

Supporting guidance for Pond Creation for Wildlife

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Table of Contents

[Introduction](#)

[Site selection](#)

[Design and construction](#)

[Buffer zones for ponds](#)

[Establishment and maintenance of the pond](#)

[Advice and consents](#)

[Useful information](#)

Introduction



Well-designed ponds can provide valuable habitat for a rich diversity of plants and animals, including amphibians, birds, fish, insects and mammals.

The purpose of this item is to create or restore ponds to benefit wildlife. It should not be used to create rural sustainable drainage systems, constructed farm wetlands to treat nutrient rich or polluted water, or ponds managed for fishing or wildfowling.

The following guidance is primarily aimed at creating or restoring ponds suitable for great crested newt. This is because great crested newt are targeted under the Agri-Environment Climate Scheme as a vulnerable priority species.

However, ponds designed for great crested newt are suitable for a wide variety of wildlife, including newt, frog, toad, dragonflies / damselflies, and potentially water vole and water shrew.

Even if you do not have great crested newt, following the guidance should still result in an excellent wildlife feature.

Site selection

Main considerations

- strategic approach
- ability to retain water
- supply of clean water
- prevent damage to existing habitats

- prevent damage to watercourses
- consent

Strategic approach

It is useful to identify the location of existing and historical ponds, as well as features such as springs and wells, across the farm and locality to inform the best location for your ponds.

Aerial imagery and historical maps are very useful for identifying historical ponds, which may be suitable for restoration, as well as potential sites for new ponds.

The strategy for developing a robust pond network within a locality should follow two objectives:

1. build clusters of ponds, particularly around known great crested newt and natterjack toad sites
2. create pond 'stepping stones' associated with strong terrestrial habitat to link pond clusters

Ponds within clusters can be up to 500 metres, but ideally less than 200 metres, apart. The connecting ponds may be up to one kilometre apart but connected by a strong network of high-quality terrestrial habitat.

Survey

Seek advice from a suitably qualified ecologist to identify the most appropriate locations for your ponds as part of your Farm Environment Assessment. They should also be able to advise you on the need for further survey work, such as for protected species including water vole, otter and great crested newt.

Location and water supply

Choose sites that are likely to hold water so as to avoid the need for liners. Consider doing some test digs to check the substrate and the presence of field drainage. Although field drains can provide a water supply they may also act as outfalls, so they may need to be closed. Historic maps could be used to identify ponds for restoration, as well as sites for new ponds.

Avoid siting your pond in existing, high-quality wetland, or other semi-natural habitat.

Do not create on-stream ponds by blocking and modifying watercourses. As well as resulting in the loss, or damage, of the existing flowing-water habitat, they silt-up quickly and require complex engineering works to form robust dams and effective outfalls.

It may be appropriate to restore an historic on-stream pond but consult the Scottish Environment Protection Agency first if you are considering restoring or creating an on-stream pond.

Ponds fed from watercourses and from other ponds will need consent from the Scottish Environment Protection Agency. If the pond is designed to benefit great crested newt do not supply it from any watercourse or pond that is likely to support fish. Stickleback in particular are voracious predators of newt larvae. Ponds which dry-out every five to ten years benefit great crested newt by controlling fish populations.

The water source should be as clean as possible. Productive farmland that has had recent applications of fertiliser may not be a suitable location.

It is not necessary to have a high inflow and outflow of water for ponds to be good for wildlife, particularly if the inflows are likely to bring nutrients and sediments, which will speed-up the process of stagnation, vegetation and in-filling. Sites with a low, but sustained water supplies, by any combination of groundwater, springs, precipitation, surface run-off and field drains, are preferable to ones supplied from watercourses.

For ponds intended to benefit great crested newt avoid areas where the water supply is likely to be very acid, such as in peat.



Species-poor soft-rush mire – a suitable location for pond creation.

