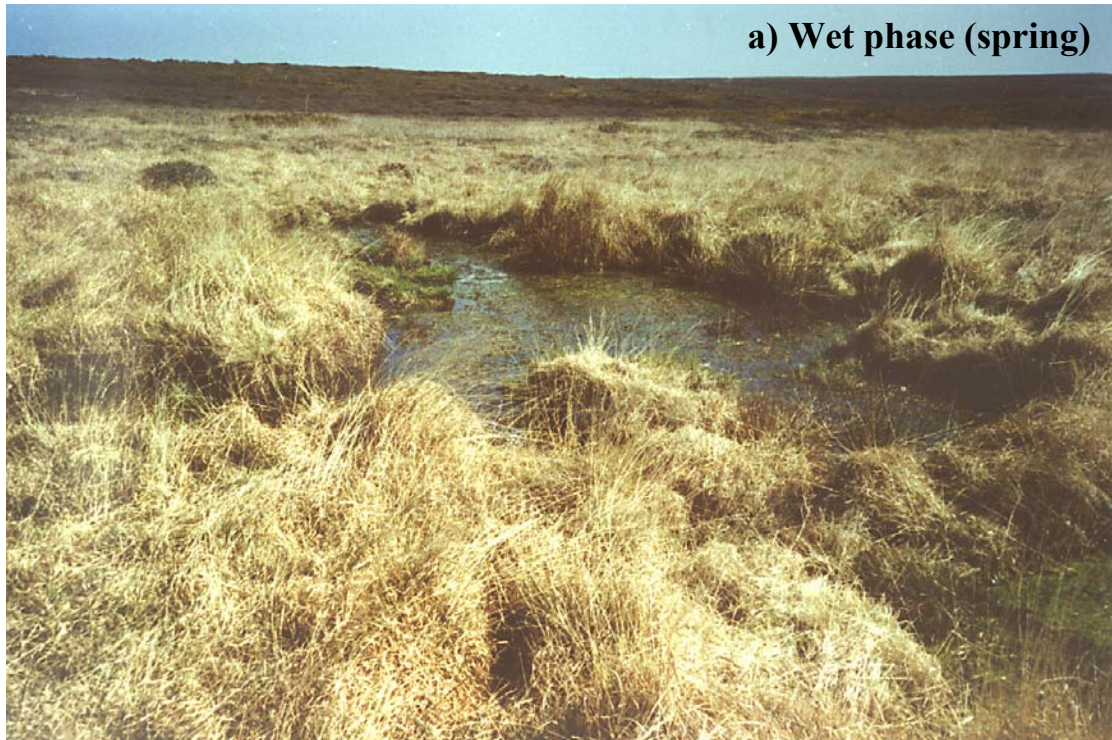


Figure 6 A temporary pond on The Range coastal heathland pond complex (Holyhead) during the a) wet and b) dry phase (photographs by Pascale Nicolet)

5.1.2 High Quality Ponds of European importance

5.1.2.1 Anglesey Fen Ponds

The Anglesey Fen ponds occur within fens associated with a band of limestone strata that run across the island. In addition to ponds, the fens also include a range of other freshwater habitats including flooded peat cuttings, ditches and flushes. The ponds and other waterbodies within the fens are best known for their stonewort interest, which contributes to their designation as an SAC and an Important Stonewort Area. Stonewort species recorded in the Anglesey Fens include the BAP and Nationally Scarce species Lesser Bearded Stonewort (*Chara curta*). The Endangered Dwarf Stonewort (*Nitella tenuissima*) also occurs in seasonally flooded fens and fen pools. Other Nationally Scarce species recorded in the fens are Hedgehog Stonewort (*Chara aculeolata*) and Clustered Stonewort (*Tolypella glomerata*). Some of these fen ponds are also excellent examples of the Annex 1 Habitat 'Hard oligo-mesotrophic waters with benthic vegetation of *Chara* species'.

Other species of significant interest include the BAP species Great Crested Newt (*T. cristatus*) which receives protection at European level and Medicinal Leech (*Hirudo medicinalis*) which is protected under Schedule 5 of the Wildlife and Countryside Act. Nationally Scarce species recorded from ponds include Lesser Water-plantain (*Baldellia ranunculoides*), Fen Pondweed (*Potamogeton coloratus*) and Scarce Blue-tailed Damselfly (*Ischnura pumilio*). The Fen ponds, and other waterbodies, also support rich water beetle assemblages and ten-spined stickleback (*Pungitius pungitius*), a local species in Wales. Ponds which qualify according to the HQP criteria occur both within and outside designated areas.

Summary of site features and qualifying criteria

Site name	Anglesey Fen Ponds
SSSI and SAC designation	Some ponds within the Anglesey fens are within SSSIs (e.g. Cors Goch; Waun Eurad, Gwen Fro and Rhos Y Gad, Cors Bodeilio and Caeau Talwyn). The SAC covers all SSSI except Talwyn Meadows.
IAP qualifying criteria	<i>Criterion 1:</i> 3140 Hard oligo-mesotrophic with benthic vegetation of <i>Chara</i> species. <i>Criterion 2:</i> Annex II, RDB, NS and BAP species. <i>Criterion 5:</i> Fen ponds.
Ordnance survey grid reference: SH5080	

5.1.2.2 Newborough Warren and Glan-traeth Ponds

The Newborough Warren Ponds occur within the large Newborough sand dune system, on the southern part of Anglesey. The site includes winter-flooded dune slack pools, ponds dug for fire prevention or for nature conservation purposes and old sand workings. Glan-traeth is just north of the open dune system and is a complex of ponds resulting from sand extraction. This area of former dunes is now stabilised and lightly grazed by livestock. Due to their close proximity, the two sites are considered as one High Quality Pond grouping.

Newborough Warren is designated as an SAC and a SSSI. It is also an Important Stonewort Area and species of significant interest include the Vulnerable and BAP species Baltic Stonewort (*Chara baltica*), the Nationally Scarce Clustered Stonewort (*T. glomerata*) and Hedgehog Stonewort (*C. aculeolata*).

The Newborough Warren and Glan-traeth ponds support the Annex II and BAP species Great Crested Newt (*Triturus cristatus*), and the BAP species Medicinal Leech (*H. medicinalis*). The Hairy Dragonfly (*Brachytron pratense*) and the Small Red Damselfly (*Ceragrion tenellum*), both Nationally Scarce species, also occur at the site, although no records were available for the present study. The ponds are known to support a rich aquatic invertebrate fauna, particularly water beetles and water bugs.

Summary of site features and qualifying criteria

Site name	Newborough Warren and Glan-traeth Ponds
SSSI and SAC designation	Ponds are within the Newborough Warren SSSI. SAC: Abermenai to Aberffraw Dunes.
IAP qualifying criteria	<i>Criterion 1:</i> 2190 Humid dune slacks. <i>Criterion 2:</i> Annex II, RDB, NS and BAP species. <i>Criterion 5:</i> Dune-slack pond complex.
Ordnance survey grid reference: SH4064	

5.1.3 High Quality Ponds of national importance

According to the data collated, there are at least another 30 ponds on Anglesey are of national importance for their species or assemblages. These are likely to represent only a small proportion of ponds supporting species of national interest on Anglesey. At least three sites support Water Vole (*Arvicola terrestris*) and there are many records for Great Crested Newt (*Triturus cristatus*) scattered throughout the island, both within and outside designated areas.

The numerous coastal heathland ponds and temporary pool complexes are important for their water beetle assemblages (e.g. The Range, Holy Island), dragonflies (Malltraeth Marsh SSSI) and wetland plants. Both Pillwort (*Pilularia globulifera*) and Three-lobed Water-crowfoot (*Ranunculus tripartitus*) are recorded from Holy Island coastal heathland and other sites inland, both within and outside SSSIs. Both species are particularly associated with temporary ponds, although Pillwort is also recorded from the margins of lakes which have extensive drawdown zones created by water level fluctuations.

Summary of site features and qualifying criteria

Site name	Anglesey Ponds
SSSI and SAC designation	Some ponds are within SSSIs.
IAP qualifying criteria	<i>Criterion 2:</i> RDB, NS and BAP species. <i>Criterion 5:</i> Temporary ponds.
Ordnance survey grid reference: SH4281	

5.2 North-east Wales IAP

LBAP Areas:

- Sir y Fflint / Flintshire;
- Ddinbych / Denbighshire;
- Wrecsam / Wrexham.

5.2.1 Site description

The North-east Wales IAP covers the three counties of Flintshire, Denbighshire and Wrexham. This area supports large numbers of natural and man-made ponds with a very high pond density exceeding 30 ponds per square kilometre (18 times the national average) in parts of Wrexham County. Natural ponds within the IAP include kettle-holes (relicts from the last ice age), floodplain oxbows and dune slack pools. The numerous man-made waterbodies include ponds created by past mining and quarrying activities. The county of Wrexham, like the neighbouring English counties of Cheshire and Shropshire, is particularly rich in marl pits, dug to reach the lime-rich “marl” which was spread on fields as a fertiliser. This part of the IAP coincides with part of the Shropshire-Cheshire Meres and Mosses Ramsar site, and this IAP could usefully be extended into England to ensure co-ordinated action with neighbouring BAP authorities.

The North-east Wales IAP has three SACs and a number of SSSIs designated for their Great Crested Newt (*Triturus cristatus*) populations. The three counties also support species and assemblages of national importance. Natterjack Toad (*Bufo calamita*) has been introduced to the Point of Ayr and other north-east Wales dune slack ponds but detailed data on its distribution were not available for the current assessment. Current Welsh distribution of the Natterjack Toad in Wales is within the Gronant Dunes and Talcare Warren SSSI.

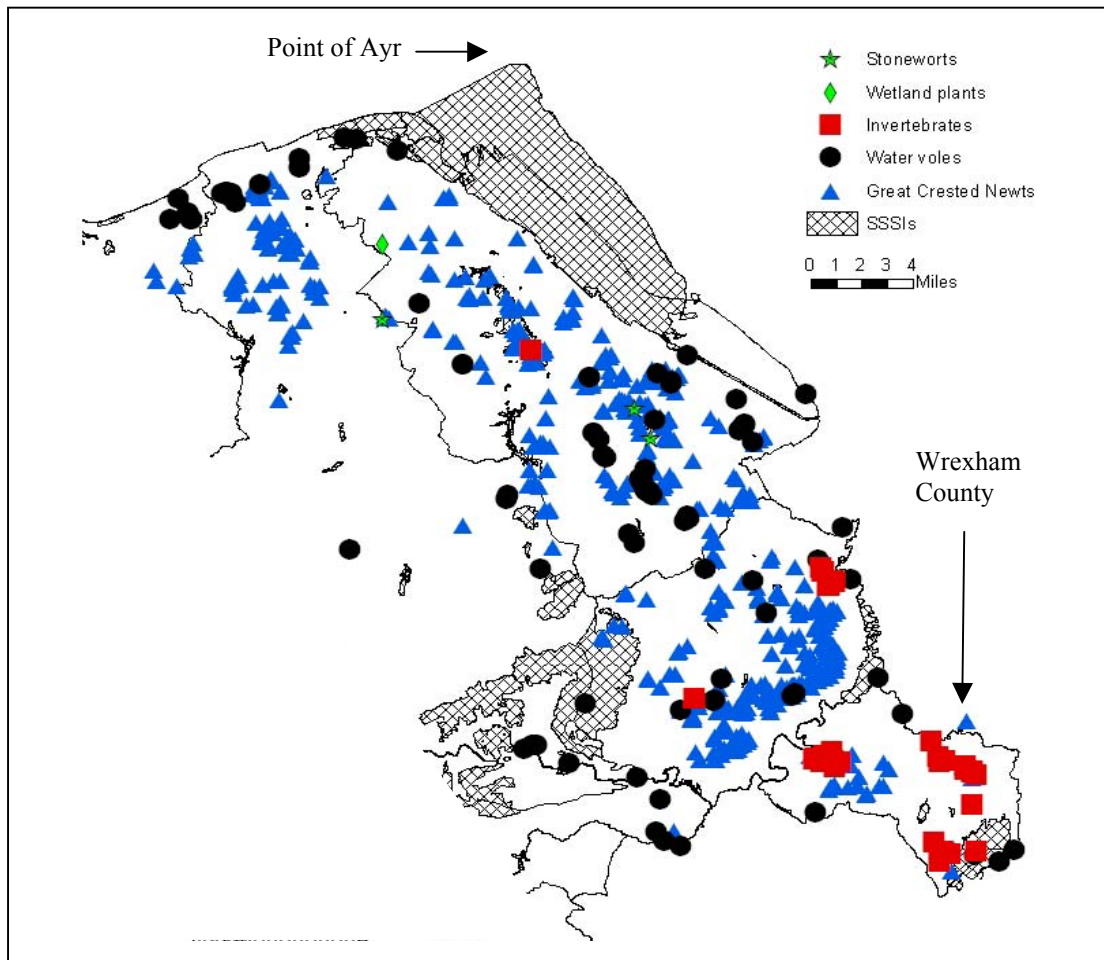


Figure 7 North-east Wales IAP: ponds with vertebrate, invertebrate or plant records which meet the HQP criteria (showing local authority boundaries)



Figure 8 Marl pit ponds in Wrexham County Borough Council (photographs by Andy Harmer)

5.2.2 High Quality Ponds of European importance

5.2.2.1 North-east Wales Ponds

The presence of a high density of populations of the Habitats Directive Annex II species Great Crested Newt (*T. cristatus*) is justification for making the whole of North-east Wales an IAP of European importance. Three sites in this area support one of the largest Great Crested Newt populations in Britain, and as a result, have been designated as SACs. Halkyn Mountain SAC is mainly common land with pond complexes created as a result of metal mining and rock quarrying. Johnstown Newt Sites SAC comprises two post-industrial sites where ponds were created by coal and clay extraction. Ponds in the Deeside & Buckley Newt Sites SAC were created as a result of clay, sand and coal extraction, and agricultural practices. Breeding ponds have also been created as part of nature conservation management, and as mitigation measures following development, e.g. landfilling of quarry sites. Further exceptional populations are considered to occur at Maes-Mynan and Rhosesmor sand quarries, St Asaph and in the landscape that surrounds Wrexham Industrial Estate.

