

# STANDING OPEN WATER

Hampshire Biodiversity Partnership

## 1 INTRODUCTION

The range of topographic, geological and catchment conditions in the county means that Hampshire has a very large diversity of ponds and lakes with a rich associated fauna and flora.

Even though lakes are spectacular features, it is the myriad of smaller ponds that sustain aquatic life across the county. Unfortunately, ponds are more susceptible to adverse changes than are lakes.

Almost all ponds and lakes in Hampshire are to some extent man-made, but many older open waters have developed a semi-natural fauna and flora of considerable county significance.

While many of the best sites are protected within SSSIs, the great majority of small ponds have no statutory protection. Fortunately, the value of ponds for amenity and wildlife is increasingly appreciated and many ponds are getting a new lease of life from conservation and amenity organisations. The rise in garden and school ponds is increasing the attractiveness of urban areas for wetland wildlife.

While several large rivers systems in Hampshire, and some larger ponds, are SSSIs, no smaller ponds are so designated. Many of the best examples tend to be notified as parts of Sites of Importance for Nature Conservation, but this affords far less protection. Ponds and lakes tend to be seen for their amenity or historic interest rather than for nature conservation and often have multiple use.

Ponds and lakes support a wide range of aquatic and marginal vegetation. In particular they provide habitats for a wide range of aquatic fauna from invertebrates to amphibians. A great many species rely on water to a varying extent, including many birds and mammals.

The most valuable open waters for biodiversity are those found in close association with others, those with differing sizes, shapes and depths and those with associated marshes, swamps and wet grasslands. These associated habitats also provide an important buffer zone between

the open water and agricultural or urban land.

Standing open waters are an important biodiversity resource and are listed as a 'Key Habitat of Nature Conservation Concern' in the Hampshire Biodiversity Action Plan<sup>1</sup>. In the UK Biodiversity Action Plan they are listed as a Broad Habitat Type and divided into three Priority Habitats: Mesotrophic Lakes; Eutrophic Standing Waters and Aquifer Fed Naturally Fluctuating Water Bodies<sup>2</sup>. Aquifer Fed Fluctuating Water Bodies are covered in the separate Ephemeral Ponds Habitat Action Plan.

While most lakes have survived, the great number of farm ponds has been considerably reduced and many remaining ponds are seriously degraded in terms of their biodiversity. This trend highlights an urgent need to conserve existing ponds and to enhance or restore other areas of open water to improve their status for wildlife.

Some of the renewed interest in the creation of ponds has been generated by their use for pollution control as part of sustainable drainage systems. Hampshire County Council (through their corporate water action plan and their developing water strategy) and the Environment Agency both encourage the use of dedicated new ponds (such as balancing ponds, attenuation ponds, settling ponds and flood storage reservoirs) together with wetlands, for the removal of silt, heavy metals and other pollutants from surface drainage waters and to allow infiltration of water into the ground.

Standing open waters are of key importance for nine Hampshire priority species and are of secondary importance for six further species (see Appendix 1, Tables 1 and 3). Standing open waters support a great many species that are a priority for conservation. These include: over-wintering birds such as gadwall, pochard and goosander; insects such as the downy and brilliant emerald dragonflies and the lesser water measurer; and plants such as the tasteless water-pepper, hair-like pondweed and floating bur-reed.

Other priority species closely associated with open waters are Slavonian and black-necked grebes, great crested newts, greater water-parsnip and galingale (*Cyperus longus*).

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## 2 CURRENT STATUS

### 2.1 Description of Habitat

Standing open waters in the county vary considerably in their size and origin. Many are historic features of considerable landscape and amenity value in continuity with other habitats and supporting a wide range of plants and animals. Others are smaller and more isolated, but add considerable diversity to the local landscape either in the countryside or in an urban setting.

The trend for garden ponds and for farm and golf course reservoirs has revitalised the biodiversity of many urban, agricultural and amenity areas.

Ponds are typically small, shallow, and continually vary in temperature throughout the year at different depths. In contrast, lakes are generally larger and deeper, and the water at depth more stable and cooler throughout the year. A precise definition separating ponds and lakes is not possible because of the great variation between both types of standing open water.

The range of standing open waters is extensive, from new amenity ponds in gardens, school grounds and public spaces, to former agricultural or stock drinking ponds (many of which may be quite old), to reservoirs and both old and new flooded mineral excavations. Some ponds have been converted to fishing lakes. Flooded gravel pits and reservoirs have created extensive new habitat for breeding wildfowl and also for important numbers of wintering waterfowl.

The more sustainable ponds and lakes are located in low-ways in the landscape or on floodplains and are fed directly by ground water, by springs and seepages or by feeder streams from river courses.

Ponds remaining from older clay and brick pit workings provide open water and swamp complexes and because they are often fed by surface waters, often become shallow or dry in the late summer. Large lakes are mostly represented by flooded former aggregate workings on gravel terraces or on the floodplains of some rivers.

To some extent, the water quality of our ponds and lakes is determined by their catchment. The fauna and flora of standing open waters is determined to a large extent by their nutrient status and this can be used to assist classification as follows:

Dystrophic	rich in organic matter and usually very poor in plant nutrients, particularly available nitrogen;
Oligotrophic	poor in plant nutrients;
Mesotrophic	intermediate levels of nutrients;
Eutrophic	nutrient rich;
Marl	rich in calcium.

In addition, water bodies are affected by eutrophication. Eutrophication occurs where artificial or natural additions of nutrients (especially nitrates and phosphates) continue to increase and so upset the water quality balance. Artificial sources of excess nutrients include those from domestic sewage, industrial waste, agricultural runoff and storm drainage.

Some oligotrophic (nutrient poor) and some mesotrophic ponds remain within the more extensive heathland areas in the county. But most standing open waters are affected by enhanced calcium levels derived from the concrete surfaces of urban areas, either by direct drainage or by calcium enhanced groundwater. Other ponds are naturally eutrophic or have become so by increased urbanisation of their catchments. In contrast, ponds and lakes deriving their water from the chalk rivers, or from chalk water fed springs, contain water rich in calcium bicarbonate.

#### Types of ponds and their origins

- Village and school ponds
- Amenity ponds for fishing and boating
- Modern stocked fishing ponds and lakes
- Mill ponds
- Farm ponds
- Dew ponds on the chalk
- Decoy ponds for wildfowl
- Ponds in former clay pits
- Balancing ponds
- Reservoirs for domestic and farm water supply
- Medieval fish ponds and historic reservoirs
- Lakes in former gravel workings
- Fire fighting ponds.

