



The Pond Manifesto



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Foreword

The importance of maintaining global freshwater biodiversity and ensuring its sustainable use cannot be over-emphasised. Wetland ecosystems, including the associated waterbodies, come in all shapes and sizes and all have a role to play. The larger ones, perhaps inevitably, have enjoyed the most attention – it is easy to overlook the many small waterbodies scattered across the landscape.

This document sets out the case for the conservation of ponds in a straightforward and convincing manner

Fortunately, over the last decade, our knowledge and attitude towards small wetlands like ponds has begun to change. We know now that they are crucial for biodiversity and can also provide a whole range of ecosystem services. These 'local waterbodies' can also help us encourage the link between people and wildlife.

To protect wetlands and the many species they support, it is not enough to only protect large expanses of marshlands, peat bogs, lakes and river valleys, coastal areas – we need to protect the small ponds and pools too.

I am delighted that the European Pond Conservation Network (EPCN), with the support of the MAVA foundation, has produced the Pond Manifesto. This document sets out the case for the conservation of ponds in a straightforward and convincing manner. Perhaps more importantly, it points in the direction we need to follow to protect their diversity and make the best use of their values with a long term vision in the future.

Anada Tiéga

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Summary

Collectively, ponds are an exceptional freshwater resource: the millions of small waterbodies of less than 10 hectares that exist around the world represent 30 percent of the global surface area of standing water. In Europe, ponds are still a highly abundant and varied aquatic habitat, despite losses of up to 90 percent in some countries.

In this Manifesto, produced by the European Pond Conservation Network, we present the case for conserving European ponds and provide an outline strategy for much needed conservation action in Europe and North Africa.

We show that the conservation of ponds faces significant challenges but also offers many opportunities which can be used to sustainably address some of the most important issues of our time, including habitat degradation, species extinctions, water resource management and climate change.

Ponds are vital for many rare and endangered species, both at national and European levels.

**Without
action to
protect ponds,
Europe will
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this critically
important habitat
and its unique
biodiversity**

Networks of ponds support the meta-populations of many aquatic species, including amphibians, invertebrates and wetland plants. Ponds are particularly important at the landscape scale: they have been shown to contribute as much to regional biodiversity as rivers or lakes, and they provide stepping-stones and increased connectivity between other freshwater habitats.

Ponds are an important part of our culture: partly because of their intrinsic historical value, but also because their sediment records can tell us about our ancestors' way of life. Ponds are the 'local waterbody' and play a crucial role in maintaining and encouraging the link between people and wildlife. They also provide many opportunities for education and experimental research across a wide range of subjects.

There is increasing evidence that ponds play a vital economic role in delivering ecosystem services: they offer sustainable solutions to support climate change amelioration and water resource management. They are also an asset for recreation and agriculture, particularly in the context of whole farm diversification and agri-tourism.

Ponds face many threats from human activities but receive little protection under European and national legislation. In addition, there are significant gaps in our knowledge of pond ecosystems, especially compared to rivers and lakes, which have been intensively studied for many years.

Without action to protect ponds, Europe will progressively lose this critically important habitat and its unique biodiversity.

There is urgent need to protect, consolidate and increase the pond resource in Europe. Doing so is an achievable goal, which could be realised with relatively few resources, and with many benefits for society.



1. About this document

This document presents the first Pond Manifesto, produced by the European Pond Conservation Network (EPCN, Box 1). The Manifesto sets out the case for the conservation of ponds in Europe and outlines, for the first time, a strategy for their conservation. A first version of this document was drafted jointly by EPCN members during the 1st European Pond Workshop which took place in Geneva in 2004, and was updated during the 2nd European Pond Workshop in Toulouse in 2006 (see 'Developing the pond manifesto' on www.europeanponds.org).

The Manifesto contains the knowledge and experience of researchers and practitioners working across Europe on all aspects of pond conservation. What we hope this manifesto will help to deliver is a Europe where ponds are properly valued, where they are appropriately protected through policy and legislation, where key ponds and pond landscapes are not degraded, where practitioners know how to manage ponds to protect and increase their value, and where new pond creation is actively undertaken to provide future benefits for society and the wider landscape.