Many ponds in this IAP are of additional value because they support rich amphibian assemblages with up to five native species present i.e. Great Crested Newt (*T. cristatus*), Smooth Newt (*Lissotriton. vulgaris*), Palmate Newt (*Lissotriton helveticus*), Common Frog (*Rana temporaria*) and Common Toad (*B. bufo*). The additional presence of Natterjack Toads (*Epidalea calamita*) in the north of the IAP means that all six British native amphibian species are represented in the area.

Ponds in this group of HQPs also support other species and assemblages of national interest. Data from a macroinvertebrate survey of 60 ponds carried out in 2004 in Wrexham County show that over half of these ponds qualify as HQPs, mainly on the basis of their uncommon water beetle species. These include the BAP and Red Data Book Lesser Silver Water Beetle (*Hydrochara caraboides*) and a number of Nationally Scarce water beetle species including *Hydroglyphus geminus*, *Cercyon convexiusculus*, *Dytiscus circumflexus*, *Ilybius guttiger* and *Hydaticus seminiger*. The White-faced Darter dragonfly (*Leucorrhinia dubia*) occurs in Fenn's Moss, also in Wrexham County, which is ecologically closer to the Cheshire meres and mosses than the ponds previously described. Given these findings it is likely that other ponds and pond complexes throughout the whole of the area support invertebrate species and assemblages of national importance.

Plant data for this area are more limited. However, Nationally Scarce stonewort species, such as Smooth Stonewort (*Nitella flexilis*) are recorded from the Buckley quarries and Clustered Stonewort (*Tolypella glomerata*) in Maes-mynan Sand Pit, which also supports nationally important amphibian populations. According to Stewart (2004) there is scope for further investigation of the numerous quarries and kettle hole ponds in the area. One record for Pillwort (*Pilularia globulifera*) is also known from a pond site near Llyn Helyg. The nationally scarce Cowbane (*Cicuta virosa*) is present in at least one pond near Penymynydd.

Summary of site features and qualifying criteria

Site name	North-east Wales Ponds
SSSI and SAC designation	IAP ponds occur within SSSIs and three SACs: <ul style="list-style-type: none">• Halkyn Mountain/Mynydd Helygain.• Deeside and Buckley Newt Sites.• Johnstown Newt Sites.
IAP qualifying criteria	<i>Criterion 2:</i> Annex II, RDB, NS and BAP species. <i>Criterion 5:</i> Marl pits, kettle holes.
Ordnance survey grid reference: SJ1872	

5.2.3 High Quality Ponds of national importance

The complex of High Quality Ponds in the North-east Wales IAP lead to the whole of this area being of European importance. No additional areas are identified as being of national importance.

5.3 Radnorshire and Brecknock IAP

LBAP Areas:

- Powys;
- Brecon Beacons National Park.

5.3.1 Site description

The Radnorshire and Brecknock IAP covers southern Powys in west Wales, adjacent to the English border. The area contains a number of areas of unenclosed common land at moderate altitude (c. 300-500 m), often dominated by habitats such as upland heath and purple moor-grass pasture. Upland ponds and pools are abundant within this area where they are often collectively referred to as ‘mawn pools’, particularly in Radnorshire. The word ‘mawn’ means ‘peat’ and many of these ponds were created by peat cutting. However, ponds referred to as mawn pools also occur on substrates other than peat, and these are believed to have been created for watering livestock (Fred Slater, pers. com.).

Ponds in the Radnorshire and Brecknock IAP are nationally important for their wetland plant and macroinvertebrate species and assemblages. The area also has many records for Great Crested Newt and Pillwort (Figure 9). Part of the IAP area is already covered by the SSSI network, and ponds or pond species are identified within some SSSI citations as a significant reason for designation. However, there are also High Quality Ponds outside designated areas.

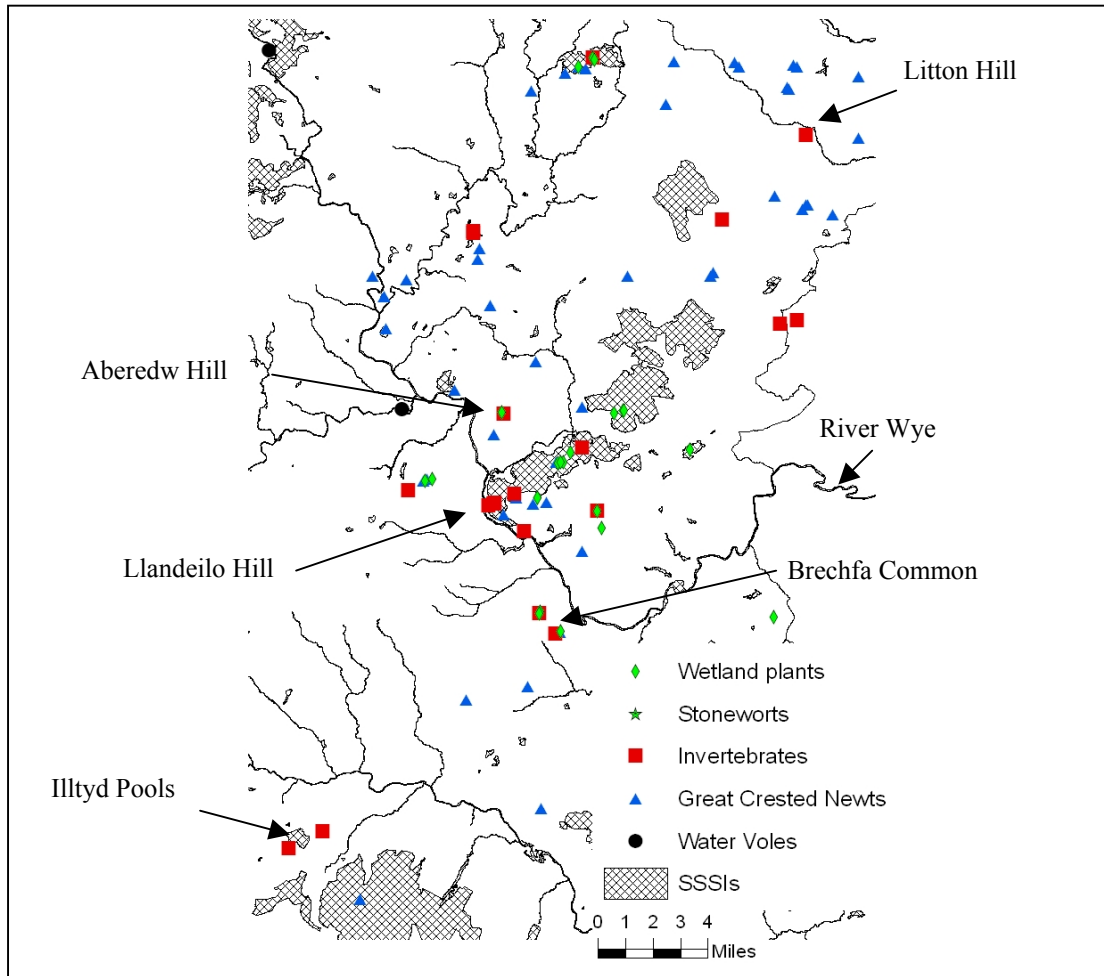


Figure 9 Radnorshire and Brecknock IAP: ponds with vertebrate, invertebrate or plant records which meet the HQP criteria



Figure 10 Mawn pools on a) Llandeilo Hill and b) Illtyd Pools SSSI showing *Littoreletea* habitat (photographs: Jeremy Biggs and Tristan Hatton-Ellis)

5.3.2 High Quality Ponds of European importance

The importance of this IAP at a European level was difficult to assess from existing data. Great Crested Newts (*T. cristatus*) are known from at least 40 ponds within the Radnorshire and Brecknock IAP. However, there are currently no data describing population size and true density. Annex I habitat 3130 ‘Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or the *Isoeto-Nanojuncetea*’ is likely to occur in mawn pools but, again, plant assemblage data is insufficient to evaluate their importance.

5.3.3 High Quality Ponds of national importance

5.3.3.1 Mawn Pools

Mawn pools in the uplands of Radnorshire and Brecknock support a number of wetland plant and macroinvertebrate species of national interest. These ponds are often, although not always, small, shallow and often seasonal, and tend to occur in clusters. Some seasonal mawn pools are known to support Fairy Shrimp (*Chirocephalus diaphanus*), a Red Data Book species restricted to temporary ponds. Records for this species include pools on Henllyn Mawr, which is part of the Llandeilo, Rhulen and Llanbedr Hills SSSI, and Litton Hill, which is outside designated areas.

Drying out, or at least water level fluctuation, creates drawdown areas which provide good conditions for the BAP plant species Pillwort (*Pilularia globulifera*), which occurs in mawn pools. There are currently at least 19 records for Pillwort from this IAP including Brechfa Common, the Maelienydd SSSI and in the Llandeilo, Rhulen and Llanbedr Hills SSSI.

Upland ponds within the IAP also provide a habitat for uncommon water beetle species such as the Red Data Book *Dryops striatellus*, and the Nationally Scarce *Hydroglyphus geminus* and *Laccobius ytenensis*. The oligotrophic peat-filled pond complex of Illtyd Pools SSSI and its surrounds are of particular interest for their water beetle and plant assemblages. The RDB Mud Snail (*Omphiscola glabra*) and Pennyroyal (*Mentha pulegium*) have both been recorded from Brechfa Pool SSSI.

Summary of site features and qualifying criteria

Site name	Mawn Pools
SSSI and SAC designation	Ponds occur within and outside SSSIs, which include Maelienydd, Illtyd Pools and Llandeilo, Rhulen and Llanbedr Hills.
IAP qualifying criteria	<i>Criterion 1:</i> 3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or the <i>Isoeto-Nanojuncetea</i> . <i>Criterion 2:</i> RDB, NS and BAP species. <i>Criterion 5:</i> Mawn pools, temporary ponds.
Ordnance survey grid reference: SO0451	

5.3.3.2 Other High Quality Ponds of national importance

Two ponds in the South Powys IAP support the BAP species Water Vole (*Arvicola terrestris*), and therefore qualify as High Quality Ponds.

5.4 South Wales Dune Slack Ponds IAP

LBAP Areas:

- Pembrokeshire;
- Caerfyrddin / Carmarthenshire;
- Swansea;
- Bridgend.

5.4.1 Site description

The South Wales Dune Slack Ponds IAP is a dispersed set of sites spread along the south Wales coast which are all dune slack pond complexes, and which make up the Annex I habitat 2190 'Humid dune slacks'. They can be found in Glamorgan (e.g. Kenfig), Swansea (e.g. Oxwich), South Carmarthenshire (e.g. Pembrey) and Pembrokeshire (e.g. Broomhill). Some sites overlap geographically with other actual or proposed IAPs, but their ecological characteristics are very distinctive, and they therefore are better placed in an IAP of their own.

These dune slacks ponds are particularly important for stoneworts and other aquatic plant species. Although the data available are limited, there is also evidence that they support invertebrate species of national importance (e.g. Hairy Dragonfly, *Brachytron pratense*). Two sites of European importance, and for which more detailed information was available, are described below: Kenfig Burrows Ponds, and the Pembrey Coast and Pendine Ponds.