All of these pond types together provide a wide range of aquatic and marginal habitats, some more natural than others.

### 2.2 Distribution and Extent

Ponds and (to a lesser extent) lakes are widely distributed across the county but we have only estimates of how many there are.

Volume 1 of the *Biodiversity Action Plan for Hampshire*<sup>1</sup> estimates that there are about 500 lakes over 0.5ha in area. Of these about 60 have a surface area of 2 hectares or more. Many of these larger water bodies originated as mill ponds or were created as landscape settings to country houses. Old Alresford Pond was created as a medieval fish pond.

Smaller water bodies are numerous and it is estimated that Hampshire may have well over 1000 ponds (less than 0.5ha in area).

In total, the ponds and lakes we see today are perhaps only 25% of those present 100 years ago. It is thought that, of the ponds present in 1880, nearly 80% have been lost.

However, the remaining standing open waters together cover about 1300 hectares and make up about 0.3% of the county area.

A study of standing open waters for the East Hampshire District Environmental Review in 1993 indicated that there were 428 ponds and 31 reservoirs and that water bodies large enough to be considered as lakes had a total area of about 11.3ha.

In 1999, BTCV circulated a questionnaire to all Hampshire schools in order to gather information about school ponds. Of the 47% returns from 518 questionnaires, 67% of schools (216) had ponds.

Ponds and lakes are less numerous on the chalk downlands where permeable substrates and large arable fields preclude their existence. Small dew ponds in chalk areas have been created artificially to provide water for livestock. Some ponds occur on the chalklands as the result of deep chalk workings into which groundwater rises in winter and so tend to be ephemeral. This is in contrast to the chalkland river valleys where there are many ornamental ponds, impounded farm and water company reservoirs, and fishing lakes.

Large lakes in former mineral workings in the Test and Avon floodplains are of great importance for birds. In particular is the 57ha lake system at Blashford Lakes SSSI near Ringwood in the Avon valley associated with former gravel workings. Here, three lakes are owned by Wessex Water and managed through a partnership of organisations for water supply, amenity and nature conservation and there is also a study centre. The lakes are rich in aquatic invertebrates and attract large numbers of migratory wildfowl.

Many ponds in the Itchen Valley are also important for birds as is the chain of lakes in

flooded gravel workings along the Blackwater Valley in the northeast of the county.

In the Wealden area of East Hampshire, ponds become much more common and result from a great variety of landuses from mill ponds to village ponds with many being managed for nature conservation. Of particular importance here is the shallow acidic Woolmer Pond and the more neutral Shortheath Pond both owned by the Ministry of Defence, and the chain of ponds at Waggoners Wells owned by The National Trust.

The largest number of ponds are in the northeast and the southern parts of the county, where they occur on mixed sands, loams and clays of the Hampshire parts of the London and Hampshire Tertiary Basins. Here, numerous small streams and springs feed a great variety of ponds and small lakes. Other ponds occur on the clay lands supported by drains off surface water catchments.

The millpond and associated wetland at Bishop's Waltham Moors SSSI (part of The Moors Nature Reserve managed by Hampshire County Council), is on Tertiary deposits but the water is derived from springs sourcing water off the chalk. Small areas of strongly acidic habitat here are related to the accumulation of acidic plant litter. The high wildlife value of water bodies at The Moors demonstrates the importance of diversity in substrate, vegetation, water chemistry and water supply. The links with a historic mill, one of a series of European Mill sites, emphasises the wider interest of many of our standing open waters.

A further example of the mixed use of open waters is Heath Pond at Petersfield Heath, a wide shallow pond used for fishing, boating and wildlife conservation. Here, reed beds are encouraged and fenced off from boating and fishing by the fishing club.

The New Forest in the Hampshire Tertiary Basin provides an outstanding resource of both spring and groundwater fed water bodies within the valley mires, fens, old gravel workings and floodplains.

There has been an increase in construction of small reservoirs for irrigation in response to an increasing demand for water. Such reservoirs serve, for example, horticultural enterprises and golf courses. Others contain a supply of water for fire fighting. While some such modern reservoirs have a wildlife element, many are intensively managed and remain relatively sterile.

### 2.3 Legislation and Site Designation

No legislation exists to specifically protect ponds and lakes, although legislation from the European Union (Birds Directive 1979, Habitats Directive 1992) and the UK (Wildlife and Countryside Act 1981) makes provision for the designation of sites to protect open waters and certain species that occur there. The Habitat Regulations identify the importance of protecting areas that act as stepping stones and wildlife corridors, and Hampshire's ponds provide significant stepping stones for wildlife and oases amongst often barren agricultural and urban landscapes.

Some lakes in historic parks and gardens have a measure of protection by virtue of their listing by English Heritage. Many such features are formal such as the pond at Hackwood House, but others are more informal such as the lakes at Avington and at Northington Grange, or originated as fish ponds as at Basing House, or lily ponds as at Marshcourt near Kings Somborne.

Many of the more ecologically important ponds and lakes are within SSSIs, SPAs and SACs. Key examples in the east and north-east of the county include: the large water body within Fleet Pond SSSI near Fleet in Hart District, a series of former silt lagoons remnant from mineral working in Bramshill SSSI, and in the nearby Warren Heath Ponds both also in Hart District; also Woolmer Pond, an acidic oligotrophic or dystrophic large pond that is part of Woomer Forest SSSI in East Hampshire District.

In the upper Itchen Valley is Alresford Pond SSSI, a calcareous lake constructed about 900 years ago, now shallow and seriously affected by siltation.

Blashford Lakes SSSI is managed by the Hampshire Wildlife Trust with funding from Wessex Water and New Forest District Council and has both a study centre and full time warden. This site illustrates the increasing trend for wildlife sites to be managed using a partnership of organisations with common interests.

The New Forest SSSI contains a large number of ponds of varied origin and water characteristics and which together with heathland, ancient woodland, valley mires and other habitats all contribute to the largest area of semi-natural habitat in southern England. The ponds vary from those that are eutrophic to those that are strongly oligotrophic and so support a wide range of aquatic wildlife.

Roydon Woods SSSI on the edge of the New Forest and Southampton Common SSSI both contain a number of ponds that form an important part of a range of other habitats.