Box 1. The European Pond Conservation Network (EPCN)

The mission of the network is to promote the awareness, understanding and conservation of ponds in a changing European landscape.

The EPCN has five objectives:

- (i) To exchange information on pond ecology and conservation between researchers, managers and practitioners.
- (ii) To promote understanding of pond ecology by encouraging the development and co-ordination of fundamental and applied research.
- (iii) To raise the profile of ponds and guide national and supra-national policies for their protection.
- (iv) To promote effective practical pond conservation.
- (v) To disseminate information on the importance, attractiveness and conservation of ponds to the people.

Although the focus of the network is on European ponds, the network welcomes researchers and practitioners from other areas in the world, and wants to have a broad global view on sustainable management of pond habitats.





2. Why protect ponds?

2.1 Overview

There are millions of ponds in Europe, rich in biodiversity and supporting a wide range of rare and endangered plants and animals. They offer a range of ecosystem services, and this is particularly important in the context of climate change. These waterbodies are also important to European culture and history, and provide one of the closest links between people and wildlife.

The need for action to stimulate and co-ordinate practical work to protect ponds is now urgent

Despite their value, ponds are now amongst the most vulnerable and endangered of freshwater habitats. They face many threats, and receive little effective protection from legislation or policy.

The need for action to stimulate and co-ordinate practical work to protect ponds is now urgent. Ponds are unlikely to be included as part of the implementation of the European Union Water Framework Directive and currently receive only limited protection under the EU Habitats Directive.

This is unfortunate since the characteristics of ponds, in particular their small size, ubiquitous nature and role as biodiversity 'hotspots' makes it both important and comparatively easy to protect them. They are also ideal for engaging the public in practical action to help maintain and restore the integrity of freshwaters in the landscape.

2.2 The pond resource

Key messages:

- Collectively ponds represent an exceptional freshwater resource
- Ponds are a varied habitat type occurring across all European landscapes

The term 'pond' covers a whole range of standing freshwater bodies of varying surface area, depth and origin. Although most commonly called ponds, pools or small waterbodies, there are a huge range of regional terms used for these waterbodies, reflecting their importance in local culture (Box 2).

Individual ponds are relatively small and can seem unimportant and dwarfed by larger waterbodies such as lakes. However, globally, ponds represent an exceptional freshwater resource. Collectively, the millions of small waterbodies less than 10 hectares on the earth's surface represent 30 percent of the global surface area of the standing freshwater resource. This suggests that we should more explicitly consider small waterbodies in analyses of global processes, such as those linked to climate change.

In Europe, despite great losses over the past century, ponds are still an abundant aquatic habitat. Unfortunately, realistic estimates of numbers are available for only a few countries, usually in northern Europe:

- In Switzerland, approximately 32,000 small waterbodies between 0.01 and 5 hectares have been counted, compared to 365 lakes (>5 hectares).
- In the UK, there are about 400,000 ponds, which are defined as being between 0.0025 and 2 hectares in area. This represents 97 percent of the number of all discrete standing waterbodies.
- In Denmark, there are just under 120,000 waterbodies between 0.01 and 5 hectares.
- In France, it is estimated that there are one million ponds of less than 0.5 hectares in surface area.
- In Germany, the young moraine region of Northeast Germany has the highest density of natural ponds, the so-called kettle-holes created by the last glaciations. The estimated number of kettle-holes between 0.01 and 1 hectare is about 167,000 in a 30,800 km² area, compared to 4,901 lakes (> 1 hectare).

Box 2. What are ponds?

Definitions of the term 'pond' vary and there is no universal agreement of what a pond is.

Ponds can vary in surface area from about one metre squared to a few hectares. For example the lower size limit of the cupular pools from the Island of Gavdos in Greece is less than one square metre. The upper size limit that differentiates ponds from lakes is two hectares in the UK and one hectare in Germany. The Ramsar definition of temporary pools includes waterbodies up to 10 hectares. The size of man-made fish ponds can be much higher: for example the biggest fish pond in Europe, in the Czech Republic, is 490 hectares in surface area.