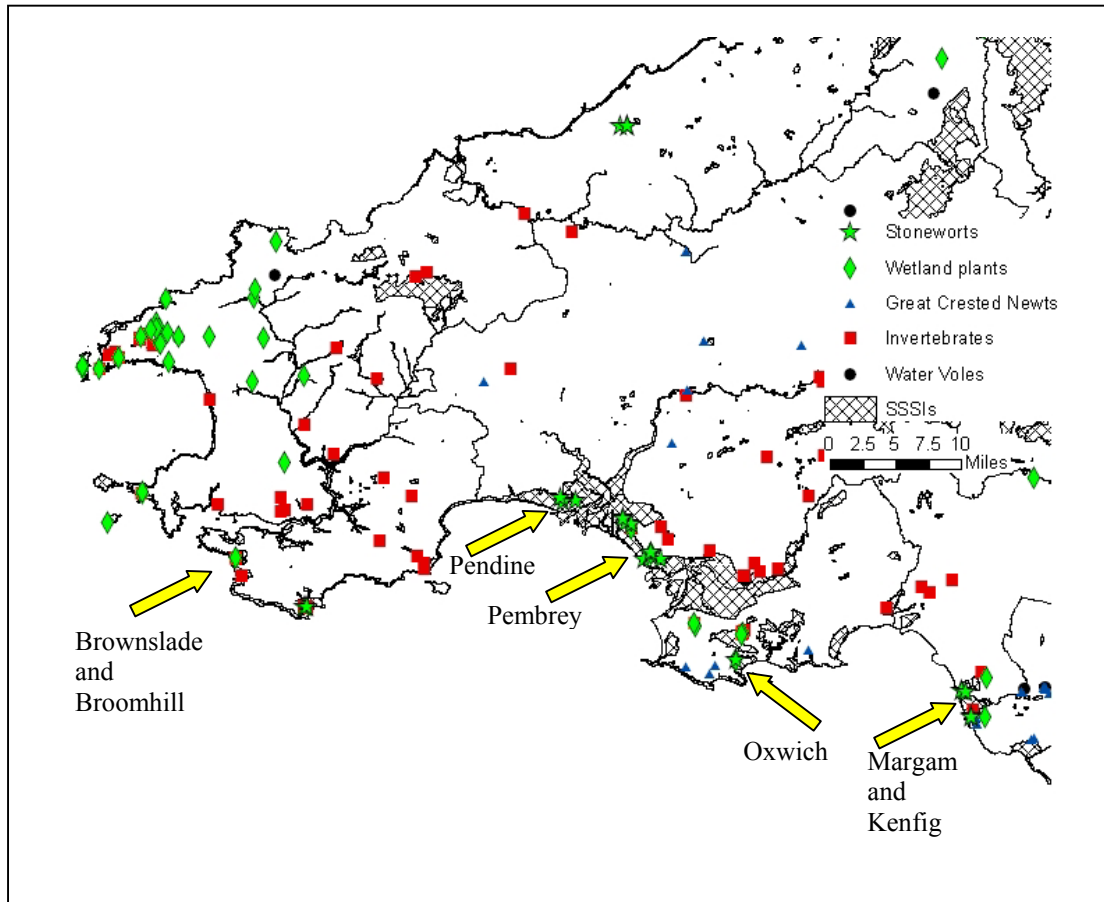


Figure 11 Gower Peninsula and Pembrey Coast IAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria (showing local authority boundaries)

5.4.2 High Quality Ponds of European importance

5.4.2.1 Pembrey Coast and Pendine Ponds

The Pembrey Coast and Pendine Burrows High Quality Ponds include sites in an extensive area of sand dunes, some of which are forested. The waterbodies here include seasonal dune slacks, more permanent pools and ponds in the grazing marshes behind the sand dune system. Ponds in this IAP occur both within the SSSIs (e.g. Pembrey Coast and Laugharne-Pendine Burrows) and outside protected areas. The whole of the coast is designated as an SAC for its marine and estuarine features.

Both the Pembrey Coast and the Laugharne/Pendine Burrows have been identified as Important Stonewort Areas (ISA) of national importance. Ponds in those areas support the Nationally Scarce species Clustered Stonewort (*Tolypella glomerata*) and Lesser Bearded Stonewort (*Chara curta*), which is also a BAP species. Other wetland plant species of national interest include Lesser Water-plantain (*Baldellia ranunculoides*) and Fen Pondweed (*Potamogeton coloratus*). The Nationally Scarce Hairy Dragonfly (*Brachytron pratense*) is recorded from ponds in the grazing marsh ponds behind the sand dune system.

Summary of site features and qualifying criteria

Site name	Pembrey Coast and Pendine Ponds
SSSI and SAC designation	Some ponds are included within SSSIs (e.g. Pembrey Coast, Gwernydd Penbre and Laugharene-Pendine Burrows). Some SSSIs are included with the Carmarthen Bay and Estuaries SAC.
IAP qualifying criteria	<i>Criterion 1:</i> 2190 Coastal sand dunes and continental dunes. <i>Criterion 2:</i> BAP and NS species.
Ordnance survey grid reference: SN4005	

5.4.2.2 Kenfig Burrows Ponds

Kenfig Burrows is an extensive sand dune system designated as a SSSI and SAC, with abundant dune slack pools. It includes Kenfig Pool, a lake which is the largest intact example of 3140 'Hard oligo-mesotrophic water with benthic vegetation of *Chara* spp.' in Wales. An Annex II species occurs at the site, Great Crested Newt (*T. cristatus*) as well as Medicinal Leech (*Hirudo medicinalis*), both BAP species. Other species of interest recorded at the site include the Nationally Scarce Clustered Stonewort (*T. glomerata*) and Lesser Water-plantain (*B. ranunculoides*).

Summary of site features and qualifying criteria

Site name	Kenfig Burrows Ponds
SSSI and SAC designation	Ponds are within SSSI and SAC.
IAP qualifying criteria	<i>Criterion 1:</i> 2190 Humid dune slacks and 3140 Hard oligo-mesotrophic water with benthic vegetation of <i>Chara</i> spp. <i>Criterion 2:</i> Annex II, BAP and NS species.
Ordnance survey grid reference: SJ224117	

5.4.2.3 Other High Quality Ponds of European importance

Other dune slack ponds in South Wales are also of European importance as humid dune slack habitat. These areas also support a range of species of national interest. The Hairy Dragonfly (*B. pratense*) was recorded in Broomhill and Broomslade Burrows in Pembrokeshire and both sites are known to support rich dragonfly assemblages. The Nationally Scarce Clustered Stonewort (*T. glomerata*) is recorded from Margam Burrows, near Kenfig Burrows. More common stonewort species are also recorded from Broomslade Burrows and Oxwich Burrows, such as Opposite Stonewort (*Chara contraria*) and Common Stonewort (*Chara vulgaris*). Oxwich also contains Soft Hornwort, *Ceratophyllum submersum*, an uncommon species in Wales.

Summary of site features and qualifying criteria

Site name	South Wales Dune Slack Ponds
SSSI and SAC designation	Some ponds are within SSSI and SAC.
IAP qualifying criteria	<i>Criterion 1:</i> 2190 Humid dune slacks <i>Criterion 2:</i> NS species.
Ordnance survey grid reference: n/a	

5.4.3 High Quality Ponds of national importance

Dune slack ponds fall within the Annex I habitat 2190 'Humid dune slacks' and are automatically regarded as being of potential European importance. No further sites of national importance were therefore identified.

5.5 Pembrokeshire IAP

LBAP Area:

- Pembrokeshire.

5.5.1 Site description

Ponds in the Pembrokeshire IAP are abundant, and include both permanent and temporary waters of varying size and hydroperiod. Pembrokeshire is well known for its commons, which support a mosaic of habitats including wet and dry heaths, and unimproved grasslands, and these areas are important for the ponds in the IAP. Arguably, some of the very shallow ponds may support plant assemblages similar to those of Annex I habitat 3170 'Mediterranean temporary ponds', which are currently only found in the UK on the Lizard and the New Forest, but additional wetland plant data would be required to confirm this.

One BAP species occurring in the Pembrokeshire IAP is of European importance: Floating Water Plantain (*Luronium natans*), which is recorded from ponds on St David's Peninsula and Ramsey Island. Many other ponds support species of national importance, including the Hairy Dragonfly (*Brachytron pratense*) and the BAP species Three-lobed Water-crowfoot (*Ranunculus tripartitus*), both within and outside protected areas.

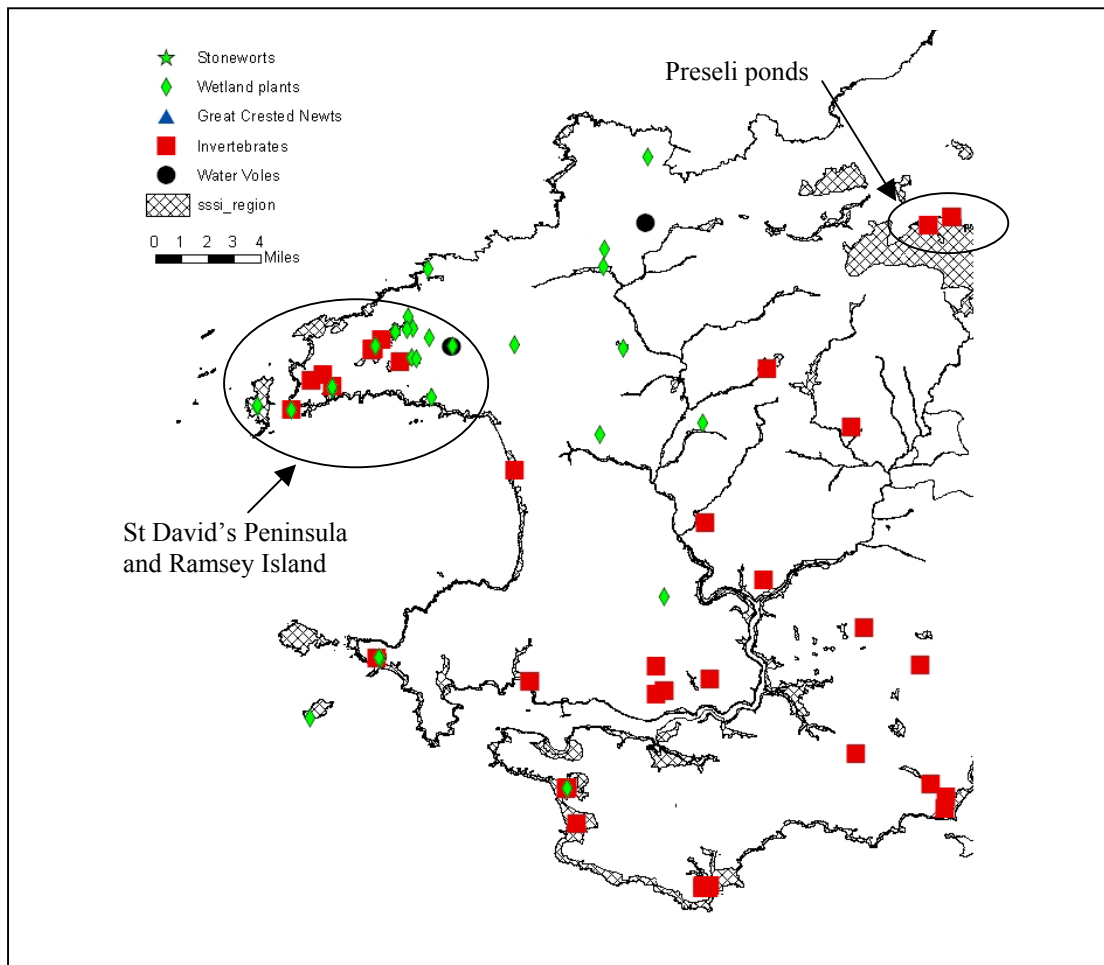


Figure 12 Pembrokeshire IAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria



Figure 13 Heathland ponds a) a pond on Ellis' piece and b) a temporary pond which supports Pillwort (*Pilularia globulifera*), shown here in its dry phase, on Ellis' piece (photographs by Matt Sutton)

5.5.2 High Quality Ponds of European importance

5.5.2.1 St David's Peninsula and Ramsey Island Ponds

This area includes the whole of St David's Peninsula and Ramsey Island, about 1 km off the coast. The region is particularly rich in high quality heathland ponds. The population of Floating Water-plantain (*L. natans*) in this IAP is particularly important because it represents an outlying population, relatively isolated from central and north Wales populations. The habitat that the species occurs in within this IAP, rain-fed lowland heath ponds, is also relatively unusual and uncommon for this species. In the current study, no detailed site records were available for Floating Water-plantain, but the species is known to occur at least in two large pools on the mainland and in another on Ramsey Island.

Ponds in the St David's area also support the BAP species Pillwort (*Pilularia globulifera*) and Three-lobed Water-crowfoot (*R. tripartitus*). Both species are particularly associated with grassland and heathland temporary pools. Nationally Scarce species include the aquatic plant Lesser Water-plantain (*Baldellia ranunculoides*). Invertebrate data are limited for this IAP. However ponds are known to support the Scarce Blue-tailed Damselfly (*Ischnura pumilio*), the Hairy Dragonfly (*B. pratense*) and the Small Red Damselfly (*Ceriatagrion tenellum*).

Summary of site features and qualifying criteria

Site name	St David's Peninsula and Ramsey Island Ponds
SSSI and SAC designation	Some ponds located within SSSIs (e.g. Dowrog Common and Tretio Common). Pembrokeshire Commons and St David's SACs, which covers, at least in part, some SSSIs.
IAP qualifying criteria	<i>Criterion 2</i> : Annex II, RDB, NS and BAP species.
Ordnance survey grid reference: SM7827	

5.5.3 High Quality Ponds of national importance

The data collated as part of this study show that at least another 30 ponds in the Pembrokeshire IAP are of national importance. Considering the abundance of ponds in this area, this is likely to represent only a small proportion of the total High Quality Pond resource in Pembrokeshire.