In addition to those sites with national or international designations are those with local designations known in Hampshire as Sites of Importance for Nature Conservation (SINCs). Key open water SINCs include: Anton Lakes in the Test Valley, Avington Lake in the Itchen Valley, Thicket Woods and Lake in the Forest of Bere, Heath Pond at Petersfield and open water at Embley Wood to the southwest of Romsey which is particularly rich in dragonflies. There are a series of standing open waters SINCs in the northeast of the county including those at The Gold, Ramillies Park Complex, Frimley Lake, Eversley Lakes, Statfield Saye Lake at Wellington Country Park and Hulford Pond.

### **3 CURRENT FACTORS AFFECTING THE HABITAT**

Despite increasing awareness of the importance of ponds and lakes, there are many factors that continue to adversely affect their biodiversity. These factors include both direct effects upon the water body itself and indirect effects originating some distance away.

Left to themselves, ponds and lakes change naturally over time, slowly infilling with sediment and vegetation and in the absence of human impact gradually become less fertile. Where standing water bodies are heavily enriched (eutrophicated) as a result of human activity, biodiversity is depressed because planktonic and filamentous algae (blanket weed) increase rapidly at the expense of other aquatic organisms. Sensitive organisms disappear and the water bodies become biologically impoverished.

#### Direct drainage

Deliberate drainage of ponds and lakes to improve safety, prevent flooding or to remove eyesores, causes total loss of the habitat. Continued intensification of agriculture could also reduce the number of wetlands, especially in arable areas.

#### Infilling

Infilling of ponds has a similar effect to drainage in that the pond is lost. Farm ponds in particular may no longer be needed and infilling can provide additional productive land or space for redevelopment.

#### Neglect and silting

Ponds naturally become shallow if they are allowed to accumulate silt on their beds. This process causes the natural transition to swamp and wet woodland (carr). Without active management, many small ponds will become seriously silted within a decade.

This happens, for instance, where ponds receive silty run-off from roads.

Even large lakes and ponds suffer from the development of scrub and trees around the margins, causing shade and loss of open habitats.

#### Inappropriate management

Too much tidying up of a water body, or removal of bankside vegetation in spring and summer can lead to temporary loss of biodiversity. Loss of marginal wetlands means not only is their intrinsic biodiversity reduced but also their ability to absorb excess nutrients, reduce flows and filter silt.

#### Isolation

While many lakes occur in clusters providing extensive habitat, ponds are often isolated and vulnerable and within areas of poor habitat. This means that their habitat diversity is often restricted and the scope for re-colonisation after damage is small.

#### Reduced water table

Lowering of water tables, through drought, deep abstraction (to supply the increasing domestic and industrial demand) or drainage of adjacent land, will reduce the ability of groundwater fed standing open waters to contain water.

Reduced water tables also affect spring flow and where open waters are sourced from springs, they could become increasingly vulnerable.

#### Change in adjacent land-use

Development of land adjacent to standing open waters can lead to a number of changes. These include:

- alterations in the extent of the catchment leading to either flooding or drying out;
- changes to the rate of flow of water underground such as by interruption of groundwater flow by excavation, lining and landfilling;
- directing source waters away from the pond;
- increasing calcium content of otherwise calcium poor source waters;
- increased disturbance by people or domestic animals, especially cats and dogs.

On agricultural land, ploughing close to pond margins increases siltation.

#### Altered floodplain management

In the past, reduced flooding from rivers by raising of river banks caused winter recharge of floodplain ponds to decline. Surviving ponds became increasingly isolated from each other as floodplain wetlands were reduced. Greater awareness of these issues in Hampshire means that such affects should no longer happen.

#### Pollution and altered water chemistry

Standing open waters receive pollution from:

- first flush point source run-off from road surfaces, commercial and industrial areas and poorly maintained oil separators including heavy metals and oils;
- salt from de-icing;
- spray drift and dumping of chemical containers, both mostly affecting farm ponds;
- overflow discharges from foul sewer systems;
- domestic or industrial pollution incidents.

Stream fed ponds and lakes are susceptible to water chemistry changes that may affect fauna and flora. This is especially so in:

- acid catchments where the introduction of non-acidic sources of water (such as from canal overflows or concrete-rich urban areas) can lead to long term adverse change;
- agricultural catchments where diffuse pollution from liming, fertilising and spreading of sludges and agrochemicals, can adversely affect the trophic status of the water. Organic matter such as farm effluent clouds the water and uses oxygen to such a degree that it starves wildlife of oxygen and light. Excess nutrients from fertiliser run-off or decaying organic matter can promote growth of microscopic algae that further increase oxygen demand, to the detriment of other plants and animals. Such changes can be subtle and only apparent in the long term, or rapid where eutrophication leads to excessive growth of vegetation and consequent changes resulting from decay and reduced oxygen levels.

Catchment based modelling suggests that a significant proportion of lakes have become nutrient enriched since the 1930's and about three-quarters of lakes within SSSIs are so affected. Increasing regularity of blue-green algae blooms may reflect this enhanced nutrient status.

The water quality of agricultural ponds can be further affected by shading trees, disturbance by farm stock and reductions in marginal vegetation. Too many ducks is a

common and serious problem in Hampshire village ponds and which causes turbidity, pollution and reduced oxygen levels.

### Leaks and seepage

Weakened clay liners (affected by cracking during summer drought or drying during cleaning) or punctured artificial liners can lead to loss of water and reduce the ability of the pond to support a biodiverse fauna and flora.

### Road Management

Many ponds receive drainage water off roads leading to excessive silting and often they are inappropriately managed.

### Fishing and fish farming

Even small scale stocking of ponds can lead to alterations in pond ecology either by introduction of too many vegetarian fish or too many predators. Both reduce the ability of the habitat to support native species.

Bottom feeding fish, such as carp and bream, can cause turbidity and accelerate the release of nutrients from sediments. Even domestic goldfish breed prolifically and, once in a pond, are difficult to remove.

However, many fishing lake owners are sympathetic to wildlife and take due account in the management of their fishing waters.

Conversion of standing open waters to fishing ponds and lakes can lead to changes in fauna and flora through insensitive stocking with fish, modification of edges and general disturbance. However, the effective management of such water bodies for both fishing and nature conservation can lead to greater biological diversity.

Heavily stocked open waters on large-scale fish farms provide little opportunity for wildlife conservation unless there are other pools on the site that can be separately managed. Small-scale fish farming for goldfish and other amenity pond species, can provide greater opportunity to improve biodiversity.

### Water sports

Poorly managed boating and water skiing on lakes can disturb breeding and roosting birds, damage waterside vegetation, create erosion and stir up sediments increasing turbidity and nutrient release.