Ponds can vary in depth from a few centimetres to many metres. Mediterranean temporary pools, for example, are defined as being a few centimetres in depth. Hell Kettles pond in Derbyshire (UK) is said to be bottomless!

Some ponds hold water all year round, but many go through cycles of wetting and drying. Some highly ephemeral pools may only remain wet for a few weeks after rainfall.

Ponds can either be man-made or natural in origin. Natural processes have created ponds throughout geological time. Examples include topographical depressions created following glaciations, floodplain backwaters, or ponds created by tree falls or animals (e.g. wild boar). Unfortunately, natural ponds are not as common in the European landscape as they once were, mainly due to human activities such as agricultural intensification, river regulation and drainage. For the last few thousand years people have also artificially created ponds for industry, agriculture and to provide beauty in the landscape. Ponds are now increasingly being created for ecosystem services (see Section 2.5) and leisure activities (e.g. on golf courses).

Worldwide, ponds occur in all biogeographical regions, from desert to tundra pools in the Arctic Circle. Ponds are often found in clusters, forming a network of patches or 'pondscapes'. These are particularly common on floodplains, but ponds can also occur naturally at high densities in other types of landscapes, such as some high altitude zones of the Alps. Examples of natural ponds which occur at high density include the kettle-holes of northern Europe which run from Denmark, through northern Germany and Poland, to Belarus. Other pond landscapes are of human origin, such as those in the north west of England and north east Germany which were dug to extract lime-rich marl used to fertilise surrounding fields.





2.3 Pond biodiversity value

Key messages:

- Ponds are a critical habitat for uncommon and rare species
- Ponds are 'stepping-stone' habitats
- Ponds are biodiversity hotspots

Ponds are vital for a wide range of rare and endangered species. In countries where data are available, high concentrations of Red Data Book species are always found in ponds. Rare species are not only associated with the wet areas of ponds, but with the semi-aquatic margins. A very few of the many examples include:

- **Mammals:** beavers make ponds and otters use them as a habitat, especially to catch amphibians and fish to feed their young. Ponds are also important for the southern water vole (*Arvicola sapidus*) and water shrews. Many bat species use ponds for feeding and for roosting sites in surrounding trees.
- **Fish:** crucian carp (*Carassius carassius*) is a species typical of ponds which is threatened throughout its native range by the introduction of alien fish.
- **Amphibians:** over 50 percent of the amphibian species listed in the EU Habitats Directive are associated with ponds. Examples include great crested newt (*Triturus cristatus*), natterjack toad (*Bufo calamita*), fire-bellied toad (*Bombina bombina*) and agile frog (*Rana dalmatina*).
- **Invertebrates:** many uncommon aquatic invertebrates live in ponds such as dragonfly and damselfly species like pygmy damselfly (*Nehalennia speciosa*) and island darter (*Sympetrum nigrifemur*), the medicinal leech (*Hirudo medicinalis*), the water beetle *Graphoderus bilineatus*, and temporary pond specialists like fairy shrimps, clam shrimps and tadpole shrimps.
- **Plants:** there are many plant species associated with ponds which are rare or protected by European or national legislation (see Box 3 for Mediterranean examples).

At the landscape level, ponds are remarkably important for freshwater biodiversity (Box 4), often contributing as much to the regional 'species pool' as rivers or lakes.

Networks

of ponds

are critical

to support the

meta-populations

of many

species

Their role in increasing connectivity between freshwater habitats by providing stepping-stones is also recognised by article 10 of the EU Habitats Directive.

Both single sites and pond networks can be important. Single ponds can act as refuges for terrestrial and aquatic organisms, particularly in the intensively farmed landscapes which cover some 80 percent of Europe. Their isolation may also help to protect populations from disease or the spread of invasive species. Networks of ponds are critical to support the meta-populations of many species and are important in the conservation of amphibians, as fish habitats (as spawning and nursery areas), and for wetland mammals and birds which range over large areas but require ponds as part of the complex mosaic of wetlands they exploit.