Ponds with RDB, BAP and Nationally Scarce species are found throughout the IAP, both within and outside protected areas. Species of particular interest include Three-lobed Water-crowfoot (*R. tripartitus*) and Pillwort (*P. globulifera*), which are both found at Marloes Mere SSSI ponds. Three-lobed Water-crowfoot (*R. tripartitus*) also occurs on Skokholm Island SSSI, and the island is known to support water beetles of national interest, although few recent data are currently available for this site.

The Nationally Scarce Hairy Dragonfly (*B. pratense*) and the Scarce Blue-tailed Damselfly (*I. pumilio*) also occur in ponds at Marloes Mere SSSI and Preseli and

Gweunydd Blaencleddau SACs, and many other ponds outside SSSIs. Water Vole (*Arvicola terrestris*), a BAP species, is known to be rare in Pembrokeshire and records were only available for two ponds in this IAP.

Summary of site features and qualifying criteria

Site name	Pembrokeshire Ponds
SSSI and SAC designation	Some ponds are within SSSIs and SACs.
IAP qualifying criteria	<i>Criterion 2</i> : RDB, NS and BAP species. <i>Criterion 5</i> : Heathland temporary ponds.
Ordnance survey grid reference: SM9417	

5.6 Glamorgan IAP

LBAP Areas:

- Bridgend;
- Caerphilly;
- Cardiff;
- Neath Port Talbot;
- Newport;
- Rhondda Cynon Taff;
- Torfaen;
- Vale of Glamorgan.

5.6.1 Site description

This IAP covers the historic county of Glamorgan in south east Wales, which until recently was dominated by heavy industry. The area is notable for having been the subject of a series of extensive, botanically-based, pond surveys since the late 1990s (Carey *et al.*, 1999; White *et al.*, 2001; White *et al.*, 2003a; White *et al.*, 2003b). A variety of ponds remain within now disused industrial landscapes, including many small temporary ponds occurring amongst old mine tips (White *et al.*, 2001).

Pond turnover is known to be very high in parts of this IAP, with the loss of a considerable proportion of ponds over recent decades more than compensated for by the creation of new ponds for the leisure industry (e.g. fishing and golf). Overall, pond numbers are thought to have increased by 33% in Bridgend since the 1960s, and by 54% in Cardiff (Carey *et al.*, 1999; White *et al.*, 2003). However, the conservation value of most of these new ponds is unknown.

The area also has many records for the Annex II species Great Crested Newt (*Triturus cristatus*), showing there is a good network of sites supporting this species. Ponds that are of national importance for the species or assemblages they support are scattered throughout the area.

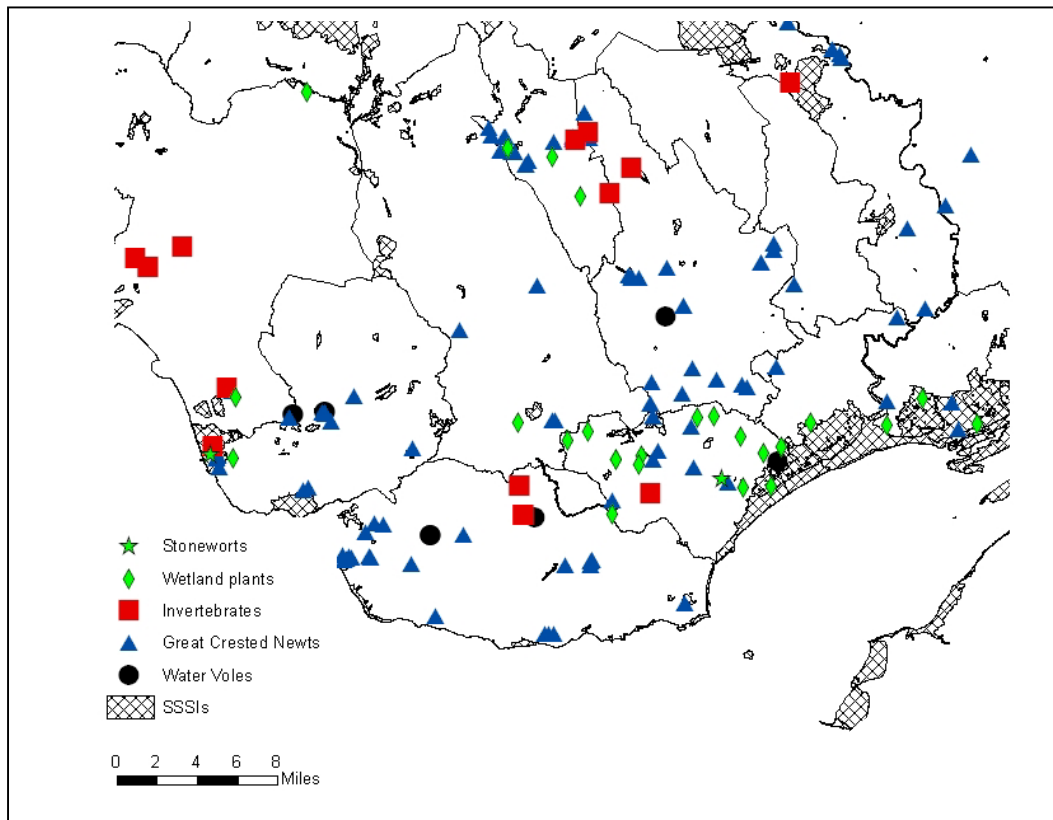


Figure 14 Glamorgan IAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria (showing local authority boundaries)

5.6.2 High Quality Ponds of European importance

The data currently available are insufficient to assess the importance of ponds for Great Crested Newt (*T. cristatus*).

5.6.3 High Quality Ponds of national importance

Based on the data collated in the present study, over 100 ponds within the Glamorgan IAP support species or assemblages of national importance. This is a post-industrial area with relatively few remaining semi-natural habitats, and therefore it is difficult to assess the actual pond resource. High Quality Ponds with species or assemblages of national interest occur both in the lowlands (e.g. Cardiff) and in the Valleys (e.g. Merthyr Tydfil), although the data currently available are inadequate to allow a distinction to be made on the basis of their ecology.

At least 70 ponds support Great Crested Newt (*T. cristatus*), and the total number of ponds from which the species is known is currently increasing as a result of surveys undertaken prior to development projects. Water Vole (*Arvicola terrestris*), a BAP species, is known from six sites. Nationally Scarce species in other ponds within the Glamorgan IAP include Hairy Dragonfly (*Brachytron pratense*), Variable Damselfly (*Coenagrion pulchellum*), Scarce Blue-tailed Damselfly (*Ischnura pumilio*) and Downy Emerald (*Cordulia aenea*). The Nationally Scarce Hairlike Pondweed (*Potamogeton trichoides*) is also recorded, mainly in the Cardiff and Newport areas. Pysgodlyn Mawr, a small SSSI which supports ponds and a range of other freshwater habitats (e.g. reed swamp and acid bog) supports the BAP species Medicinal Leech (*Hirudo medicinalis*). The BAP species Pillwort (*Pilularia globulifera*) is also known from the site, its only locality in Glamorgan, but no detailed site records for this species were available for the current study.

A number of ponds within the IAP have been shown to support exceptionally rich wetland plant and macroinvertebrate assemblages. A pond in a relatively urban area of Cardiff supported 67 species of macroinvertebrates, the richest site surveyed as part of the National Pond Survey in Wales. This highlights the potential importance of ponds in this IAP, for which little detailed macroinvertebrate information is currently known.

Summary of site features and qualifying criteria

Site name	Glamorgan Ponds
SSSI and SAC designation	Few IAP ponds are within designated areas.
IAP qualifying criteria	<i>Criterion 2:</i> Annex II, BAP and NS species. <i>Criterion 3:</i> Wetland plant and macroinvertebrate species richness.
Ordnance survey grid reference: SJ1185	

6 Proposed IAPs

6.1 Llŷn Peninsula pIAP

LBAP Area:

- Gwynedd.

6.1.1 Site description

The Llŷn Peninsula is located in west Gwynedd. Relatively few data were available for this area, but it supports ponds of national importance for their wetland plants and water beetle assemblages. Most of the sites are coastal ponds located within SSSIs. The exception is a group of pingos located on the western end of the Peninsula.

Further survey work for both wetland plant and macroinvertebrates is likely to reveal other ponds of at least national importance both inside and outside protected areas (e.g. Cors Geirch SSSI).

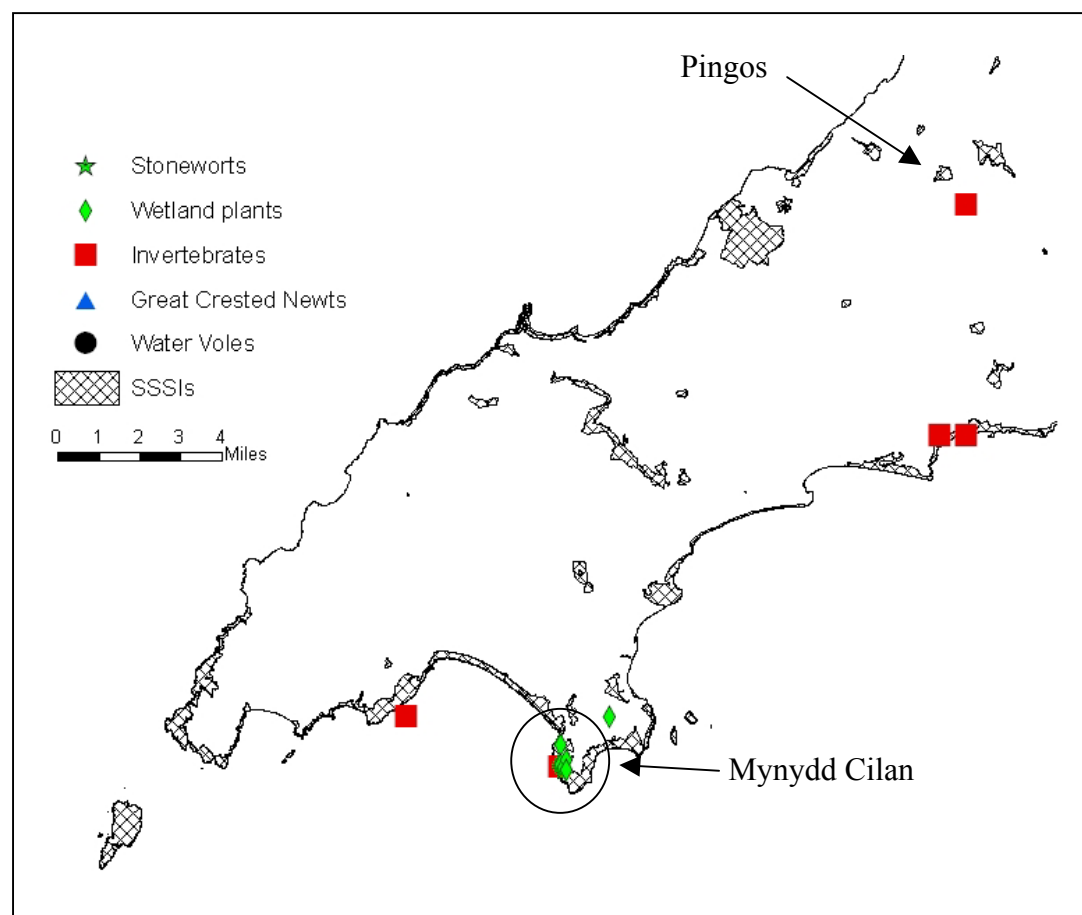


Figure 15 Llyn Peninsula pIAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria

6.1.2 High Quality Ponds of European importance

No sites of European importance have so far been identified on the Llŷn Peninsula.

6.1.3 High Quality Ponds of national importance

6.1.3.1 Mynydd Cilan Ponds

Mynydd Cilan is a coastal heathland site with ponds which support two BAP wetland plant species: Pillwort (*Pilularia globulifera*) and Three-lobed Water-crowfoot (*Ranunculus tripartitus*). The ponds are also known to support rich water beetle assemblages.

Summary of site features and qualifying criteria

Site name	Mynydd Cilan Ponds
SSSI and SAC designation	Ponds at Mynydd Cilan are located within Porth Ceiriad, Porth Neigwel ac Ynysoedd Sant Tudwal SSSI.
IAP qualifying criteria	<i>Criterion 2</i> : RDB and BAP species.
Ordnance survey grid reference: SH2924	

6.1.4 Other High Quality Ponds of national importance

Other ponds of national importance for their water beetle assemblages are located in Mynydd y Graig within the Mynydd Penarfynnydd SSSI, Bwlch Derwin pingos and Glanllynau SSSI. Pillwort is also reported from ponds in the Cors Leferin area, north-east of Mynydd Cilan and outside the SSSI boundary.

6.2 Severn Valley pIAP

LBAP Area:

- Powys.