Credit: Tony Seymour The Farm Environment Ltd

Areas dominated by dense stands of soft-rush, with evidence of permanent water-logging and seasonal surface water, are usually suitable for wildlife pond creation.

These areas tend to have relatively low biodiversity value and so damage to other high-quality semi-natural habitats is minimised. They are often in water-logged and possibly previously drained areas of more productive ground, where pond creation may be more appropriate than attempting to re-drain.

Be aware that areas of soft-rush may support water vole, and so it will be necessary to check for their presence. Contact Scottish Natural Heritage if any signs are found.

Trees and shrubs

Choose sites that are open but sheltered. Aim to limit shading to 40 per cent of the pond perimeter, with the majority of cover to the north, to provide shelter, and the southern aspect kept as open as possible.

Dense tree / shrub cover around ponds prevents the water from warming and produces excessive leaf-litter, which speeds-up the rate of in-filling, and reduces water quality. If trees are to be planted, use species that cast light, dappled shade, such as rowan and birch. Do not plant conifers.



Four hundred square metre great crested newt pond created in two days, including spoil management.

Note variable depths and gradients, and incorporation of 'sub-ponds'. Spring-fed water supply.

Credit: Tony Seymour The Farm Environment Ltd

Design and construction

Pond size and profile

Aim to create approximately 400 to 500 square metres of pond at each pond cluster. For great crested newt individual ponds should ideally be at least 200 square metres (10 metres by 20 metres), but preferably 400 to 600 square metres. Create ponds with irregular-shaped edges.

Create a range of depths, with shallow margins in full sunlight to provide warm water. As a general guide, aim for 50 per cent of the pond area to be less than 20 centimetres deep, 30 to 40 per cent between 20 and 60 centimetres deep, and 10 to 20 per cent between 60 and 150 centimetres deep. The deeper areas, between one metre and 1.5 metres, provide open water habitat and extend the longevity of the pond.



Asymmetrically excavated pond profile providing both depth (right) and gentle gradients (left).

Credit: Tony Seymour The Farm Environment Ltd

Smaller, auxiliary ponds may be created to provide a range of pond types and conditions. Some plants and animals rely on ponds drying out seasonally to complete their life cycle, whilst others require deep water all year round.

Avoid creating islands as they limit the overall area of the pond. If necessary, install artificial floating islands. Do create ponds with irregular-shaped edges.

Aim to form most of the pond depth by excavation rather than embankment, as embankments are at risk of failure and leakage. Avoid sloping locations, which will require significant amounts of embankment on the lower edges. It may be more appropriate to create a series of smaller excavated ponds.

If embankments are needed ensure that vegetation and topsoil are stripped, the build material is impermeable and it is keyed-in well to the substrate. Replace any stripped vegetation over the embankment. Avoid forming embankments more than 50 centimetres high and aim to make them as wide and shallow-sloping as possible.



Pond working area stripped of vegetation, and pond outline marked-out.

Credit: Tony Seymour The Farm Environment Ltd

Try to strip and preserve the turf from the working area.

Aim to landscape spoil on site to avoid expensive and time-consuming transportation and double-handling of material. However, do not dispose of spoil on areas of high-quality habitat.

Prevent damage to hibernacula and other valuable terrestrial habitat, and identify opportunities to create features using any cut wood, excavated stone, spoil and turf.

If you are restoring ponds, or creating ponds for great crested newt or natterjack toad, you will need to identify suitable locations for spoil, as well as access routes. Avoid siting the spoil in steep bunds around the edge of the perimeter of the pond, creating a 'doughnut'. As well as having limited value for wildlife and no visual appeal, the bund also makes it very difficult to access and maintain the pond. It may be appropriate to use the spoil to increase shelter around exposed areas of the pond, whilst retaining gentle slopes into the pond.

The excavator should cast the material as far from the pond as possible and then grade it. Leave room for a machine to access the pond for maintenance.