### Introduction of invasive vegetation

Some species of aquarium and water garden plants (especially Australian swamp stonecrop/New Zealand pigmyweed *Crassula helmsii*, parrot's feather *Myrriophyllum aquaticum*, floating pennywort *Hydrocotyle ranunculoides*, Indian/Himalayan balsam *Impatiens*

*glandulifera*, and the water ferns *Azolla filiculoides* and *A. caroliniana*) can be highly invasive of ponds leading to the rapid replacement of natural vegetation by swamping, mulching and reduction of light levels. Death of large amounts of invasive plants in the winter leads to development of toxic anaerobic conditions.

### Introduction of fish and alien fauna

Introduction of fish for fishing together with predatory terrapins and non-native fish (such as zander) and alien crayfish, can lead to reduction in species diversity. This is a particular issue in urban areas such as Southampton.

### Extreme climate events

In recent years, extreme floods and droughts have led to disruption in the natural cycles of some open waters. Higher water levels on flood plains and in previously dry valleys, has allowed many ponds to fill and some to extend beyond their banks.

During drought years, the drying up of ponds has led to the loss of sensitive fully aquatic species from snails to fish. While many ponds and lakes appear to recover, their biodiversity may be much reduced.

### Climate change

The extent to which climate change is occurring is a matter of considerable concern. Current trends are uncertain and predictions for the future are based on broad assumptions. However, current governmental guidance suggests that by the 2080s winter rainfall could increase by about 20% with a corresponding decrease in summer rainfall.

While increased rainfall could be beneficial to wetlands (especially winter rain which increases base flows), other factors such as deposition of silt from land erosion and greater leaching of agricultural fertilisers could lead to adverse effects.

Increased summer drought could lead to the more regular drying up of more vulnerable ponds and wetlands and reduced water flows in source streams. This will be especially so if the demand for surface and ground water sourced irrigation water increases. Nevertheless the risk of summer drought could see a shift to the development of storage lagoons with a rise in the number of standing open waters.

Together these factors could lead to a reduction in aquatic biodiversity if measures are not taken to counteract them. However, in the absence of specific information, resources are better spent on solving

immediate problems whilst monitoring trends to improve prediction.

## **4 CURRENT ACTION**

### *4.1 Site and Species Protection*

- Hampshire County Council (HCC) has adopted a Corporate Water Action Plan<sup>3</sup> that aims to raise the profile of water issues within the county estate and to further develop a county-wide water strategy. The Council also own many ponds and lakes, on both historic and countryside sites. Those on countryside sites are specifically managed for wildlife conservation. A notable example is the mill pond at the Moors Nature Reserve SSSI. The County Council's Schools Landscape Project restores many ponds in school grounds.

Ponds in Country Parks receive particular attention for wildlife conservation and considerable effort is put into maintaining open water habitats. For example, at the Queen Elizabeth Country Park, a former fire fighting pond has been converted to a wildlife lake and access provided by boardwalks. This pond has recently been re-excavated, lined, re-vegetated and provides recreational interest for visitors and allows for pond dipping by schools and other groups. So successful has been the re-vegetation that native wetland plants are available to local groups for the stocking other ponds.

- Many ponds and lakes resulting from gravel extraction in the Blackwater Valley (in the northeast of the county), are managed by the Blackwater Valley Recreation and Countryside Management Service for water sports and for nature conservation.
- SINC identification is ongoing in Hampshire. Further standing open waters are likely to be identified by HCC in consultation with English Nature (EN), Hampshire Wildlife Trust (HWT) and the relevant district council.
- Many local development plans, such as that for New Forest District Council, have policies to retain landscape features such as ponds and lakes.
- Southampton City Council's Nature Conservation Strategy identifies the major ponds and lakes in the city and gives some protection from development.

### *4.2 Habitat Management and Programmes of Action*

- 'Integrated Management Guidelines' are being developed for the East Hampshire AONB. These include measures to promote the conservation of ponds and lakes. In particular, there are grants to landowners for pond restoration and, in some circumstances, for pond creation. Recent examples have included restoration and other works at ponds in Stroud, the Criddle Lake in Ramsdean, ponds at Colemore and Froxfield and the newly restored wildlife pond at Queen Elizabeth Country Park (where new dew ponds have also been created).

- Hart District Council and the Fleet Pond Society have been funding hydrological and ecological studies of Fleet Pond SSSI with a view to developing a water level management plan. This is in order to sustain the reedbeds and remnant acidic wetlands around the pond margins in this eutrophic but one-time oligotrophic water body.

- Petersfield Town Council, assisted by the Petersfield and District Angling Club and the Friends of Petersfield Heath, manage The Heath Pond on Petersfield Heath for mixed nature conservation, fishing and boating use. Current objectives are to remove some fringing scrub and to repair and prevent erosion of the banks.

- DEFRA has a number of schemes relevant to Hampshire. Part of the chalk plateau in the southeast of the county is within the South Downs Environmentally Sensitive Area (ESA). The ESA scheme makes provision for grants towards the cost of capital works on ponds and lakes. The current ESA scheme will end in 2002. The future of the scheme beyond this date is still to be decided.

The Test and Avon ESAs aim to maintain the pastoral landscape character and wildlife of the valleys by encouraging appropriate management of wildlife habitats including maintenance of high groundwater in meadows and the management of standing open waters.

Standing open waters and their control systems are a target habitat for the Countryside Stewardship Scheme (CSS). The Scheme provides payments for maintaining, enhancing and creating pond and lake habitats together with associated ditches, culverts and sluices. Advice is given on the appropriateness of pond creation according to water sourcing.

