



amphibian ponds in farmed landscapes



Inspiring ideas to encourage wildlife...



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ponds and ecosystem services

Ponds and other water bodies have always been part of productive landscapes where a mix of grazing and crop production thrives.

Farm ponds in the past...

Prior to technological advances in agriculture ponds had practical roles for farmers, mainly as a source of drinking water for animals; they were also created as part of clay, marl or peat extractions. Water bodies were created for water irrigation purposes (and still are). Other ponds were occurring in natural depressions in ground which had been taken out of production or was farmed later in the year. Drainage ditches were less intensively managed than today, holding clean water and flooding in the spring, creating breeding sites for amphibians and other aquatic wildlife. In a mosaic of relatively small fields with a range of crops, pastures, meadows, copses, woodlands and fallow land, there was a variety of habitats. These provided cover and food source for hundreds of plant and animal species. A less intensive use of inorganic fertilisers and crop protection treatments meant that the water in the catchment was clean and flowed slowly causing minimum erosion of soil.

Jules Howard

Farm ponds today...

While this vision seems to be a step backwards in terms of modern agricultural practises, the European Union spends a lot of money maintaining such practises in Eastern Europe. There is going to be a detectable shift in the prioritisation of Common Agricultural Policy (CAP) funding from direct subsidies (Pillar I) to more ecologically sound management of farmland supported by agri-environmental schemes (Pillar II). These changes reflect increasing public pressure to diversify the services that the countryside offers from intensive food production to provision of clean water and air, soil protection and flood prevention, recreational and aesthetic opportunities and support for biodiversity. These so-called 'ecosystem services' are only part of the whole spectrum of goods and services that the productive landscape should provide. For this to happen, the farmer's role as steward of the countryside needs to be recognised and financial rewards should be available for the provision of these services.

Ponds provide important ecosystem services for farmers, wildlife and the general public, namely flood prevention, water storage, nutrient and other pollutant mitigation, carbon sequestration and protection of biodiversity. Many farmers are aware of this, as indicated by the replies to a questionnaire distributed by the Farming and Wildlife Advisory Group (FWAG) to their Cambridgeshire members: of the 41 participating farmers, 46% considered their ponds to be primarily for wildlife, but also for fish and game (21% each) and livestock watering (9%). Asked about benefits that ponds provide, over 80% of the respondents stated that they are good for wildlife and are a source of drinking water for birds and mammals. Creation and restoration of ponds is currently primarily driven by farmers' desire to improve biodiversity and the aesthetic value of their landholdings rather than for agricultural reasons. Ponds are a perfect feature for increasing the number of species supported by a farm. This booklet provides inspiration and examples of successful pond creation schemes for amphibians in farmland.

what is a good amphibian pond?

When thinking about a wildlife pond, the primary concern should be the source of clean water. This can be achieved by locating the pond in woodland, rough grassland with low nutrient input or, if this is not possible, by surrounding the pond with a grassy buffer zone at least six metres wide. For amphibians, it seems that a pond's proximity (approx. 100m) to a copse or woodland is especially beneficial for hibernation purposes. Alternatively, large (at least 1.5m high) hibernacula made of wood or bricks, covered with some rainproof material and soil, can be provided. The pond should be located at the lowest point of the chosen area, where any surface water collects. Usually, if a site is occasionally flooded, it is a good indication that a pond will hold water there without an artificial liner.



Pond features important for amphibians:

Ponds of all sizes are valuable but for amphibians the best are those larger than 100m². If possible, several ponds should be created no more than 250m from each other.

The pond should be up to 1.5m deep, with a few depressions of different depths. In the summer, shallower areas may dry out with only the deepest point holding water. This can be beneficial, creating a variety of conditions to suit different plants, invertebrates and larger animals.

Shallow slopes, which become exposed or flooded depending on the weather, allow a dynamic process which seems to be beneficial for many invertebrate species.

A variable shoreline helps to create different niches and maximises the number of species that will benefit from the pond.

Ponds should not be planted up as they will quickly be colonised by native plants from surrounding areas.

Preferably rainfall or ground water should be the only source of water.

No more than 30% of the pond should be shaded by surrounding shrubs or trees, and preferably there should be no shade on the southern edge of the pond. While shading provides a beneficial variation of microclimate on larger ponds, it should not be encouraged on small ponds below 100m².