Box 3. Mediterranean temporary ponds and pools

Temporary ponds are one of the most remarkable and most threatened freshwater European habitats. Temporary ponds are common throughout Europe, including Northern and Alpine regions, but they are a particularly important pond type on the mainland and islands of the Mediterranean basin. Indeed, temporary ponds are the commonest and most characteristic freshwaters in North Africa.

Temporary ponds, in general, are characterised by alternating phases of flooding and drying which leads to the establishment of unique and diverse plant and animal communities. Mediterranean temporary pools support threatened and endemic species such as:

- The tyrrhenian painted frog (*Discoglossus sardus*), the mallorcan midwife toad (*Alytes muletensis*), the marbled newt (*Triturus marmoratus*) and the iberian spadefoot toad (*Pelobates cultripes*).
- The plants *Marsilea strigosa*, *Isoetes olympica*, *Lythrum thymifolium*, *Ranunculus revelieri* and *Artemisia molinieri*.
- The macrocrustacean *Linderiella massaliensis*, *Cyzicus bucheti*, *Taymastigites stellae* and *Immadia yeyetta*.

Temporary ponds, however, do not constitute a homogeneous group and vary considerably depending on local physico-chemical characteristics such as soils and surface area. Dayas of Morocco, for example, often have a surface area of several hectares, whereas the cupular pools of Sicily are often less than one square metre.

Threats to ponds in the Mediterranean region are similar to those faced by small waterbodies everywhere, but their vulnerability is greater. The pools are shallow and often small in area and volume. This makes them exceptionally susceptible to pollution, drainage and destruction by man and increasingly now, to the effects of climate change.

Mediterranean temporary ponds protected under the EU Habitats Directive include only a small proportion of all Mediterranean temporary pools: specifically those which have oligotrophic water and support particular plant communities. Other temporary ponds receive little or no protection under national or international legislation.





Box 4. Which freshwater habitat supports the most species?

Few studies have compared the biodiversity of different waterbody types because there are so few data. This is partly because freshwater research has traditionally focused on single waterbody types, mainly rivers and lakes. However this is now changing, and the first truly comparative studies are beginning to be published.

In a study that compared the biodiversity of rivers, streams, ditches, ponds and lakes across 80 km² of lowland British agricultural countryside, ponds were found to contribute most to regional biodiversity in terms of both wetland plants and macroinvertebrates (Figure 1).

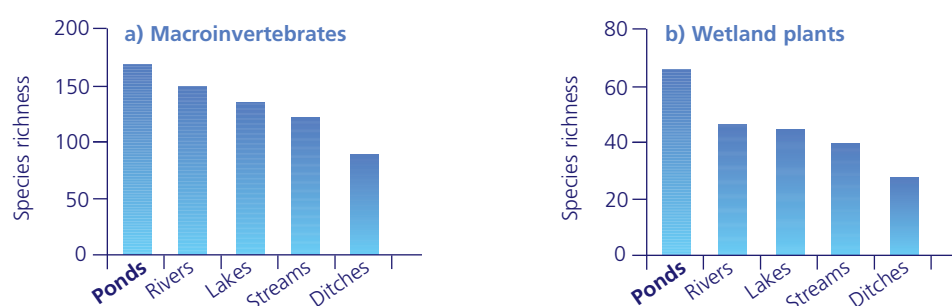


Figure 1. Regional diversity in the catchment of the River Cole (UK), which shows that, regionally, ponds support more species than other waterbody types.