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- Much land within SSSIs is either under sympathetic management by public bodies, under ESA or CSS agreements, or under Section 15 Management Agreements with EN. Despite this, additional funding is required to achieve favourable condition. EN is currently producing 'Site Management Statements' for some SSSIs with standing open waters, outlining conservation objectives and appropriate management.
  - The Forestry Commission maintain ponds within their estate for their nature conservation and educational interest, for example the woodland ponds at Alice Holt Forest and many ponds in the New Forest.
  - The RSPB are mostly concerned with sites of significant wildlife value such as Blashford Lakes Special Protection Area (SPA). Advice has been given on drawing up site objectives. There are no RSPB reserves with open water components in Hampshire. The RSPB contributes to the wider conservation of open waters through measures such as their 'ponds for wildlife' information leaflet.
  - Hampshire Wildlife Trust is involved in open waters as part of their wider remit in the county. These include:
    - The management of ponds and lakes that occur on Trust nature reserves;
    - Habitat survey and biodiversity research projects on species such as the medicinal leech, great crested newt and the swamp stonecrop; also species groups such as the Hampshire Amphibian and Reptile Group;
    - Landowner advisory work including the HCC/HWT Habitat Management Advisory Project (HMAP). This provides free advice and assistance with grant aid to owners and managers of SINC's in Hampshire, including ponds and lakes and especially those with otters;
    - Through the Wildlife Awareness Team (WAT) comprising five community conservation officers who work on local projects. WAT offers advice on planting, removal and control of invasive species, management, use of contractors, training and leading work parties and providing practical advice. WAT also assists with grant applications, surveys and education. Projects include advice on school ponds and a range of other ponds such as those in Hartney Wintney and Long Sutton in Hart District; on spring fed pools and streams at the Rotherlands near Petersfield, East Hampshire District; at Fordingbridge and New Milton in New Forest District; in Highclere and Crawley, Test Valley;
  - Influencing policy and plans operated by local authorities and the statutory agencies where these effect the water environment.
  - The British Trust for Conservation Volunteers (BTCV) provides advice to communities managing ponds, either directly, or through the Southern Water sponsored Pond Warden Scheme. Training is provided for volunteer pond wardens in order to spread the biodiversity message on a parish-by-parish basis. This scheme is supported by PondNet, a group of wildlife organisations and pond specialists that advise local groups on all aspects of pond design, interpretation and management.
  - The Environment Agency, while mainly concerned with flowing waters, does have some involvement with specific still open waters. Local Environment Agency Plans (LEAPs) have been produced for all river catchments in the area and reflect the wide range of activities in which the EA is involved.
- The Agency is responsible for producing Water Level Management Plans for rivers and wetlands in the area, priority being given to SSSIs. Producing and implementing these plans are entirely dependent upon reaching consensus between the agency, English Nature, landowners and managers and other relevant bodies. The Alresford Pond Water Level Management Plan is one such plan, where the objective is to raise and maintain water levels to restore and sustain the ecological vitality of this important mosaic of habitats.
- As a direct result of the Agency pursuing and presenting a strong case to government, the ecological damage caused by groundwater abstraction to the Moors SSSI was recognised. Portsmouth Water are committed to closing the Hoe Pumping Station at The Moors by March 2003 as part of the AMP III programme.
- Fisheries are an important consideration in many ponds, and as part of their Coarse Fisheries Strategy the Environment Agency has established an urban coarse fisheries enhancement programme. This has included enhancing a series of ponds in Southampton (Millers Pond, Ice-house Pond and Cromarty Pond) both for able bodied and disabled anglers. Improvement of these habitats has also been achieved through dredging accumulated silt, planting marginal vegetation and ensuring that some areas are not accessible to people. This work (along with other sites in Winchester) was done in collaboration with the local community. An important part of the Strategy is an increased

emphasis on habitat management in still waters. At Ice House Pond in Shirley, Southampton, the Agency has assisted with pond enhancement and provision of pond dipping activities.

The Agency has also worked with landowners to restore neglected ponds and create new ones throughout the county. Some ponds with islands in the Itchen Valley have been designed to provide otter havens away from people and dogs, and wet margins have been increased to suit water voles.

Through its regulatory role, the Agency seeks to exploit opportunities to restore old ponds and/or create new ones and to maintain these. For example, the Agency advises applicants wishing to create storage reservoirs to manage them for wildlife.

The EA has submitted proposals for the National Environment Programme (NEP) to secure environmental investment from the water companies for the period 2000-2005.

As statutory planning consultees the EA are promoting the use of sustainable drainage systems to ameliorate the impacts of run-off on water systems.

- Hampshire FWAG provides advice to all landowners on general nature conservation issues including the management of ponds for wildlife.
- DEFRA has produced a publicity pack highlighting the issue of soil erosion and the Codes of Good Practice for Water and Soil have recently been revised and re-launched. The Soil Code emphasises the need to avoid drift of lime and nitrogenous and phosphate rich fertilisers into watercourses and wildlife sites in order to avoid eutrophication and similarly, to avoid influxes of silt from erosion. The Water Code further emphasises best practice in minimising the risk of polluting water.
- Local action is being taken by District and Parish Councils together with private trusts around the county to revitalise village and other ponds.

Examples include Petersfield Town Council that manages the Heath Pond for fishing, amenity and wildlife conservation and the

Deadwater Valley Trust, an environmental charity that manages an area of woodland and other habitats, including Knox's Pond, for Whitehill Parish Council. Many ponds and lakes in public ownership are managed by fishing clubs who take account of biodiversity issues in their management operations.

### 4.3 Action for Species

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Table 1 (Appendix 1) gives details of priority species in Hampshire found primarily in standing open waters. Action proposed in this Plan will be the principal means of conserving most of these species. In some cases additional action plans and programmes will also contribute to conserving priority species.

Table 3 (Appendix 1) lists those Hampshire priority species that occur in standing open waters but whose main habitat is **not** standing open water. Although action in this habitat action plan (HAP) may contribute to the conservation of these species, other HAPs have key responsibility for their conservation.

### 4.4 Survey, Research and Monitoring

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- EN is currently carrying out regular condition assessment of all SSSIs.
- While the Environment Agency does not monitor water and biological quality in standing waters in the same way as for running waters, it does survey ponds as part of specific investigations. For example a recent survey of ponds and wetlands in Upham and Wallington catchments produced new records for rare invertebrates. Such information underpins regulatory, operational and advisory roles.

The proposed Water Framework Directive, although not yet adopted by the EC, has been hailed as the most significant piece of European legislation to affect the management of our water environment over the last 20 years. It will have a major effect on future environmental protection, policy and legislation. Provision is likely to be made for the restoration of degraded flowing and still waters to realise their ecological potential. This will impact upon all of the Agency's role as a regulator, operator and advisor to others.

**5 OBJECTIVES**

The overall aim of this Plan is to protect and enhance the biodiversity of standing open waters in Hampshire. This broad aim translates into the specific objectives set out below. Where feasible, objectives have been allocated targets against which achievement can be measured: for example total numbers of ponds or lakes to be restored or dates for completion. The 'Proposed Action' table in section 6 identifies the action to be taken to meet these objectives.