6.2.1 Site description

The Severn Valley pIAP lies in northern Powys. High Quality Ponds in this area are mainly associated with the floodplain of the River Severn. Other important ponds may occur in the uplands but there is little information currently available on the pond resource in these areas. One site in this IAP is designated as an SAC for its Great Crested Newt (*Triturus cristatus*) population (Granllyn SAC) and therefore qualifies as a High Quality Pond of European importance. A number of other High Quality Ponds also support Great Crested Newt (*T. cristatus*), mainly ponds in the Severn valley. However, little information on population sizes is available from these sites, and they are consequently classified as being of national rather than European importance. Other ponds of national importance are scattered across the IAP, few of those identified in this study are located within protected areas.

The Montgomery Canal runs almost parallel to the river, and supports a rich plant and invertebrate community associated with comparatively unpolluted standing waters. The canal probably acts as a refuge for plant and animal species which, historically, would have been found in floodplain ponds. Species recorded from the canal include the Annex I species Floating Water-plantain (*Luronium natans*) and other species of national importance, including Grass-wrack Pondweed (*Potamogeton compressus*), a Nationally Scarce species and Long-stalked Pondweed (*Potamogeton praelongus*), which is rare in Wales. Further botanical investigation of ponds in this area is very likely to reveal sites of, at least, national importance.

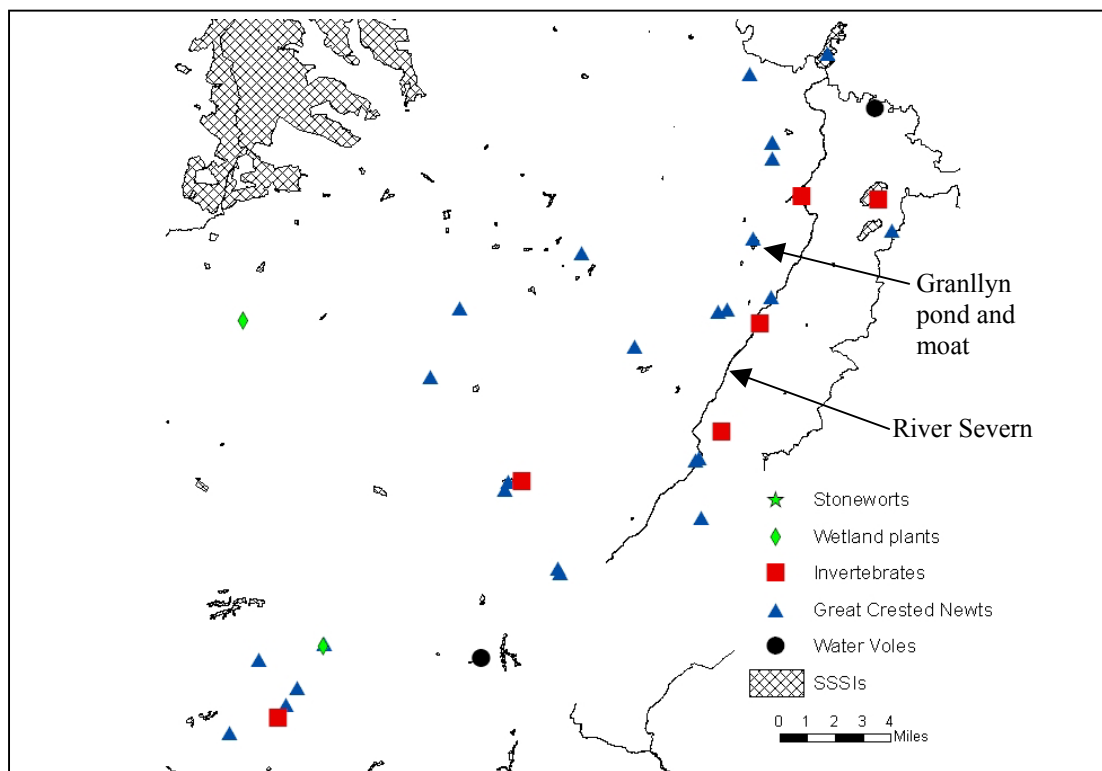


Figure 16 Montgomeryshire IAP: ponds with vertebrate, invertebrate or plant records which meet the HQP criteria (Part of the River Severn channel is shown)

6.2.2 High Quality Ponds of European importance

6.2.2.1 Granllyn Ponds

The Granllyn pond site is located near the town of Guilsfield and comprises a kettle hole pond and a historic moat on the floodplain of the River Severn. The waterbodies at this site support the largest population of Great Crested Newt (*T. cristatus*), an Annex II species, in Central Wales. The surrounding landuse is mainly pasture and rough grassland, with woodland and scrub, providing good terrestrial habitats for Great Crested Newts (*T. cristatus*).

Summary of site features and qualifying criteria

Site name	Granllyn Ponds
SSSI and SAC designation	The ponds are located within the SAC.
IAP qualifying criteria	<i>Criterion 2:</i> Annex II and BAP species. <i>Criterion 5:</i> Kettle-holes.
Ordnance survey grid reference: SJ224117	

6.2.2.2 High Quality Ponds of national importance

At least 30 ponds in the Severn Valley pIAP are sites of national importance for their species or assemblages. Two sites are known to support Water Voles (*Arvicola*

terrestris) and there are at least 20 records for Great Crested Newt (*T. cristatus*). A small number of sites have been noted for their dragonfly assemblages, but no species information was available for the current assessment.

Summary of site features and qualifying criteria

Site name	Severn Valley Ponds
SSSI and SAC designation	Few ponds are within SSSI or SACs.
IAP qualifying criteria	<i>Criterion 2</i> : BAP and NS species.
Ordnance survey grid reference: SJ1005	

6.3 North Ceredigion pIAP

LBAP Area:

- Ceredigion.

6.3.1 Site description

Ponds in this IAP are located in the north-eastern part of Ceredigion, mainly in the upland. Ponds are abundant in this pIAP, many being associated with the region's past mining activities, or the many streams and rivers draining the Cambrian Mountains. This pIAP coincides with the southern redoubt of the Cambrian Mountains and may be ecologically linked to the Snowdonia pIAP to the north. Further data is needed to establish any possible link.

This area is proposed as a pIAP based on the fact that many of the disused mine reservoirs may fall within the Annex I habitats 3130 or 3160, but this classification is provisional because plant data for the area are limited. Water Vole (*Arvicola terrestris*), a BAP species of national importance, is present in ponds throughout the pIAP.

An extensive series of pingos associated with purple moor-grass pasture also occur in the northern part of the Teifi valley (Ross et al. 2006 – not shown on map). Some of these contain ponds, but no biological data are available.

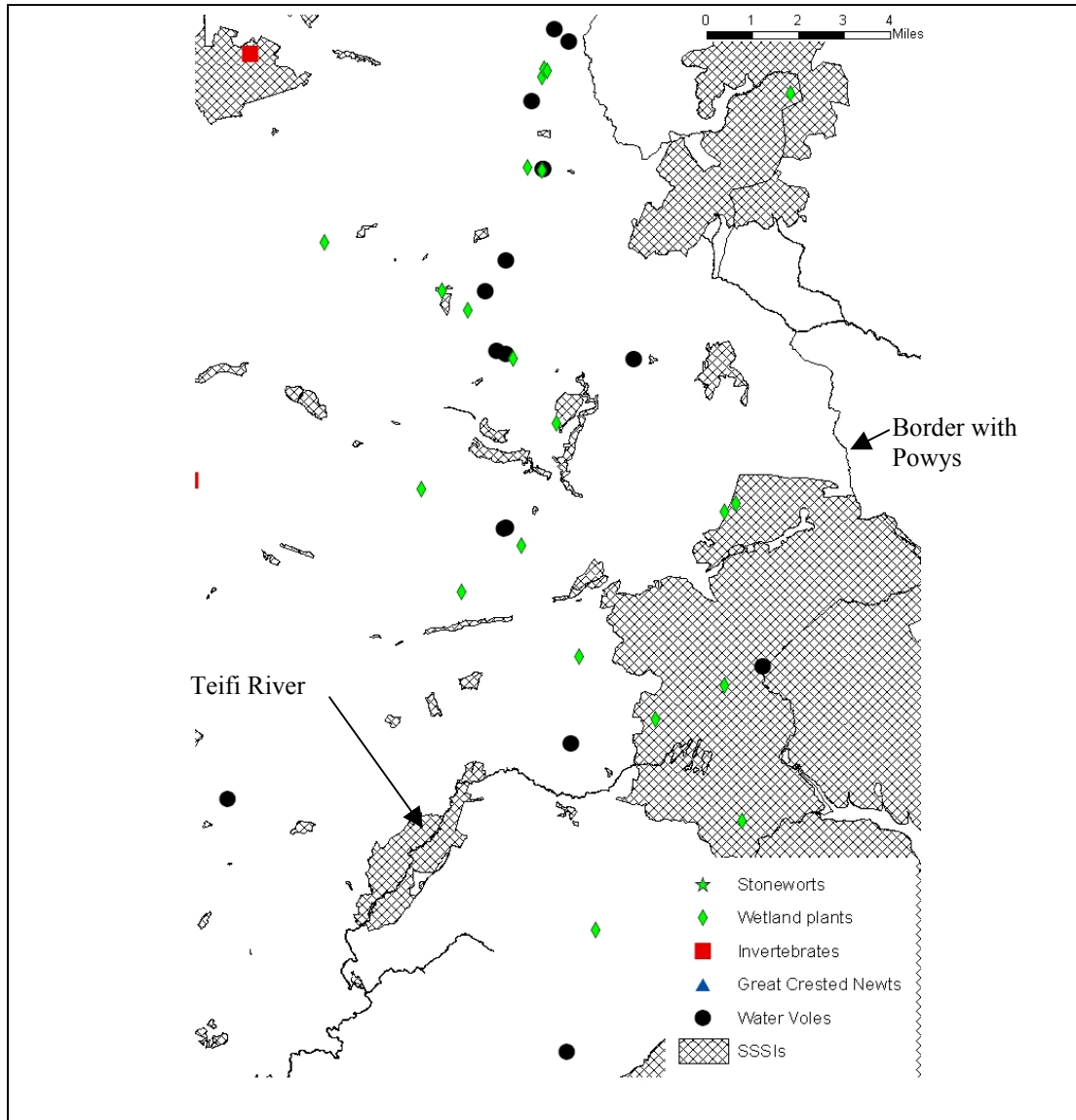


Figure 17 North Ceredigion pIAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Ponds criteria

6.3.2 High Quality Ponds of European importance

6.3.2.1 Upland Ceredigion Ponds

Many upland ponds within the pIAP were created as a result of the metal mining industry which thrived in the county until the beginning of the 20th century. Local expert knowledge reported that many of these ponds support Shoreweed (*Littorella uniflora*) and other species considered as the defining component of the Habitats Directive Annex I habitat 3130 ‘Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*’ and 3160 ‘Natural dystrophic lakes and ponds’.

The number of upland sites which qualify as Annex I habitats in this area is unknown. However, at least 20 sites supporting plant assemblages potentially of European

importance are scattered across the pIAP, representing only a small proportion of the total pond resource in the region. Currently, lack of detailed plant data also makes it impossible to grade the value of the sites in a European context.

Summary of site features and qualifying criteria

Site name	Upland Ceredigion Ponds
SSSI and SAC designation	Some ponds are within SSSIs (e.g. Teifi and Elenydd).
IAP qualifying criteria	<i>Criterion 1</i> : 3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoeto-Nanojuncetea</i> and 3160 Natural dystrophic lakes and ponds.
Ordnance survey grid reference: SN7479	

6.3.3 High Quality Ponds of national importance

At least eight ponds within the North Ceredigion pIAP have records of Water Vole (*Arvicola terrestris*), a BAP species. The ponds from which these records come are very varied in their characteristics: they include headwater reservoirs and ponds in river valleys.

Summary of site features and qualifying criteria

Site name	North Ceredigion Ponds
SSSI and SAC designation	Unknown.
IAP qualifying criteria	<i>Criterion 2</i> : BAP and NS species.
Ordnance survey grid reference: SN7175	

6.4 Snowdonia pIAP

LBAP Area

- Snowdonia National Park

6.4.1 Site description

The Snowdonia pIAP covers upland areas of Gwynedd and Conwy Borough County which include the highest peaks in Wales, in Eryri/Snowdonia. The geology of this glacial landscape includes acidic slates, granite and limestone intrusion, as well as pockets of peat. This pIAP may be ecologically linked to the North Ceredigion pIAP.

The data available for this study is limited, but waterbodies in this area support the Annex I habitat type 3130 ‘Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea*’. These are usually defined as lakes, but some are less than 2 hectares in area and therefore fall within the scope of the present assessment. More importantly, these areas tend to have a high pond density, including temporary ponds, many of which are not marked on Ordnance Survey maps. Although data for these are very limited, it is very likely that they share characteristics of the small lakes, and may even support Annex I habitat type 3130.

Further biological surveys in these upland areas should be undertaken to assess the pond resource in this pIAP, and the role of ponds in relation to other, larger waterbodies. Other upland ponds and pond clusters support invertebrate assemblages of national interest, but again data are limited.