Similar results were found in agricultural landscapes in other European areas, altogether covering three biogeographic regions:

- Atlantic region: Coleshill (UK, see above), Whitechurch (UK) and Funen (Denmark)
- Central region: Braunschweig (Germany)
- Mediterranean region: Avignon (France)

2.4 Pond cultural and social value

Key messages:

- Ponds are an important part of our history and culture
- Ponds are a link between people and wildlife
- Ponds can be used as 'outdoor laboratories' for education and research

Many ponds are important historic features in their own right. At a grand scale this includes illustrious ponds such as those found in the garden of the Palace of Versailles in France. Equally important to our history and culture are the many thousands of village ponds used to provide fish and water for people and livestock for thousands of years (Box 5). Some of these ponds have sediment records that have built up over millenia, and provide a unique 'section through time'. The sediments and artefacts within them can tell us both about the pond itself, about its surroundings and about the way of life of our ancestors.

Ponds can play an important role in maintaining and encouraging the link between people and wildlife, both in urban areas and in the countryside. Ponds are ‘the local waterbody’: in the garden, in the village, next to the path where you walk the dog, on the farm, even in the town, a place to fish or simply to recharge your batteries. They are the ideal place to bring together messages about water management, and again, because they are small and easy to create, they are a place to encourage individual action. A growing number of pond warden schemes have been introduced across Europe. Where they occur, local groups are involved in practical pond conservation and management activities, as well as raising awareness about the value of their local pond resource.

Ponds can be a valuable tool in teaching and research. Ponds are often created in schools as an outdoor classroom, where many aspects of the curriculum can be taught in ways that are both practical and fun. Furthermore, opportunities for creative learning extend beyond the narrow boundaries of biological science to art, drama, writing, history and geography. For higher education and research the use of ponds as model ecosystems to test scientific theories has been recently demonstrated in areas such as conservation biology, ecology, evolutionary biology and climate change modelling.

Box 5. Some historical and cultural uses of ponds

Historically, ponds were made for many agricultural and industrial purposes. Ponds generally had multiple uses, for example water and food supply, or defence and status. Ponds are often just one part of the historic character of a site, perhaps part of an industrial complex, associated with dwellings, or part of an historic landscape design. Some examples of the historical and cultural uses of ponds are listed below.

Cooling ponds	Forge/furnace ponds	Peat ponds
Curling ponds	Hammer ponds	Pond bays
Decoy ponds	Heathland ponds	Reclamation ponds
Dew ponds	Ice ponds	Retention ponds
Distillery ponds	Irrigation ponds	Sauna ponds
Drinking water tarns	Laundry ponds	Silt ponds
Droving ponds	Livestock watering ponds	Stew ponds
Duck ponds	Marl pits	Subsidence ponds
Dye ponds	Mill ponds	Swimming ponds
Extraction ponds	Moats	Traction engine ponds
Fish ponds	Old farm ponds	Watercress beds
Flax retting ponds	Ornamental garden ponds	Wagon wheel soaking pond





2.5 Pond economic value and ecosystem services

Key messages:

- Ponds can help address water management issues
- Ponds can help mitigate the impact of climate change
- Ponds are an important asset for recreation and agriculture

The economic value of ponds for industry, agriculture and recreation has changed over time. Many ponds have their origins as important sources of fish, dating back to the monastic period, and some are still important fish culture sites in Central and Eastern Europe, for example for carp, perch and silver fishes. In other parts of Europe, farm ponds have lost their original function for irrigation and livestock watering, but still retain other values such as providing protection against fire hazard.

Ponds offer sustainable solutions to some of the key issues of climate change and water management

In some areas of Europe, financial benefits from agri-environment schemes have encouraged pond creation and restoration activities as part of whole farm diversification in the context of agri-tourism, for example nature trails, bird watching and low intensity fishing. Sports like waterfowl shooting and angling have long been popular across Europe, and still promote widespread creation and management of ponds.

It is often assumed that ponds were useful in the past but have little value in today's world. In fact, ponds continue to play a vital economic role in delivering ecosystem services. Ponds offer sustainable solutions to some of the key issues of climate change and water management. For example, recent research suggests that collectively, because of their huge number coupled with their high productivity, farm ponds may sequester as much carbon as the oceans. This opens up opportunities for the use of pond creation to help ameliorate climate change, and emphasises the importance of considering the pond resource as a whole rather than as individual sites. Networks of ponds, strategically located, can also be used to alleviate flooding and help reduce diffuse pollution from urban run offs and intensive agriculture (Box 6).