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	<b>OBJECTIVE</b>	<b>PROPOSED ACTIONS</b>
<b>A</b>	<p><b>Protect and maintain the full range of standing open waters including a variety of types based on size, water chemistry and hydrology and including both older ponds and lakes and newer lakes on mineral workings:</b></p> <ul style="list-style-type: none"> <li>▪ Maintain the numbers and quality of existing older and well established ponds and lakes</li> <li>▪ Improve the condition of new lakes arising out of mineral workings and water supply reservoirs.</li> </ul>	1, 2, 3, 4, 5, 13
<b>B</b>	<p><b>Improve the water quality and biodiversity of standing open waters:</b></p> <ul style="list-style-type: none"> <li>▪ Identify those standing open waters that have some degree of pollution or nutrient enrichment and undertake measures to improve their biodiversity.</li> </ul>	6, 7, 8, 9, 10, 11, 14, 15, 18
<b>C</b>	<p><b>Increase the numbers of standing open water bodies:</b></p> <ul style="list-style-type: none"> <li>▪ Facilitate the restoration of former ponds, now drained, to a biodiverse condition</li> <li>▪ Create new ponds close to high quality ponds to reduce isolation</li> <li>▪ Create new ponds in areas of extensively managed land (ie. unfertilised) where they have a better chance of developing high biodiversity</li> <li>▪ Encourage formation and restoration of ponds through the planning process as mitigation/enhancement measures for relevant development.</li> </ul>	12, 16, 17
<b>D</b>	<p><b>Ensure that the needs of Hampshire priority species occurring in standing open waters are met.</b></p>	19, 20, 21
<b>E</b>	<p><b>Improve knowledge of distribution, extent and status of standing open waters in Hampshire through survey, research and monitoring.</b></p>	22, 23, 24, 25, 26, 27, 28, 29, 30, 31
<b>F</b>	<p><b>Communication, Awareness and Promotion:</b></p> <ul style="list-style-type: none"> <li>▪ Promote the importance of standing open waters, their associated species and threats to them. Communicate with and provide information to key sectors including statutory agencies, NGOs, landowners and managers, schools, community groups and members of the public.</li> </ul>	5, 32, 33, 34, 35, 36, 37

**6 PROPOSED ACTION**

The following table lists the actions required to achieve the objectives set out in section 5 of this Plan. Each action has been assigned to one or more 'Key Partners'. Key Partners are those organisations that are expected to take responsibility for the delivery of the actions assigned to them, according to the targets set in this Plan. Other organisations may also be involved in the delivery of action, and they are indicated in the 'Others' column of the table.

Key to symbols in Action Table:

- ◆ To be completed by the indicated year. Work can commence at any time before the due date, at the discretion of the Key Partner.
- ◆⇒ Design or production of a plan/strategy to be completed by this year and then followed by its implementation.
- ➔ To start by the indicated year and usually followed by ongoing work. A start arrow in year 2002 can indicate a new action or a new impetus to existing work.
- ⇨ Work that has already begun and is ongoing.

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	ACTION	DELIVERY BY		YEAR						MEETS OBJ.
		Key Partner	Others	2002	2003	2004	2005	2006	2010	
◆ = complete by    ◆⇒ = design by and implement ➔ = start by    ⇨ = ongoing										
<b>Habitat Protection</b>										
1	Review SINC criteria for standing open waters, especially small ponds in urban locations at risk of reduced management or development.	HCC	HWT,EN, DCs		◆					A
2	Ensure that all suitable ponds and lakes that meet SINC criteria are identified.	HCC	HWT,EN, DCs	⇨	⇨	⇨	⇨	⇨	⇨	A
3	Review and/or develop site acquisition policies and purchase sites where appropriate.	ALL		➔						A, C
4	Ensure that standing open waters of all sizes and associated priority species are safeguarded from development through forward planning and development control.	LAs	EA, EN, HWT	⇨	⇨	⇨	⇨	⇨	⇨	A, D
5	Provide advice to mineral operators regarding the restoration of mineral workings to standing open waters. Also advise how to avoid damage to open waters close to proposed mineral workings.	HCC	EA, EN	⇨	⇨	⇨	⇨	⇨	⇨	A, C
<b>Habitat Management, Incentive Schemes and Other Resources</b>										
6	Monitor all SSSIs supporting standing open waters and ensure all are under favourable and appropriate management.	EN	EA				◆⇒			A, C

## Standing Open Water

	ACTION	DELIVERY BY		YEAR						MEETS OBJ.
		Key Partner	Others	2002	2003	2004	2005	2006	2010	
◆ = complete by    ◆⇒ = design by and implement ➔ = start by    ⇔ = ongoing										
<b>Habitat Management, Incentive Schemes and Other Resources (cont'd)</b>										
7	Ensure nature conservation objectives for European and internationally designated ponds and lakes are met, similarly those under military control	MoD, EN	EA		◆					A, C
8	Ensure appropriate management of standing open waters managed by 'conservation' bodies.	HCC, HWT	NT, RSPB	⇔	⇔	⇔	⇔	⇔	⇔	A, C
9	Implement Integrated Management Guidelines for East Hampshire AONB.	EHA		➔						A, B, C
10	Extend the principle of Integrated Management Guidelines to other AONBs that support standing open water.	CA	HCC	➔						A, B, C
11	Encourage appropriate management on all non-SSSI (e.g. SINCs) sites that support biodiverse standing open waters.	HMAP	DEFRA/ FRCA, FWAG, EHA	⇔	⇔	⇔	⇔	⇔	⇔	A, C
12	Increase the number of ponds managed for wildlife by 25% and lakes by 50% by providing advice, grant aid and practical assistance across the county.	HWT	HCC, EN, DEFRA/ FRCA, EHA						◆	B
13	Reflect the need to protect standing open waters of high conservation value in the targeting of Countryside Stewardship Schemes (CSS) in Hampshire.	DEFRA/ FRCA		➔						D
14	Encourage further uptake of ESA and CS schemes to ensure favourable condition on standing open waters.	DEFRA/ FRCA	HMAP, EN, EHA, EA	⇔	⇔	⇔	⇔	⇔	⇔	A, C
15	Ensure that options for the conservation of standing open water habitats are available through ESA schemes in the South Downs and encourage landowners to manage existing water bodies in the valleys of the South Downs.	DEFRA/ FRCA	EHA		◆					A, B, C
16	Ensure that ESA and CSS pond creation and restoration payments are attractive and encourage further uptake of schemes to achieve Natural Area standing open water re-establishment targets	DEFRA/ FRCA	HMAP	➔						B
17	Provide information and advice to landowners and managers on standing open water management, incentive schemes and advisory projects.	DEFRA/ FRCA, FWAG, HMAP	EHA, EA, EN, HWT	⇔	⇔	⇔	⇔	⇔	⇔	C, F
18	Encourage the appropriate and beneficial management of land adjoining standing open waters.	DEFRA/ FRCA	FWAG, HMAP, HWT	➔						C, F