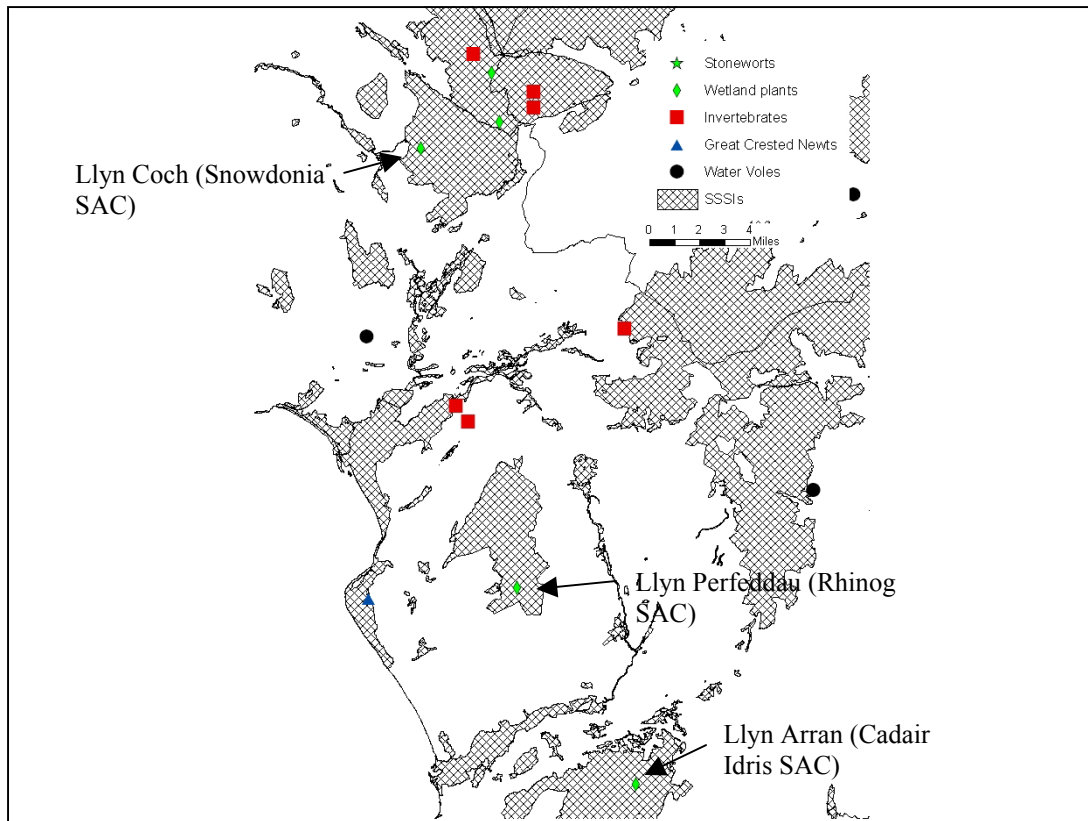


Figure 18 Snowdonia pIAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria

6.4.2 High Quality Ponds of European importance

6.4.2.1 Snowdonia Upland Ponds

The ponds in this upland area include both relatively large waterbodies (1-2 ha) and many smaller ponds often occurring in clusters (e.g. Bera Bach). Most of the ponds in this IAP are likely to be rain-fed and acidic, often with a peaty influence. On the whole they are unlikely to have much direct human impact except for acidification.

Waterbodies in this pIAP are of European importance because they support Annex I habitat 3130 'Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea*' include Llyn Coch in the Snowdonia SAC, Llyn Perfeddau in the Rhinog SAC, and Llyn Arran in the Cadair Idris SAC. Floating-water plantain (*Luronium natans*), pillwort (*Pilularia globulifera*) and marsh clubmoss *Lycopodiella inundata*, all occur in lakes in this IAP and are likely to also use ponds.

Other pond complexes in this area, such as the Bera-Bach and Llyn y Caseg-fraith upland pond complexes, are reported by local specialists to support important water beetle assemblages although, again, no detailed species information was available.

Summary of site features and qualifying criteria

Site name	Snowdonia Upland Ponds
SSSI and SAC designation	Ponds are within SSSI/SAC including Snowdonia, Rhinog and Cadair Idris.
IAP qualifying criteria	<i>Criterion 1</i> : 3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> .
Ordnance survey grid reference: SH695658	

6.4.3 High Quality Ponds of national importance

The data currently available are insufficient to identify High Quality Ponds of national importance in this IAP.

6.5 Inland Gower pIAP

LBAP Area:

- Swansea

6.5.1 Site description

The Inland Gower Ponds pIAP lies to the west of Swansea in south Wales. Ponds which qualify for HQP status in this area are mainly heathland ponds which support rich wetland plant and macroinvertebrate assemblages, and uncommon species such as the BAP species Three-lobed Water-crowfoot (*Ranunculus tripartitus*). A few ponds, usually in more urban areas, also support Great Crested Newt (*Triturus cristatus*), but population sizes are unknown.

Information on ponds in this pIAP is limited, but considering the richness of the assemblages found, it is very likely that further investigation of both wetland plants and macroinvertebrates in ponds, particularly in the commons, would lead to the identification of further High Quality Ponds.

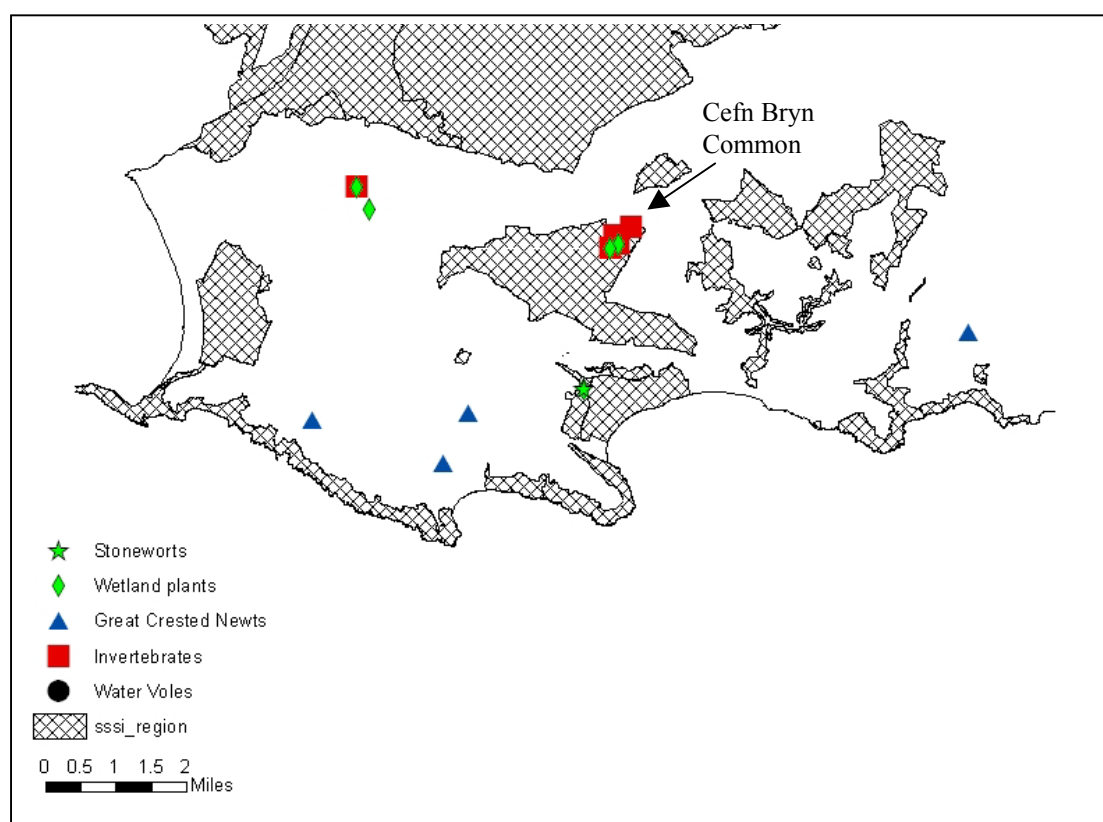


Figure 19 Gower Peninsula and Pembrey Coast pIAP: ponds with vertebrate, invertebrate or plant records which meet the High Quality Pond criteria

6.5.2 High Quality Ponds of European importance

No High Quality Ponds of European importance are currently known from this pIAP.

6.5.3 High Quality Ponds of national importance

6.5.3.1 Inland Gower Ponds

Gower Peninsula ponds which qualify for High Quality Pond status occur mainly within the commons, many of which are SSSIs. Heathland ponds in the commons support the RDB and BAP species Three-lobed Water-crowfoot (*Ranunculus tripartitus*), and the Nationally Scarce Lesser Water-plantain (*Baldellia ranunculoides*). Ponds in this IAP also support particularly rich wetland plant assemblages.

All the ponds in this IAP for which invertebrate data were available also supported exceptionally rich macroinvertebrate assemblages. Species of national interest recorded from ponds were all water beetles and included the Nationally Notable beetles *Enochrus ochropterus*, *Helochares punctatus* and *Berosus signaticollis*.

There are also three records for Great Crested Newt (*Triturus cristatus*) from village ponds, but at this time no information is available on their population size and extent.

Summary of site features and qualifying criteria

Site name	Gower Peninsula Ponds
SSSI and SAC designation	Some ponds are within SSSIs (e.g. Cefn Bryn Common). Gower Commons SAC covers, at least in part, the SSSIs for commons.
IAP qualifying criteria	<i>Criterion 2</i> : NS species. <i>Criterion 3</i> : Wetland plant and macroinvertebrate species richness.
Ordnance survey grid reference: SS5090	

7 Conclusions and recommendations

7.1 Conclusions

In this first assessment of Important Areas for Ponds (IAPs) in Wales, six areas which have important concentrations of ponds of high conservation value were identified as IAPs. Five further areas, which are likely to support significant concentrations of High Quality Ponds but which are currently data deficient, were identified as potential IAPs (pIAPs). These areas covered a significant proportion of the country, reflecting the wide distribution of high quality ponds.

7.1.1 Identification of Important Areas for Ponds (IAPs)

This preliminary assessment has applied the IAP approach to the identification of groups of ponds in Wales of importance at European and national level. IAPs were characterised by the types of ponds they supported, the pond landscapes, the species assemblages and the rare species they supported.

It is important to remember that this is a first step in an ongoing process. The IAP concept for Wales now needs further development. The first stage in this process is to carry out a thorough consultation on this report, and incorporate data and feedback arising. The second stage will be one of filling data gaps, either from existing hard-to-access datasets (e.g. paper records), or in the light of further targeted surveys. Once these data gaps have been filled it will then be possible to produce the first full statement on IAPs in Wales. Particular effort to fill data gaps will be focussed on the proposed IAPs which look likely to be important, but for which there currently insufficient data. Gaps in data are highlighted and further discussed in section 7.2.2 and form the basis for proposals for further survey work.

At present, IAPs have been identified by eye rather than using a more sophisticated software-based approach. Although a GIS analysis could have provided a more objective means for identifying clusters of ponds, there are in reality several obstacles to such an analysis at the moment. These are:

- **Limitations in data quality** (see also below). Most objective methods assume that datasets are unbiased. If the datasets are biased (for example, there are significant spatial gaps in the data) then the results will likewise be biased. For this reason we do not consider the use of statistical methods justified at this stage.
- **Inadequate information on the most appropriate spatial scale for this type of analysis.** At present there is little information on the dispersal capabilities of many pond organisms, which means that a network of ponds for one species may be simply a series of isolated patches for another. In order to identify valid networks of ponds, we need a much better understanding of the spatial scale of dispersal over which most pond organisms operate. Part of this work would require incorporating key landscape features such as topography, other wetland habitats and settlements.
- **Lack of information on pond habitat types within and among different IAPs.** Different pond habitats may support quite different suites of species, such that a

single pond ‘network’ may in effect consist of several different sub-networks that have only a few species in common. Where we considered there to be sufficient ecological evidence to separate out widely divergent pond types, we have done so. For example, the South Wales Dune Slack Ponds IAP has been identified precisely because we consider these ponds to comprise a specialist habitat, likely to have more in common with one another than with geographically closer ponds inland. Although some other IAPs may support distinctive pond types, very little information on this is available at present.

We hope that this preliminary assessment will stimulate discussion and exchange of information to help create a shared understanding and recognition of the high quality pond resource for the many practitioners working with this habitat type in Wales including Conservation Agencies, Local Authorities, Defra and NGOs. Even this preliminary stage emphasizes the importance of special and often overlooked pond types found in Wales, such as mawn pools and coastal heathland ponds. With further development, IAPs could also act as a focus for delivering the Pond HAP through pond creation and management, and so lead to an improvement of the pond resource.

The successful application of the IAP approach in the present study suggests that it will be valuable as the basis for similar work on dispersed small water bodies in other parts of the UK, particularly as the first step for identifying sites for the forthcoming Pond HAP. The IAP approach is also included in plans for activities of the proposed European Pond Conservation Network (EPCN).

7.1.2 Contacts with data holders

Identifying IAPs in Wales involved making contact with 55 individuals. Between them they represented 27 organisations. Many of the datasets included were collected using volunteer effort so represent the survey and recording work of many more people. This demonstrates the wide interest and enthusiasm for ponds and the species they support. These people will potentially be future contacts for involvement with recording or conservation activities on the IAPs which their data have been used to identify. We are, of course, very grateful for their hard work in generating these data.