In all cases, a key asset of small waterbodies is that they are easy and cheap to create. They provide a practical small-scale solution that works at a local scale, but can also build together to give a network providing significant national benefits.

Box 6. Ecosystem services: the use of ponds for water resource management and diffuse pollution mitigation

Water resource management

Strategically located pond networks have the potential to hold water back at source, recharge aquifers and reduce the volumes of water generated before they become a problem. Modelling studies in the UK have shown that by installing 10,000 m³ of storage per kilometre square (roughly equivalent to ten medium-sized ponds) it is possible to capture all of a typical heavy rainfall event from that 1 km², significantly reducing water loss. Small ponds ranging in size from only 3 m² have been shown to intercept all the flow from a 25 hectare field drainage network, with no outflow. These systems effectively mimic what can be seen in natural systems, where wooded headwater valleys do not flow, but are a series of terraced temporary ponds (Figure 2).

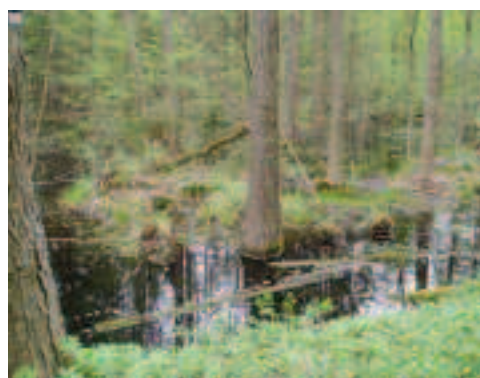


Figure 2. Series of small ponds at Loddington (UK, left) and terraced seasonal pools holding back winter water in Bielowieza (Poland, right), one of the most natural European forests.

Artificial floodplain ponds are now integral parts of flood relief strategies, such as in the tributary floodplains of the River Meuse catchment. These are often integrated as parts of river rehabilitation projects (e.g. the lower Rhine).

Diffuse pollution mitigation

Ponds or sequences of small pools can remove diffuse pollutants from surface waters, including sediment, phosphorus and nitrogen. For example, in the UK small ponds have been shown to reduce phosphorus concentrations by 50 percent in-pond. Similarly, in the intensively farmed landscape of northern Germany, ponds strategically located to intercept water from drainage systems can significantly reduce the nutrient load of receiving waters through denitrification, sedimentation processes and uptake from wetland plants.





3. Threats to ponds

Key messages:

- Ponds are threatened by many human activities such as development and intensive agriculture, and by climate change
- The pond resource is not well protected by most European and national legislation

Ponds and their wildlife face many threats including degradation or losses from agricultural intensification, pollution, development, over-abstraction of water for human use, land drainage, inappropriate or lack of management and climate change (Box 7). Furthermore, the scientific basis for appropriate management and conservation of ponds is currently weak compared to the information available for other freshwater habitats.

Ponds and their wildlife receive little legislative protection in Europe, with the exception of Mediterranean temporary ponds and turloughs. Ponds are also mentioned in the EU Habitats Directive as 'stepping-stone' habitats, but in practice this has led to little

For most countries... there is little national awareness or concern about

the value of these waterbodies

action on the ground to protect them. The other major piece of European legislation which could benefit ponds is the Water Framework Directive (WFD), which is intended to protect all waters. Again, however, this will have little effect on ponds because most national administrations have set a 50 hectare size limit to the waterbodies to which WFD will apply. Therefore the EU's most powerful piece of water legislation, as currently being implemented, will bring few or no benefits for critically important ponds.

The protection and enhancement of the pond resource can sometimes occur through species protection measures, for example through pond creation for amphibian species such as those listed in Annex II of the EU Habitats Directive.

However, this is not enough, as it fails to protect the hundreds of thousands of ponds critical for supporting these species.

In a few cases, national environment agencies from countries such as France, the United Kingdom, Germany and Switzerland, have developed elements of a national strategy for pond conservation. The UK has also recently included ponds as a priority habitat in its Biodiversity Action Plan. In Germany, ponds in general are protected by nature conservation legislation, but they are still affected by intensive landuse practices.