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<b>Species Action</b>										
19	Encourage landowners/managers and their advisors to ascertain which Hampshire priority species (listed in Appendix 1) occur in their standing open waters and ensure that appropriate management is implemented.	HWT	NFU, CLA, HMAP	➔						C, D, F
20	Identify and promote knowledge of key species that can be used to highlight specific adjustments to standard management regimes and produce appropriate guidelines.	HWT, EN		➔						C, D, F
21	Identify 'flagship' species that can be used as indicators to assess progress of this HAP.	HWT	HCC		◆					D, F
<b>Survey, Research and Monitoring</b>										
22	Produce a survey strategy for standing open waters to complement actions within this HAP.	HCC, EA, PCT	HWT	◆⇒						E
23	Implement a rolling re-survey programme for standing open water SINC's at a 10-yearly interval.	HCC	DCs	◆⇒						E
24	Undertake a sample NVC survey of standing open water plant communities to establish the current extent, distribution and condition of the habitat in Hampshire.	HCC	EN, EA	◆⇒						E
25	Produce an inventory of all Hampshire standing open waters to include all existing survey information and collate existing research on standing open waters in Hampshire.	HCC, EA, HWT, PCT	EN		◆					E, F
26	Ensure that all relevant data on standing open waters is incorporated into the Hampshire Biodiversity Information Centre (HBIC) and is fed into the National Biodiversity Network (NBN).	HCC	HWT, BTCV, EN	⇒	⇒	⇒	⇒	⇒	⇒	E
27	Identify target areas within each Natural Area for standing open water restoration.	EN						◆⇒		B, C, E
28	Design and implement a monitoring scheme to assess favourable condition of non-SSSI standing open waters.	HCC, HWT	EN, EA, PCT		◆⇒					E
29	Present a case to the UK Biodiversity Steering Group for the inclusion of small water bodies of a certain quality in the definition of the national priority habitat 'Eutrophic Open Water'.	DEFRA/FRCA, FWAG			◆⇒					E
30	Review the need for further research on large standing open waters (lakes), especially with regard to sustainable hydrology and nutrient status in Hampshire, and promote or facilitate this research as appropriate.	HCC, HWT	EN, PCT				➔			E
31	Undertake research to assess the ecological sustainability and viable management of small standing open waters (ponds) in Hampshire in line with national projects.	HCC	EA, BTCV, HWT, PCT				➔			E

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## Standing Open Water

	ACTION	DELIVERY BY		YEAR						MEETS OBJ.
		Key Partner	Others	2002	2003	2004	2005	2006	2010	
◆ = complete by    ◆⇒ = design by and implement ➡ = start by    ⇨ = ongoing										
<b>Communication and Publicity</b>										
32	Compile an index of information sources and guidance on good management practices for standing open waters and associated priority species.	HCC, HWT, EA	EN		◆⇒					C, D, F
33	Convene a Hampshire ponds and lakes forum as a means of disseminating best management practice, raising awareness of the habitat and to co-ordinate research and monitoring projects throughout the county.	HCC	EA, EN, HWT		◆⇒					E, F
34	Identify ponds and lakes that demonstrate good management practice and establish those sites as centres to raise awareness of standing open waters.	HWT, EA	EN, HCC					◆⇒		E, F
35	Increase public awareness of standing open waters, including production of promotional material and encouragement of public access to appropriate sites.	HWT, BTCV, HCC, PCT	EA	⇨	⇨	⇨	⇨	⇨	⇨	F
36	Involve local communities in the conservation of standing open waters where appropriate.	HWT, BTCV, PCT	EA	⇨	⇨	⇨	⇨	⇨	⇨	C, F
37	Support the actions of the Hampshire Education & Awareness Topic Action Plan relevant to this habitat and associated priority species.	ALL		➡						F

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### KEY TO ORGANISATIONS

BTCV British Trust for Conservation Volunteers  
 CA Countryside Agency  
 CLA Countryside Land and Business Association  
 DCs District Councils  
 DEFRA Department for the Environment, Food and Rural Affairs  
 EA Environment Agency  
 EHA East Hampshire AONB  
 EN English Nature  
 FRCA Farming and Rural Conservation Agency  
 FWAG Farming and Wildlife Advisory Group

HCC Hampshire County Council  
 HMAP Habitat Management Advisory Project  
 HWT Hampshire Wildlife Trust  
 LAs Local Authorities (HCC & DCs)  
 MoD Ministry of Defence  
 NFU National Farmers Union  
 NT National Trust  
 PCT Pond Conservation Trust  
 RSPB Royal Society for the Protection of Birds