No more than 60% of the pond should be covered by emergent vegetation such as reeds and bulrushes (reedmace). Whilst vegetation is very important as cover for amphibians such as great crested newts, ponds that exceed this threshold are more vulnerable to succession and a decline in water quality.

Fish ponds and wildlife ponds have different roles and should be kept separate.

Only larger ponds should be used for watering cattle, and access should be restricted (either in terms of time or by limiting the area which can be accessed). While cattle definitely help to keep vegetation both in and around the pond in check, too much pressure can result in complete destruction of the vegetation and a decline in water quality.

practical aspects of pond restoration and creation

pond creation

Ponds can be created where wet conditions already exist and where management is therefore difficult and soils less productive. It is very important to check if such places do not have an intrinsic value already. Generally field corners, woodlands and farmyards could all be considered for the potential location of a new pond without causing disruption to everyday field management. Ponds can be dug very quickly (sometimes in less than an hour); most of the time and effort required lies in the preparation.

Choosing the location for your pond...

- Consider how water flows through the landscape, based on the **topography** of the terrain. Look at the size of temporary puddles that occur in natural depressions during intensive rainfall. The pond should be at least as big as these puddles, otherwise it is likely to overflow.
- Preferably, the pond should not be connected to ditches, streams or rivers. This is because the water in the pond should be as clean as possible, and we cannot be sure about the **water quality** in watercourses. For the same reason, the vegetation around the pond should be rough, and rain or ground water should be the source of water.
- With regard to soil type, the more **clay** the better. To test the water-holding quality of the soil, dig as deep a hole in the ground as possible, fill it with water and see how quickly it disappears. Repeat the process until the soil around the hole is soaked (or simply wait for rain!). If the hole holds water well, it is a good sign. Another approach is to test the soil structure by making a ball out of soil from the hole. Is it solid or does it fall apart in your hand? Does the ball hold its shape in the water? If it remains in shape for 24 hours, it is a sign that the pond will be successful.
- Examine the local topography and mark a **shoreline**. If one side is lower, a small bank can be created using spoil from the pond. Make sure that there is a good content of clay in the spoil, as ordinary topsoil works like a sponge, soaking up water from the pond.
- When **choosing the site** for a pond, avoid areas which already have wildlife or archaeological interest. Digging a hole in a species-rich meadow or on top of a Roman burial site would not be a good idea! Creating ponds in the vicinity of existing ponds, however, can be very beneficial.
- Usually a **14 or 21-tonne digger** is sufficient for the majority of wildlife ponds. The bucket should preferably be wide and without teeth. For as little as £200 - £250 a digger can work on the farm for a full day, during which time it can create three or four ponds in different locations.
- **Spoil** can be distributed on farmland, preferably thinly across arable fields, or alternatively can be used to create a low south facing bank near the pond. Remember not to block the route of surface water to the pond with the bank. Spoil can also be used to cover hibernacula for amphibians. Please note, that the Environment Agency consent may be required if ponds are created in floodplain, or near to watercourses.
- For **hibernacula**, choose a dry site that is protected from both flooding and frost. If scrub or tree clearance has been undertaken elsewhere on the farm, use logs and brush to create a large pile of wood. You can also use bricks or rubble. Place some waterproof material on top of the pile and cover with soil, remembering to leave plenty of spaces at the bottom where newts and other animals can crawl in.



Alex Draper/Froglife

Sam Taylor/Froglife

finding funding

Pond creation does not need to be an expensive undertaking, though time needs to be invested in preparing to create a pond in the best location. Following this planning, ponds could be created as part of other maintenance tasks when an excavator will be on site. An extra half a day with an excavator (worth approximately £200 - £250) should be enough to create a pond. Additional costs might include time and diesel for transporting the soil, if required.

Restoration work is more demanding as it often requires moving the spoil further, and may require tree work. On the other hand, there are no risks associated with planning issues.

Grant aid may be available for pond creation, restoration and management through Natural England's Higher Level Stewardship scheme. This is a competitive scheme and the options chosen need to meet area targets, so all the opportunities on the farm must be assessed in addition to pond work.

If protected species such as water vole, great crested newt or stoneworts are involved, funding may be available from your Local Biodiversity Partnership. These have a dedicated coordinator located in each county, and details can be found on the internet. You may already know what protected species you have on your farm, but if you are not sure you can contact the local Wildlife Trust or Biological Records Centre for information.