For most countries, however, there is little national awareness or concern about the value of these waterbodies. Whilst initiatives do exist, they are often very small scale, linked to community action and they tend to be uncoordinated and unsustainable due to the lack of long-term financial and technical support from national or regional administrations.

Box 7. Pond loss and degradation in Europe

In most European countries, the number of ponds has declined dramatically over the past century, with losses over 50 percent in many European countries (e.g. Sweden, Poland) and occasionally reaching 90 percent (e.g. Netherlands, Switzerland and some parts of Germany). We are now losing both natural ponds, which can no longer continue to re-form because of anthropogenic factors such as river regulation, and man-made ponds originally created for livestock watering and other purposes.



Pond loss is exacerbated by water pollution, with a large proportion of the remaining ponds heavily impacted by diffuse pollution including excessive nutrient, sediments and possibly pesticide loading, polluted inflows and a degraded buffer zone and littoral vegetation belt. For many species, loss of connectivity between ponds appears to reduce the pond's potential to maintain species meta-populations. In several European countries the presence of exotic species is also an issue.



Pond degradation is not just a local phenomenon and we need to take a landscape approach to understanding pond degradation. Pollution from runoff from agricultural land has traditionally been believed to be the main contributors to local wetlands degradation. However, recent research on Branchiopoda (a group of crustaceans) in the temporary ponds of the central Spanish Campo de Calatrava suggests that these invertebrates were susceptible to landuse changes at broad spatial scales, including pollutants from outside the catchment brought in through atmospheric processes.





4. Strategy for the conservation of ponds in Europe

We are running out of time to protect European ponds. Given the huge losses in pond number and quality, we need urgent action if we are to protect the unique value of ponds for biodiversity, cultural heritage and providing ecosystem services.

In the following sections we present the outline for a European strategy which will help to protect the pond resource for future generations. It focuses on four key issues:

- 1. Policy and legislation:** we must work at European level, and with existing national networks and organisations, to ensure that current and new policies, legislation and funding opportunities support the conservation of ponds.
- 2. Research and monitoring:** we need more applied and fundamental research work on pond biology and ecology to support best practice in pond conservation, management, creation and monitoring.
- 3. Communication and raising awareness:** we need to make stakeholders at all levels aware of the value and importance ponds, and of best practice techniques to protect and maintain them.
- 4. Protection and enhancement of the resource:** we must work on the ground to protect key sites of unique value, and to create new high quality ponds which will replace sites now destroyed or too damaged to restore.

4.1 Policy and legislation

The problem

The protection of the ponds and their wildlife through EU and national legislation is currently inadequate.

The objective

Work at the European level and with existing national networks and organisations to ensure that current and new policies, legislation and funding opportunities support the conservation of ponds.

Actions

Ensure that relevant European and national biodiversity and water management policy and legislation operate to protect ponds. Specifically, ensure that:

- Ponds are formally included in relevant sections of EU and national nature conservation and water management legislation, including the Water Framework Directive.
- Ponds are adequately represented in statutory networks of protected sites (e.g. Ramsar, Natura 2000, national designations).
- Species protection and management measures are adequately enforced (e.g. by tighter restrictions on the sale of invasive non-native species).
- National development and planning policies adequately safeguard pond biodiversity in all European countries.
- Relevant EU and national funding bodies and grant schemes help to promote the conservation of ponds.

4.2 Research and monitoring

The problem

Ponds are an important part of the freshwater resource but have been little studied compared to other freshwater habitats. There are still many gaps in our most basic knowledge of (i) pond ecology and function and (ii) effective pond management and protection measures.

The objective

Identify and undertake applied and fundamental research work on pond biology and ecology needed to support best practice pond conservation and management, and pond monitoring.