7.1.3 Datasets collated

Over 10,000 records of ponds were included in the IAP assessment. Of these nearly half were inventory records of pond locations. Of the remaining c. 6,000 biological records, around 700 were assemblage data, the rest were records of individual species. We know of several other datasets that we were unable to access in the short timescale of this project, and no doubt others exist of which we are unaware. This is an impressive knowledge base for a habitat for which there is little statutory monitoring. While these data have been valuable in identifying IAPs they also illustrate how little is known about ponds in Wales. No information is available for the majority of ponds and large data gaps were identified in the present project. Much more comprehensive data is needed to understand the condition of ponds in IAPs and across Wales as a whole, and to assess how their status is changing through time.

7.2 Recommendations

In the light of the results of this first assessment, we make the following recommendations, specifically:

- Data gaps identified in this assessment should be addressed through (i) standardised pond surveys, and (ii) transcribing paper-based data unavailable to this study into electronic format.
- The IAP assessment process should be further developed in a second phase by (i) carrying-out further analysis of the current data, and (ii) incorporating data unavailable or lacking in the current study, (iii) carrying out dedicated pond surveys to fill geographic or taxonomic gaps in the dataset.
- Information on IAPs in Wales should be widely disseminated to raise awareness of the importance of the small water bodies in Wales.
- The IAP study should lead to ‘on the ground’ pond conservation action to protect and enhance the pond resource, and use ponds to strengthen freshwater biodiversity more generally.

Each of these is briefly discussed below.

7.2.1 Data gaps and survey priorities

This first assessment of IAPs in Wales was based mainly on relatively easily accessible datasets available in electronic format. This has allowed major IAPs to be identified, and a large number of important ponds to be located. However, the study has also highlighted the fact that there are extensive areas with real data gaps, either because the data was (i) inaccessible due to the short timescale of the project, (ii) mostly in paper-based format, or (iii) insufficient or completely lacking.

Based on the current assessment, the areas where standardised surveys should be given the highest priority are:

- Llŷn Peninsula pIAP: botanical and macroinvertebrates survey of temporary ponds on coastal heathland.
- Severn Valley pIAP: botanical survey of ponds near the Montgomery Canal and on the floodplain of the River Severn.
- Snowdonia pIAP: botanical surveys of ponds in existing SACs.
- Inland Gower pIAP: botanical and macroinvertebrate surveys of temporary heathland ponds.
- North Ceredigion IAP: botanical surveys of upland mine reservoir ponds.

Comprehensive data also needs to be collected using standardised methods on minimally impaired ponds across Wales in order to be able to report on the condition of the high quality pond resource as a whole, and how it is changing through time. A report has been prepared which examines the value of existing datasets and makes proposals for a minimally impaired pond monitoring network for Wales (Weatherby et al., 2007).

Wider data collection and monitoring could be facilitated by the development of a simple standard method for surveying ponds on designated sites in Wales, or ideally a UK wide Common Standards Monitoring method for ponds.

7.2.2 IAP assessment Stage 2

To complete this first identification of the IAP pond resource a second stage of data collection and analysis is needed. Specifically, data which could not be accessed due to the short timescale of the project or which are held in paper format should be collated and the analysis repeated. This could also include an assessment of the pond resource which is currently included within designated areas, data held on them, and their monitoring requirements. At this stage we also recommend that contact be made with partner organisations in England, in order to ensure that the potential cross-border IAPs in North-East Wales and the Severn Valley are correctly delineated and action co-ordinated appropriately.

7.2.3 IAP dissemination

Dissemination of the IAP assessment is a key objective of the project, and it is important that the IAP assessment does not become another ‘on the shelf’ report. There are a number of mechanisms which can be used to ensure that the information gathered is widely accessible:

- The NPMN, through its website and newsletter, will ensure that the report reaches a wide audience throughout the UK, including all stakeholders.
- The consultation process should be an opportunity for pond workers and other freshwater specialists to comment on the IAPs they are involved in and, potentially, fill some of the information gaps.
- Following consultation, a summary of the report should be published as a high quality colour document to inform and enthuse readers about Welsh ponds of biodiversity importance.

7.2.4 Conservation action

The IAP assessment should help focus and stimulate ‘on the ground’ pond conservation action. The information collated to date allows for High Quality Ponds to be identified, but gives little information about whether:

- Management of these sites, if any, is appropriate.
- High Quality Ponds are part of a pond complex or isolated sites, which are less likely to support viable populations in the longer term.
- These High Quality Ponds are threatened in the short, medium or longer term.

To address these issues, it is recommended that current pond conservation action, such as pond management, monitoring and creation, should be coordinated locally through existing groups, including LBAP groups, using IAPs as a stimulus and focus. Activities could be informed by the IAP assessment. For example, pond creation effort could be focused on sites which are relatively isolated, or which create appropriate landscape level links between existing High Quality Ponds. This could be

most effective if a Pond Officer was employed in each Welsh region. The North-east IAP, where a Ponds for People Officer is already in post, could be used as pilot project to maximise the use of the IAP assessment. Similarly, Pond Conservation's Million Ponds Project, which is currently being developed and aims to facilitate and carry out high quality pond creation, will also gain from the IAP assessment.

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Appendix 1 List of BAP Broad Habitat Types likely to support ponds by LBAP Area

Broad Habitat Types are shown in hectares and as a proportion of the total LBAP Area. For hectareage columns, bold denotes more than 10% of the Wales resource lies in that area. For percentage columns, bold italic indicates special responsibility (i.e. the LBAP area has one of the four highest proportional areas of the habitat type in Wales). Modified from Blackstock et al. (2003).

LBAP	Total LBAP Area (ha)	Wet woodland (ha)	%	Lowland meadows (ha)	%	Purple moor-grass / rush pasture (ha)	%	Lowland heath (ha)	%	Reedbed (ha)	%	Fen	%	Lowland Raised bog (ha)	%	Grazing marsh (ha)	%	Upland heath (ha)	%	Blanket bog (ha)	%	Sand dune (ha)	%
Anglesey	74608	240	0.32	44	0.06	1400	1.88	840	1.13	100	0.13	520	0.7	0	0	2900	3.89	0	0	0	0	1400	1.88
Snowdonia NP	213191	1000	0.47	64	0.03	3800	1.78	3000	1.41	23	0.01	1400	0.66	94	0.04	4200	1.97	26900	12.6	17000	7.97	800	0.38
Gwynedd	90997	860	0.95	30	0.03	3400	3.74	1400	1.54	35	0.04	610	0.67	0	0	3800	4.18	2200	2.42	480	0.53	510	0.56
Conwy	72222	100	0.14	6	0.01	350	0.48	590	0.82	28	0.04	300	0.42	0	0	2000	2.77	1700	2.35	1900	2.63	24	0.03
Denbighshire	84880	220	0.26	21	0.02	72	0.08	410	0.48	0.5	0	71	0.08	0	0	3500	4.12	5500	6.48	1300	1.53	52	0.06
Flintshire	48788	140	0.29	22	0.05	50	0.1	163	0.33	4	0.01	32	0.07	0	0	2500	5.12	230	0.47	0	0	49	0.1
Wrexham	49680	160	0.32	38	0.08	73	0.15	62	0.12	0	0	41	0.08	420	0.85	2400	4.83	2200	4.43	970	1.95	0	0
Powys	428781	1700	0.4	160	0.04	3600	0.84	810	0.19	4	0	280	0.07	53	0.01	9300	2.17	13300	3.1	18800	4.38	0	0
Ceredigion	180587	460	0.25	150	0.08	4200	2.33	820	0.45	23	0.01	1200	0.66	1120	0.62	4700	2.6	3500	1.94	8300	4.6	120	0.07
Carmarthenshire	222826	940	0.42	170	0.08	6600	2.96	400	0.18	66	0.03	340	0.15	49	0.02	7500	3.37	2500	1.12	830	0.37	1200	0.54
Pembrokeshire	161458	520	0.32	510	0.32	3200	1.98	1200	0.74	73	0.05	300	0.19	13	0.01	1000	0.62	2500	1.55	91	0.06	560	0.35
Brecon Beacons NP	134538	1200	0.89	95	0.07	2400	1.78	410	0.3	7	0.01	130	0.1	16	0.01	660	0.49	11800	8.77	5300	3.94	0	0

LBAP	Total LBAP Area (ha)	Wet woodland (ha)	%	Lowland meadows (ha)	%	Purple moor-grass / rush pasture (ha)	%	Lowland heath (ha)	%	Reedbed (ha)	%	Fen	%	Lowland Raised bog (ha)	%	Grazing marsh (ha)	%	Upland heath (ha)	%	Blanket bog (ha)	%	Sand dune (ha)	%
Swansea	41984	0	27	0.06	1300	3.1	900	2.14	61	0.15	290	0.69	0	0	540	1.29	580	1.38	42	0.1	480	1.14	
Neath Port Talbot	45051	0	72	0.16	1300	2.89	250	0.55	12	0.03	210	0.47	0	0	680	1.51	650	1.44	49	0.11	190	0.42	
Bridgend	25444	0	28	0.11	660	2.59	160	0.63	4	0.02	25	0.1	0	0	200	0.79	510	2	53	0.21	850	3.34	
Rhondda Cynon Taff	37021	0	44	0.12	1500	4.05	480	1.3	0.8	0	130	0.35	9	0.02	130	0.35	980	2.65	850	2.3	0	0	
Merthyr Tydfil	8647	0	10	0.12	260	3.01	160	1.85	0	0	25	0.29	0	0	0	0	450	5.2	0.2	0	0	0	
Vale of Glamorgan	33876	0	47	0.14	120	0.35	45	0.13	4	0.01	19	0.06	19	0.06	930	2.75	0	0	0	0	3	0.01	
Cardiff	14905	0	4	0.03	46	0.31	0.4	0	0.5	0	5	0.03	0	0	520	3.49	2	0.01	0	0	0	0	
Caerphilly	27676	0	11	0.04	500	1.81	180	0.65	2	0.01	32	0.12	1.6	0.01	160	0.58	1000	3.61	30	0.11	0	0	
Blaenau Gwent	10509	0	0.7	0.01	160	1.52	160	1.52	0	0	42	0.4	0	0	0	0	1400	13.3	160	1.52	0	0	
Torfaen	12439	0	10	0.08	110	0.88	120	0.96	0	0	12	0.1	0	0	20	0.16	970	7.8	110	0.88	0	0	
Monmouthshire	73456	0	120	0.16	79	0.11	17	0.02	0.3	0	34	0.05	0	0	2700	3.68	0	0	0	0	0	0	
Newport	21772	0	6	0.03	45	0.21	0.2	0	8	0.04	37	0.17	0	0	4200	19.3	0	0	0	0	0	0	
Total	2,115,359	9,000	1,700		35,200		12,500		460		6,200		1,830		54,600		79,000		56,200		6,200		

Appendix 2 List of BAP species associated with ponds in Wales

The table below shows designations of species that use ponds in Wales that are listed as UK BAP Priority Species (UK BAP), Wales BAP Priority Species (Wales BAP), receive full protection under the Wildlife and Countryside Act Schedule 5 or 8 (WCA), are Habitats Directive Annex II species (HD Annex II) or Red Data Book species (RDB).