Funding may also be available from your local council, although usually only where protected species are involved. Some county and city councils have dedicated biodiversity officers or an environmental services unit.

pond restoration

Pre-existing farm ponds could benefit from restoration if they are in a poor condition. Here are some tips:

Most ponds suffer from too much shading and accumulation of leaf litter from surrounding shrubs and trees. The **shrubs and smaller trees can be taken out with chainsaws**, and the material used for firewood or to build hibernacula. Smaller branches can be burnt or chipped on site.

Larger trees are trickier and whether you remove them or not depends on the species, age and preservation status. Removing mature oak or ash would be detrimental, and old willows could easily be **pollarded** instead. You may need to obtain a felling licence from the Forestry Commission.

Roots can be removed using an excavator, thus avoiding the need to keep on top of regeneration. Roots can be used as material for hibernacula.

Accumulated sediment can be scraped out with an excavator, preferably to the level of the original clay base. In order to keep a good depth but also create gentle slopes, the pond might need to be extended slightly.

Depending on the scale of the restoration, the **sediment can be spread as fertiliser** on arable land, mixed with other organic fertiliser or stored in a place of low wildlife or archaeological value. Advice should also be sought from the Environment Agency with regard to the spreading of spoil (see 'further advice' right).



planning permissions and other formalities

A new pond may not require planning permission, but the local authority should always be consulted. Provide simple information on the location, approximate size, purpose, method of excavation, any materials to be brought in etc., and ask for a written response.

If a small wildlife pond is not created close to a water course or in the floodplain, spreading soil around the pond or on the nearby field should not be a concern to the Environment Agency. However, this should be checked with the regulator on a case by case basis.

Generally, you will need planning permission if the pond:

- involves engineering operations.
- is a change of land use e.g. from agriculture to nature conservation or recreation.
- may affect highways or properties.
- may affect water flow on a floodplain.
- may affect important wildlife/archaeological sites, especially if they are protected.
- may affect underground pipes and services.

By avoiding the above situations, the chances are that you will not require planning permission; however, it depends on the local authority and usually on the individual officer who makes the assessment. See 'further advice' below for a list of the relevant authorities and further reading on the topic.



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further advice and contacts

Organisation	Issue	Contact
Froglife	Amphibian (and reptile) conservation and pond creation/restoration	www.froglife.org 01733 558960 info@froglife.org
Farming and Wildlife Advisory Group (FWAG)	Funding and habitat management advice	www.fwag.org.uk 02476 696699 (to find your local office)
Pond Conservation	Pond creation and management for general wildlife	www.pondconservation.org.uk 01865 483249 info@pondconservation.org.uk
Wildlife Trust	Funding and habitat management advice; pond creation and management	www.wildlifetrusts.org 01636 677711 (to find your local Trust)
Local Biodiversity Partnerships and Record Centres	Species distribution and management advice	www.nfbr.org.uk
Natural England, Countryside Council for Wales or Scottish Natural Heritage	Protected species and sites	www.naturalengland.org.uk www.ccw.gov.uk www.snh.gov.uk
Forestry Commission	Tree felling	www.forestry.gov.uk
Local Planning Authority	Archaeology and planning permissions	Please contact your local authority
Environment Agency or Scottish Environment Protection Agency	Working on flood plains, impacts on watercourses, use of chemicals and other environmental risks	www.environment-agency.gov.uk www.sepa.org.uk
Service providers for pipes and overhead power lines	Overhead power lines and buried services	Use a search facility such as: www.linesearch.org www.linewatch.co.uk

case studies

As part of the Ponds in the Landscape project, Froglife worked with several farmers and organisations to build amphibian and general wildlife ponds in Cambridgeshire. Below are a few examples of work undertaken on farmland, working in partnership with farmers, to provide some inspiration.

case study 1: rookery farm, stow longa

Background

The farmer wanted to apply for Higher Level Stewardship and wished to invest in his population of great crested newts (GCN). From previous surveys, it was apparent that there was a healthy population of newts in three ponds located within 100m of each other. The ponds are located in pasture with nearby derelict buildings and the complex lies between the village and agricultural land. The terrestrial habitats were judged to be good; however, all the ponds were heavily shaded and tended to dry out during the summer.

What was done?

Froglife provided tree contractors and an excavator. The farmer provided a tractor and trailer to remove some of the spoil, which was then distributed as a thin layer on fields. Excavators worked for two days and two tree contractors worked for five days to restore the ponds. Spoil was removed by the farmer; thicker branches were placed in piles whilst smaller branches were chipped.