Actions

Key research areas include gaining a better understanding of:

- Pond ecosystems e.g. pond catchments, role of ponds in freshwater ecosystems and landscapes (e.g. 'stepping-stones').
- The impact of environmental changes on pond biodiversity, for example landuse and climate change, non-native species, waterbody isolation, pollution, etc. A monitoring strategy, including reference sites and standardised monitoring techniques, should be developed to monitor these impacts.
- The value of ponds from a social, cultural and economic perspective (e.g. ecosystem services).
- The pattern and distribution of ponds and pond biodiversity across Europe, particularly in terms of species of conservation concern, leading to the development of a pond classification and of a targeted approach to on the ground conservation action through the identification of Important Areas for Ponds.
- Pond management and creation e.g. where in the landscape to put new ponds, test advice, role of buffer zones, methods for improving ponds for species of conservation concern.



4.3 Communication and awareness raising

The problem

Knowledge of the importance of ponds and better understanding of techniques for protecting them needs to be disseminated widely at all levels, from policymakers to the general public. Language and cultural barriers between European regions can also be an issue leading to a lack of coordination between pond researchers and workers.

The objective

Develop and deliver a communication strategy to ensure that stakeholders, including policymakers, scientists, managers and practitioners and the general public, are aware of the most up to date information about pond ecology, the importance of ponds, best practice techniques and conservation issues.

Actions

A communication strategy for the conservation of ponds should include:

- Dissemination of information about Important Areas for Ponds to raise awareness of the high quality pond resource in Europe.
- Information about key pond conservation topics disseminated through the internet, the media, newsletters, fact sheets etc.
- A tool kit of resource materials and practical demonstrations of good practice to support the conservation of ponds at all levels from policy development to delivery on the ground.
- Coordination between stakeholder organisations at national and supra-national levels to develop networks sharing messages and materials that can be promoted jointly, including information on fundamental and applied research, the importance of ponds, and best practice information on pond conservation and management.

4.4 Conservation of the pond resource

The problem

The widespread loss and degradation of ponds throughout Europe is continuing, with impacts on the freshwater biodiversity resource and the integrity of ecological networks.

The objective

There is a critical need to work on the ground to halt the loss and degradation of the pond resource. Key sites need to be protected and new high quality ponds which will replace sites now destroyed or too damaged to restore need to be created. The role of ponds as 'stepping-stones' in the landscape also needs to be maintained.

Actions

- Establish national networks linking pond stakeholders in order to: (i) facilitate the identification of Important Areas for Ponds, (ii) provide advice on best practice and (iii) encourage and integrate local and national initiatives (e.g. Pond Warden schemes).
- Protect Important Areas for Ponds on the ground. This needs to include development of partnership agreements to maximise protection (e.g. set up and support a pond guardian/warden system, work to obtain local designation, minimise impacts from pollution, set up early warning monitoring systems to detect threats).
- Restore ponds to high quality status for targeted species of conservation concern. Work in partnership to (i) identify appropriate sites to restore for species of conservation concern and (ii) promote, support, undertake and monitor appropriate management on the ground.
- Create high quality ponds targeted to (i) maintain or extend existing pond networks or Important Areas for Ponds and (ii) to improve connectivity in the wider countryside.

5. Conclusion: pond conservation is an opportunity

Ponds are a vital and much threatened freshwater habitat. Without action to protect them Europe will progressively lose this habitat and the critical biodiversity, cultural and economic resources it maintains.

Set against this, however, are enormous opportunities. The small size of ponds, which makes them so easy to ignore, neglect and destroy is also a major asset. Ponds are easy to manage and protect. They connect directly with people. Compared to many other freshwater habitats, they are exceptionally cheap and easy to make, and when created in large numbers, in the right places, they have the potential to bring major benefits for biodiversity, flood relief, pollution mitigation and climate change.

Our ambition is that this manifesto will provide both a wake-up call to the importance of ponds, and the outline of a strategy that will help us use, maintain and enjoy ponds in the decades ahead.



This document can be downloaded in full from the website of the European Pond Conservation Network (EPCN, www.europeanponds.org) in English, French, German or Spanish. A summary version in four languages is also available from the EPCN website.