Pond restoration

All still waterbodies become infilled with sediments and plant material as part of a natural process of succession, resulting in a transition from aquatic to terrestrial habitats. The rate of succession increases as the waterbodies become shallower and richer in nutrients.

Restoration aims to revert the pond to an earlier stage in its succession, from which the process will re-start. High levels of sediment and nutrient inputs will speed-up the process. Controlling the inputs will reduce the frequency of restoration.

The advantages of pond restoration are:

- the site is known to be able to hold water, either with a natural or constructed liner
- many species, including great crested newt, are faithful to their breeding ponds
- they already support a source of plants and animals that will rapidly re-colonise the pond
- they may have some historical or cultural interest that should be maintained

The disadvantages are:

- old ponds may contain fish that will not be removed from the process
- the material may be difficult to extract and specialist machinery may be required
- there may be a risk of harm to wildlife already using the pond (particularly protected species, which may constrain operations)
- old liners or structures may be damaged
- there may be limited room to dispose of spoil
- there may be a risk of sediments entering other waterbodies
- older ponds tend to be 'on-line' or have managed inflows

The general principles for ponds restoration are:

- survey / research the existing ecological and historical interest, particularly in relation to scheduled species or sites
- reduce water levels before excavation. Notify and liaise with the Scottish Environment Protection Agency
- clear trees back from the pond, by about three times their average height, to allow light to penetrate
- work to the existing liner; avoid over-digging as this may break any lining
- remove fast-growing dominant plants such as reedmace and common reed
- identify and cordon areas of particularly valuable vegetation
- leave about 10 to 30 per cent of the pond edge and vegetation undisturbed, to provide a haven and allow re-colonisation
- have someone keep watch for wildlife during operations, particularly to spot and rescue amphibians. A licenced surveyor will need to be present during operations on great crested newt ponds
- stop work and notify Scottish Natural Heritage if water vole, water shrew or great crested newt are found
- avoid depositing mounds of plant material close to the pond to avoid nutrients from washing into it from the rotting vegetation
- avoid depositing loose spoil in places where it is likely to wash back into the pond
- wash-down machinery to avoid the risk of material being transported to other sites

Plant and machinery operations

It is vital that the operator understands the objectives and sensitivities of the work, and has the best equipment to do the job. The machinery of choice would be 11 to 13 tonne, wide-tracked excavators equipped with a tilting, rotatable, quick-hitch attachment.

As an approximate guide a 13 tonne excavator can create about 150 to 200 square metres of pond per day (approximately 25 square metres / hour) at the depths described above.

However, this is greatly influenced by the distance between pond clusters and between individual ponds, the volume of spoil produced, and the distance and method of landscaping required.

It may be necessary for the machinery to use bio-degradable fuels and oils, suitable for work in and around water.



- wide tracks reduce ground-pressure which is particularly advantageous when operating in and around wet areas
- the tilting and / or rotatable mechanism of the hitch enables precise forms, gradients and shapes to be created with minimal re-positioning of the excavator
- smaller plant may be suitable for smaller / confined operations. However, the preference is to use a larger digger whenever possible
- tracked dumpers are very useful for transporting material on wet sites

Timing

Late summer and autumn are generally the best times for pond creation and restoration, when ground conditions tend to be at their driest and there is least risk of damage to wildlife.

However, great crested newt larvae may occupy ponds into late autumn, so any work aimed at restoring known great crested newt breeding ponds should be carried out between the beginning of November and the end of February.

Great crested newt are likely to be present in the terrestrial habitat during this time so great care should be taken to prevent damage to features such as walls, banks and log piles during operations. A licence will be needed for work on great crested newt ponds outwith this period.

Buffer zones for ponds

Surrounding land use will have an impact on the pond's water quality. Avoid areas likely to be exposed to severe or frequent disturbance of adjacent ground through field cultivations, forestry operations or excessive livestock / machinery movement. This may release sediments and nutrients to the water and risk direct harm to the wildlife using such areas. This is very important for great crested newt.