Results

The highest count was 88 GCN recorded on 17th May 2010. The results confirmed the good status of the GCN population at Rookery Farm. The ponds did not dry out during the summer and larvae were found in all the ponds. The habitat management taking place on the site will provide long-term security for this population.



case study 2: conington hall, conington

Background

Ordnance Survey maps show an abundance of ponds in the Conington area but on closer inspection, many were dry or had been filled in. Restoring ponds on the Conington Hall Estate, and creating new ponds near those with existing great crested newt populations, was felt would help strengthen and establish a number of newt population groups.

What was done?

Several ponds across a wide area under one ownership presented a great opportunity for restoration. A short work plan and map were presented to the owners of the estate. The best approach to the habitat work involved hiring a mini-digger, which was operated by the landscape manager employed by the estate; Froglife covered the cost of hiring the digger. Six ponds were restored, which involved clearing scrub, increasing the depth of the ponds and erecting fencing. The fencing was required because the ponds were located in pasture and were heavily disturbed by cattle. As part of the project, a block of woodland was also fenced off from the pasture, so that a better understorey can develop where newts might hibernate. The estate's staff will dedicate time to ensuring that the ponds remain sufficiently clear of vegetation and shade.

Results

Apart from the village pond, there was no preliminary data for Conington Hall and the results exceeded our expectations. The highest count for the whole site of 146 newts makes this one of the most important populations in Cambridgeshire. As a result of the project, the continued existence of the great crested newt population here is secured for many years to come.



case study 3: rb organic, yaxley

Background

RB Organic is a supplier of organic vegetables to supermarkets in the region. At this site vegetables are washed before being shipped to market. In the past RB Organic used chemicals to treat the waste water, which proved to be costly and also contradicted their ethical policy. Since 2007, RB Organic have changed the way they process waste water, using a system of slow moving channels and dense emergent vegetation (reed and bulrush mats and beds) to trap nutrients and sediments. After a period of ten days the water is clean enough to meet Environment Agency standards and be let into the local ditch system. The system functions very well and, in addition to the obvious environmental benefits, it is also cheaper in the long term than the use of chemicals. In order to maximise the impact of this demonstration project, there was a need to improve the biodiversity value of the site through the integration of wildlife friendly solutions with the water treatment system.

What was done?

Froglife and RB Organic volunteers dug two new ponds in grassland east of the reedbeds. Unfortunately, it was necessary to install liners as the soil was not able to hold water. One side of the existing pond was extended to provide shallower slopes. The low-value grass around the ponds was cultivated and seeded with a wildflower meadow mix. A few hibernacula were created around the site for frogs. Buglife - The Invertebrate Conservation Trust undertook an invertebrate survey of the site to assess its biodiversity value.

Results

A total of 447 species of invertebrate were recorded in 2009, and 535 in 2010; the combined total of species for the two years is 657. Of these, 21 (twelve in 2009, fourteen in 2010) have a formal conservation status (Red Data Book or Nationally Scarce). A further 82 (52 in 2009) species are considered to be, to a greater or lesser extent, uncommon. The invertebrates benefited from a mosaic of habitats and a disturbance regime caused by the day-to-day management of the site. The channels, reed and bulrush beds, sparse ruderal vegetation and some mature trees on the edge of the site were of interest for invertebrates and proved that this kind of scheme can contribute to the biodiversity of a local area. It was, however, difficult to detect positive changes associated with the creation of ponds and grassland due to the short timescale of the project. There were the first signs of interesting fauna in the ponds, which should increase with each year of their existence.



ponds in the landscape

Ponds in the Landscape was a Froglife project funded by Natural England's Countdown 2010 biodiversity action fund. The main goal of this project was to halt the decline and degradation of standing water habitats in selected areas of Cambridgeshire by delivering the following in line with the Cambridgeshire Standing Water Habitat Action Plan:

- Creating and restoring habitats in Cambridgeshire for threatened species, particularly great crested newts, stoneworts (including the bearded stonewort) and threatened water-beetles.
- Creating management plans for these animals and their habitats, developed with climate change adaptation principles in mind.
- Creating site-based conservation strategies, ensuring populations of threatened species can be sustained long-term.
- Investigating the innovative use of ponds and wetland habitats for water purification, retention, recycling and flood prevention, using three farm sites as a model.

Further details can be found at www.froglife.org/hnr/pondsinthelandscape



project partners



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