**APPENDIX 1**

**Key to abbreviations in Tables 1 and 2 – see columns ‘Action in addition to HAP’ and ‘Status/Protection’**

Abbreviation	Definition
<b>ACTION IN ADDITION TO HAP (Other Plans Relevant to Priority Species)</b>	
UK SAP	Species Action Plan prepared under UK Biodiversity programme
UK Grouped SAP	Species catered for by a grouped Species Action Plan prepared under UK Biodiversity programme
UK Species Statement	Conservation of species generally achieved through HAPs. Statement prepared under UK Biodiversity programme to link the relevant Plans.
No Plan	Species removed from revised UK priority list. No Action Plan / Species Statement produced
BC RAP	Butterfly Conservation Regional Action Plan
BC NAP	Butterfly Conservation National Action Plan
<b>PROTECTION: European (EC Habitats Directive)</b>	
Annex II	Designation of protected areas for animals and plants listed
Annex IV	Special protection for animals and plants listed
Annex V	Control of exploitation of animals and plants listed
<b>PROTECTION: British (Wildlife and Countryside Act 1981)</b>	
Sch. 1	Special protection for birds listed
Sch. 5	Special protection for animals listed
Sch. 5 (sale)	Protection against sale for animals listed (Schedule 5 section 9 (5))
Sch. 8	Special protection for plants listed
<b>STATUS: International (International Union for the Conservation of Nature)</b>	
IUCN VU	Vulnerable – Species facing high risk of extinction
IUCN LR/cd	Lower Risk / conservation dependent species – Species that do not satisfy the criteria for ‘Critically Endangered’, ‘Endangered’ or ‘Vulnerable’. They are ‘conservation dependent’ if they are the focus of specific conservation programmes, which if stopped, would result in the taxon qualifying for one of the threatened categories within a period of five years.
IUCN LR/nt	Lower Risk / near threatened species – Species that do not qualify for ‘conservation dependent’ but are close to ‘Vulnerable’ status
IUCN DD	Data Deficient – Insufficient data to make a direct or indirect assessment of a species status, based on its distribution and/or population status.
<b>STATUS: British – Mammals (Red Data Book)</b>	
RDB	Mammal species listed in the British Red Data Book
<b>STATUS: British – Plant and Fungi (Red Data Book and associated)</b>	
RDB Cr	Critically Endangered – Extremely high risk of extinction in the near future
RDB En	Endangered – Very high risk of extinction in the near future
RDB V	Vulnerable – High risk of extinction in the medium-term future
RDB K	Insufficient data to assess status
NS	Nationally Scarce – Plants not on red list but occurring in 16 to 100 10x10 km squares
NT	Near Threatened – Plants not on red list but occurring in 15 or fewer 10x10 km squares
<b>STATUS: British – Invertebrates (Red Data Book and associated)</b>	
RDB En	Endangered – In danger of extinction
RDB V	Vulnerable – Declining or occurring in a vulnerable habitat. Usually occurs in less than 16 10x10 km squares
RDB R	Rare – Not declining but occurring in less than 16 10x10 km squares
RDB K	Insufficiently known – Suspected, but not definitely, Endangered, Vulnerable or Rare
NS (a)	Nationally Scarce – Occurring in 16 to 30 10x10 km squares (for well recorded species)
NS (b)	Nationally Scarce – Occurring in 31 to 100 10x10 km squares (for well recorded species)
<b>STATUS: Royal Society for the Protection of Birds (Birds of Conservation Concern)</b>	
Red List	Various criteria, including a 50% decline in breeding population or range over last 25 years
Amber List	Various criteria, including a 25-49% decline in breeding population or range over last 25 years

**Table 1 - Hampshire priority species found primarily in standing open waters**

Scientific name	Common name	Group	Status/Protection	Habitat/Ecology	Hants Distribution	Specific management requirements	Action in addition to HAP	Hants SAP?
<i>Anas strepera</i>	gadwall	Birds	RSPB Amber List	Winters on open water, breeds in river valleys	Scarce resident and moderately common winter visitor; on major river valleys		no	no
<i>Aythya ferina</i>	pochard	Birds	RSPB Amber List	Winters on open water, breeds in river valleys	Nationally important numbers overwinter. A scarce and declining breeder.		no	no
<i>Mergus merganser</i>	goosander	Birds	-	Open water	scarce/erratic winter visitor; most numerous in hard weather Particularly NE Hants.		no	no
<i>Cordulia aenea</i>	Downy emerald	Dragonflies	NS (b)	Mesotrophic neutral-acidic ponds/lakes, streams, well vegetated, tree fringed/sheltered	New Forest and heathlands in north. Basingstoke canal.	Needs trees overhanging ponds	no	no
<i>Somatochlora metallica</i>	brilliant emerald	Dragonflies	NS (b)	Mesotrophic neutral-acidic ponds - esp. heath areas, streams, sheltered bays	Heathlands in NE Hants only.		no	no
<i>Persicaria mitis</i>	tasteless water-pepper	Flw Plants	NS	Marshy places in alluvial pasture.	Very rare and much declined outside of the New Forest.		no	no
<i>Potamogeton trichoides</i>	hair-like pondweed	Flw Plants	NS	Shallow, still or slowly flowing water. Mesotrophic - Eutrophic ponds.	Very rare Blackwater Valley, often short lived. Basingstoke Canal Surrey section.		no	no
<i>Sparganium angustifolium</i>	floating bur-reed	Flw Plants	-	In acid, peaty gravel ponds	Only known site, Hatchet Pond		no	no
<i>Hydrometra gracilentia</i>	lesser water measurer	True Bugs	RDB R	Shallow water margins over peat/mud, sedge & rush vegetation - inc. marsh dykes; carnivorous on small inverts	One New Forest record in the 1950s		UK Species Statement	no

**Table 2 - Priority species, thought to be extinct in Hampshire, which are primarily associated with standing open waters**

Scientific name	Common name	Group	Status/Protection	Habitat/Ecology	Hants Distribution	Specific management requirements	Action in addition to HAP
<i>Badister peltatus</i>	a ground beetle	Beetles	NS (a)	Lush vegetation and mud lge of water; probably atory	Only old records from Hants, probably extinct		UK Species Statement
<i>Lamprothamni um papulosum</i>	foxtail stonewort	Algae	RDB En	Clean, hard water in ditches which have not been cleared of weed/sediment for many years - typical on lowland grazing marsh.	Only old records in Hants	Ditches should be in advanced stage of vegetational succession	UK Species Statement

**Table 3 - Priority species, found primarily in other habitats, but which occur in standing open waters**

Scientific name	Common name	Group	Primary HAP	Hants SAP?
<i>Cygnus columbianus</i>	Bewick's swan	Birds	Lowland wet grassland	no
<i>Melanitta nigra</i>	common scoter	Birds	Marine	no
<i>Mergus serrator</i>	red-breasted merganser	Birds	Marine	no
<i>Podiceps auritus</i>	Slavonian grebe	Birds	Marine	no
<i>Podiceps nigricollis</i>	black-necked grebe	Birds	Marine	no
<i>Sium latifolium</i>	greater water-parsnip	Flw Plants	Fen, carr, marsh, swamp, reedbed	no

## REFERENCES

- 1 ***Biodiversity Action Plan for Hampshire: Volume One***, Hampshire Biodiversity Partnership, Hampshire County Council, 1998.
- 2 See ***UK Biodiversity Group: Index to the Steering Group Report and Tranche 2 Action Plans***, English Nature, 2000.
- 3 ***Corporate Water Action Plan***, Hampshire County Council, 2001.

This is one of many Habitat, Species and Topic Action Plans being prepared by the Hampshire Biodiversity Partnership. It will be monitored by the Partnership and fully reviewed and updated in 2007.

This Habitat Action Plan has been prepared by Ron Allen on behalf of the Hampshire Biodiversity Partnership.

For further information contact: David Pape, Hampshire County Council, Tel: 01962 846739, e-mail: david.pape@hants.gov.uk