Consider options that support the maintenance or establishment of buffer zones around the ponds. As a guide maintain a minimum of a 12 metre buffer around the pond for all activities to maintain low nutrient levels and reduce the risk of algal blooms that can deplete the water of oxygen.

Lightly graze the pond margins where possible to maintain vegetation diversity and to create some open access to the water side. Manage livestock numbers and access to prevent extensive poaching. Whilst some small areas of seasonal poached ground can benefit biodiversity, excessive poaching can lead to sediment and faecal inputs into the pond.

Establishment and maintenance of the pond



Ponds should be allowed to naturally vegetate and colonised by plant species appropriate to the local area. Artificial planting of the pond is not recommended as it can introduce invasive species and is also an unnecessary additional cost. Restored ponds will re-vegetate very quickly from plant remains in the pond.

Replacement of turfs of vegetation, originally striped from the work site, will aid the re-vegetation process.

It is very common and natural for new and recently restored ponds to suffer from cloudy water and algal blooms in the first year or so, until they settle down and mature. Monitor their development and changes in water levels, etc. Check any inflows for obvious signs of nutrient enrichment such as cloudy water or bright algal growth. These will point to any source of nutrients and sediments which will need to be addressed.

Excessive algal growth, such as blanket weed, may be removed using rakes. Leave the removed material on the side of the bank for a day or so to allow animals to travel back to the water, and allow the material to dry. Remove the vegetation from the pond edge before it starts to rot. It will make excellent compost.

If the water level does not reach the height expected after a winter, check the 'tideline' for field drains or other potential points for leakage.

A pond, constructed along the lines of the guidance above, will reach maturity in about four to five years. From then on it is likely to require maintenance, to keep the balance between vegetation and open water.

Advice and consents

It will be necessary to consult, and gain consent for your ponds from a number of bodies.

Planning permission

Pond creation, and pond restoration (rather than maintenance), do not have 'Permitted Development Rights' in Scottish Planning Policy, so may be subject to planning permission. It is an item requirement for you to 'obtain planning permission, or have confirmation that planning permission is not required for your proposed pond' to claim the funding. Contact your local planning authority in good time before starting operations to confirm their requirements for your ponds.

Waterbodies

Scottish Environment Protection Agency approval is required for pond creation or restoration that

- is connected to a river, stream, ditch, wetland, estuary or loch, or
- is constructed within a watercourse, or
- involves excavating springs and other groundwater-fed wetlands, or
- damages any protected species or habitats

Designated sites

We strongly advise you to contact Scottish Natural Heritage if the work is within, or likely to affect, a designated site such as Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) or Special Areas of Conservation (SAC).

Protected species

Scottish Natural Heritage and the Scottish Environment Protection Agency should be consulted and licences may be required for work that may harm protected species, including great crested newt, natterjack toad, water vole, otter and badger.

Archaeological and historical features

Historic Environment Scotland should be consulted for pond creation within, or likely to affect, Scheduled Designed Landscapes or a Scheduled Monument.

Utilities and services

Once you have identified the areas in which you intend to work, check for overhead and underground pipes and cables, and contact the relevant provider.

Useful information

Useful contacts – statutory

- [Scottish Natural Heritage](#)
- [Scottish Environment Protection Agency](#)
- [Historic Environment Scotland](#)

Useful contacts – advisory

- [Amphibian and Reptile Conservation Trust](#)
- [Amphibian and Reptile Groups](#)
- [Froglife](#)

Useful information

- [A guide to Agri-Environment Climate Scheme options for great crested newts \(PDF, Size: 5.7 MB\)](#) – information sheet
- [A guide to Agri-Environment Climate Scheme options for natterjack toad \(PDF, Size: 2.3 MB\)](#) – information sheet
- [Ponds, pools and lochans](#) – Scottish Environment Protection Agency