Common name	Scientific name	UK BAP	Wales BAP	WCA	HD Annex II	RDB
Mosses						
Long-leaved Threadmoss	<i>Bryum neodamense</i>	*		*		
Sea Bryum	<i>Bryum warneum</i>	*				*
Vascular plants						
Dune Gentian	<i>Gentianella uliginosa</i>	*		*		*
Fen Orchid	<i>Liparis loeselii</i>	*		*	*	*
Floating Water-plantain	<i>Luronium natans</i>	*		*	*	
Grass-wrack Pondweed	<i>Potamogeton compressus</i>	*				*
Marsh Clubmoss	<i>Lycopodiella inundata</i>	*				
Pennyroyal	<i>Mentha pulegium</i>	*		*		*
Pillwort	<i>Pilularia globulifera</i>	*		*		
Three-lobed Water-crowfoot	<i>Ranunculus tripartitus</i>	*				*
Stoneworts						
Dwarf Stonewort	<i>Nitella tenuissima</i>	*				*
Lesser Bearded Stonewort	<i>Chara curta</i>	*				
Slender Stonewort	<i>Nitella gracilis</i>	*				*
Invertebrates						
A water beetle	<i>Hydroporus rufifrons</i>	*				*
Lesser Silver Water Beetle	<i>Hydrochara caraboides</i>	*		*		*
A weevil	<i>Melanapion minimum</i>	*				
Fine-lined Pea Mussel	<i>Pisidium tenuilineatum</i>	*				*
Mud Snail	<i>Omphiscola glabra</i>					*
Medicinal Leech	<i>Hirudo medicinalis</i>	*		*		
White-clawed Crayfish	<i>Austropotamobius pallipes</i>	*		*	*	*
Fairy shrimp	<i>Chirocephalus diaphanus</i>			*		*
Vertebrates						
Great Crested Newt	<i>Triturus cristatus</i>	*		*	*	
Natterjack Toad	<i>Bufo calamita</i>	*		*		
Otter	<i>Lutra lutra</i>	*		*		
Water Vole	<i>Arvicola terrestris</i>	*		*		
Barbastelle Bat	<i>Barbastella barbastellus</i>	*		*		*
Bechstein's Bat	<i>Myotis bechsteinii</i>	*		*	*	*
Greater Horseshoe Bat	<i>Rhinolophus ferrumequinum</i>	*		*	*	
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	*		*	*	*
Pipistrelle Bat	<i>Pipistrellus pipistrellus</i>	*		*		
Curlew	<i>Numenius arquata</i>		*			
Golden Plover	<i>Pluvialis apricaria</i>		*			
Lapwing	<i>Vanellus vanellus</i>		*			

Appendix 3 Habitat Types present in Wales protected under Annex I of the Habitats Directive and thought especially likely to contain ponds

Number	Description
2190	Humid dune slacks
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-batrachion</i> vegetation
4010	North Atlantic wet heaths with <i>Erica tetralix</i>
7110	Active raised bogs
7120	Degraded raised bogs still capable of natural regeneration
7130	Blanket bogs
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the <i>Rhynchosporion</i>
7210	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>
7230	Alkaline fens

Appendix 4 Revised Pond Priority Habitat Proposal December 2006

Suggested habitat name: Ponds
<p>CORRESPONDING HABITATS</p> <p>BAP broad habitat: Standing open waters and canals</p> <p>Phase 1: G1 Standing water</p> <p>NVC: Various aquatic, swamp and fen communities; OV28-OV35; and others</p> <p>Annex I: Oligotrophic waters containing very few minerals of sandy plains (part); oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoeto-Nanojuncetea</i> (part); Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> species (part); Natural dystrophic lakes and ponds (part); Mediterranean temporary ponds; Natural eutrophic lakes (part)</p>
<p>DESCRIPTION</p> <p>BAP Priority Habitat Ponds are defined as permanent and seasonal standing water bodies up to 2ha in extent which meet one or more of the following criteria.</p> <ul style="list-style-type: none"> • <i>Habitats of high conservation importance.</i> Ponds that meet criteria under Annex 1 of the Habitats Directive. • <i>Species of high conservation importance.</i> Ponds supporting Red Data Book species, 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. • <i>Exceptional assemblages of key biotic groups:</i> 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). • <i>Ponds of high ecological quality:</i> Ponds classified in the top PSYM category (“high”) for ecological quality (i.e. having a PSYM score $\geq 75\%$). [PSYM (the Predictive SYstem for Multimetrics) is a method for assessing the biological quality of still waters in England and Wales. Plant species and / or invertebrate families are surveyed using a standard method. The PSYM model makes predictions for the site based on environmental data and using a minimally impaired pond dataset. Comparison of the prediction and observed data gives a % score for ponds quality.] • <i>Other important ponds:</i> Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context e.g. pingos, duneslack ponds, machair ponds. <p>Estimates based on the relatively small pond data sets currently available suggest that around 20% of the c.400,000 ponds outside curtilage in the UK might meet one or more of the above criteria.</p>
<p>GEOGRAPHIC DISTRIBUTION AND EXTENT</p> <p>Widespread throughout the UK, but high-quality examples are now highly localised, especially in the lowlands. In certain areas high quality ponds form particularly significant elements of the landscape, e.g. Cheshire Plan marl pits, the New Forest ponds, pingos of East Anglia, mid-Wales mawn pools, the North East Wales pond landscape, the forest and moorland pools of Speyside, dune slack pools, the machair pools in the Western Isles of Scotland, and examples of Habitats Directive Annex I pond habitats across Northern Ireland.</p>

Identification of the proposed habitat: Priority Habitat Ponds can be readily identified by standard survey techniques such as those developed for NVC, Common Standards Monitoring, the National Pond Survey or for specific species groups. Ponds will need to be distinguished from other existing Priority Habitat types. The general principle to be applied is that where the standing water element is functionally a component of another Priority Habitat and that Priority Habitat definition takes account of the standing water element then it should be treated as part of that habitat.. For example small waterbodies within blanket bog should be considered as part of the blanket bog Priority Habitat, but ponds in heathland (which are not dealt with through the heathland HAP) should be considered under the pond Priority Habitat. Agreement has been reached with the lake HAP group that the pond Priority Habitat will cover to most water bodies up to 2ha while the lake Priority Habitat will cover most larger water bodies. As with other potentially overlapping priority habitat types a small proportion of cases will need to be individually assessed to decide how they are best dealt with.

Inventory. An inventory of ponds, including many high quality sites, has been established as part of the National Pond Monitoring Network and work is in progress to add further known sites to this database. This is publicly accessible (for non-sensitive sites/species) at www.pondnetwork.org.uk. Currently about 500 high quality sites are listed on this database.

Monitoring. The National Pond Monitoring Network (NPMN) will provide the main mechanism for monitoring Priority Habitat ponds. The NPMN was established in 2002 as a partnership of organisations involved in pond monitoring led by the Environment Agency and Pond Conservation.

REASONS FOR RECOMMENDATION

Habitats of international importance.

Six Habitats Directive Annex I types are included within this habitat (either entirely or in part), these include upland lochans, ponds in blanket bogs, machair pools and Mediterranean temporary pools in the Lizard in Cornwall.. The importance of ponds as ‘stepping stone’ habitats is recognised in Article 10 of the Habitats Directive. Current freshwater priority habitats, in particular, do not adequately meet UK obligations under the Directive because the majority currently cover only lakes. In addition, many high quality ponds will not be covered by SACs. UK guidelines for implementation of the Water Framework Directive indicate a UK responsibility for assessing and monitoring ponds under the Directive. In August 2006 English Nature submitted a proposal to Defra for River Basin Characterisation to identify a limited number of ponds of significance for EU or UK biodiversity.

Habitats at risk

Ponds are vulnerable to loss and damage by a wide range of factors including nutrient enrichment and infilling. The 1996 Lowland Pond Survey (LPS96) shows that at least 50% of ponds in the wider countryside are highly degraded and that there is widespread evidence of enrichment and other diffuse pollution impacts. Temporary ponds are believed to be more degraded than permanent ponds. There is also growing concern that even ponds in semi-natural landscapes are at risk from air-borne pollution (e.g. acidification, nutrient-enriched rainfall) and climate change, to which shallow ponds are recognised as being particularly vulnerable. Pond numbers in the UK are probably at an historic low, with the loss of about 70% of the ponds existing in 1880. Much of the loss appears to have occurred in the second half of the 20th century as a result of agricultural change and urbanisation. In addition, LPS96 and Countryside Survey 2000 data show that, although pond numbers are now beginning to stabilise, there is an exceptionally high turnover of ponds, with 1% of the total resource both destroyed and created each year. There is currently no indication of the quality of ponds lost compared to those gained. However, LPS96 suggests that most new ponds are created (a) with stream inflows - a practice discouraged in many other European countries, since most inflows are polluted, and (b) as fishing lakes. Both trends are worrying. Recent evidence shows that many high value ponds are seriously at risk from the spread of alien invasive species of plants and animals. With increased emphasis on access to the countryside, this risk is likely to increase.

Habitats important for key species

At the landscape level, ponds typically support more invertebrate and plant species than other water body types (i.e. lakes, rivers, streams and ditches). The criteria and thresholds listed in the habitat description have been selected so that the Priority Habitat includes ponds that qualify as important for key taxon groups, particularly in terms of international obligation, threat / rarity, exceptional populations / richness, and ecological quality. Ponds support considerable numbers of key species. Species with statutory protection include at least 65 BAP priority species (e.g. water vole, tadpole shrimp, lesser silver water and spangled water beetles, starfruit, pennyroyal, three-lobed crowfoot), at least 28 animal and plant species listed under the W&C Act Schedules 5 & 8, and six Habitats Directive Annex II species including: great crested newt, white-clawed crayfish, otter (in larger ponds) and floating water-plantain. Ponds have additionally 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) has never been estimated but is likely to be considerable. There is increasing evidence that ponds are an important feeding resource for bats and also for farmland birds, including species for which there is a current Public Service Agreement, such as Tree Sparrow and Yellow Wagtail.

NAME OF PROPOSER/ORGANISATION(S)

Anita Weatherby, on behalf of Pond Conservation, Freshwater LCN, Environment Agency, Scottish Environment Protection Agency

DATE Revised version received 6th December 2006

Appendix 5 List of contacts

Organisation	Name
Aberystwyth University	John Gee
Anglesey Council	Rebecca Pritchard
Balfoure-Browne	Garth Foster
Botanical Society of the British Isles (BSBI)	Arthur Chater
Bridgend County Borough Council	Sarah Mellor
British Dragonfly Society	Mark Walters
British Dragonfly Society	Allan Brandon
British Dragonfly Society	Stephen Coker
British Dragonfly Society	Graham French
British Dragonfly Society	Ian Smith
Caerphilly County Borough Council	Melanie Sutherland
Cardiff University	Fred Slater
Carmarthenshire County Council	Isabel Macho
CCW	Geane Matthews and (Liz Halliwell)
CCW Aberystwyth	Alan Hale
CCW Aberystwyth	Andy Jones
CCW Afon Teifi	Jonathan Turner
CCW Bangor	Tristan Hatton-Ellis
CCW Bangor	Mike Howe
CCW Bangor	Jan Sherry
CCW Bangor	Julia Korn
CCW Bangor	Clare Burrows
CCW Bangor	Liz Howe
CCW Bangor	Sally Ellis
CCW Mold	Matthew Ellis/Paul Day
CCW Pembrokeshire	Matt Sutton
CCW Stackpole	Bob Haycock
EA SW Wales	Mike Jenkins
Flintshire County Council	Amanda Davies
Gwent Amphibian and Reptile Group	
Herpetological Conservation Trust	Chris Gleed-Owen
National Botanic Garden of Wales	Trevor Roach
National Museums and Galleries of Wales	Tim Rich
Newport City Council	Celina Gio-batta
Environment Agency Wales	Dave Thorpe
North Wales Environmental Information Services	Aisling Carrick
Plantlife	Trevor Dines
South East Wales Record Centre	Rebecca Davies
Biodiversity Information Service for Powys and Brecon Beacons NP	Janet Inlach
Torfaen County Borough Council	Steve Williams
West Wales Biodiversity Information Centre	Kate Jones/Robert Davies
Wildlife Trust Brecknock	Beverley Lewis
Wildlife Trust Radnorshire	Julian Jones
Wildlife Trust S&W Wales	Rob Parry
Wildlife Trust S&W Wales	Lizzie Wilberforce
Wildlife Trust S&W Wales	Nigel Ajax Lewis

Organisation	Name
Independent	Ian Killeen
Independent	John Bratton
Independent	Nick Stewart
Independent	Rebecca Sharp
Independent	Jim Clarke
Independent	Dominic Carmichael
Independent	Janet Moseley
Independent	Andy Harmer
Independent	Valerie Bradley

Appendix 6 Overview of datasets collated for the IAP assessment

The datasets used in this preliminary assessment of Important Areas for Ponds (IAPs) in Wales can be obtained from Pond Conservation or the contacts listed below.

Dataset	Data type (species record and site assemblages data)	Dataset obtained from	Number of sites/records	Number of HQPs
Pond Inventory				
Anglesey inventory	Pond location	CCW	3150	n/a
Dyfed Inventory	Pond location	CCW	597	n/a
GB lakes < 2ha	Pond location	UK lakes: http://www.uklakes.net/	1114	
Total			4861	n/a
Biological data				
North Ceredigion mine reservoirs	Ponds with plant assemblages of interest	Arthur Chater	21	21
British Dragonfly Society (BDS)	Species records	BDS	3656	50
CCW Great Crested Newt	Species records	CCW	921	921
CCW Water Vole	Species records	CCW	127	127
EA Water Vole	Species records	EA	97	97
Fairy Shrimp survey	Species records	CCW	68	4
Various sites	Ponds/pond complexes with invertebrate assemblages of interest	John Bratton	30	30
CCW - Lake monitoring	Plant assemblages	Goldsmith et al. (2006)	3	3
Llanelli Naturalist Bulletin	Species records		7	7
Various sites	Ponds/pond complexes with invertebrate assemblages of interest	Mark Walter (BDS)	6	6
Various sites	Ponds/pond complexes with invertebrate assemblages of interest	Mike Howe (CCW)	7	7
Mynydd Cilan ponds	Plant species records	CCW	11	11
National Museum and Galleries of Wales (NMGW)	Plant assemblages	NMGW	565	25
National Pond Survey /Temporary pond survey	Plant and invertebrate assemblages	Pond Conservation	32	26
BAP species records	Plant species records	Plantlife	62	62
Various sites	Ponds/pond complexes with invertebrate assemblages of interest	Steven Coker (BDS)	29	29
Stonewort sites from Important Stonewort Area	Ponds/pond complexes with stonewort assemblages of interest	Stewart (2004)	12	12
Various sites	Mainly plant assemblages	Tristan Hatton-Ellis (CCW)	3	3
Water voles in fisheries	Species records	Rob Parry (S&W Wales WT)	122	21
Wrexham pond survey	Invertebrate assemblages	Harmer (2004)	60	34
Total			5839	1496

