# Outline steps for pond creation for wildlife

MILLION PONDS PROJECT

A 50-YEAR PROJECT TO CREATE A NETWORK OF CLEAN WATER PONDS FOR FRESHWATER WILDLIFE

## About this summary sheet

This factsheet summarises the main steps to create clean water ponds for wildlife, including:

- Pond design
- Choosing a site and finding a clean water source
- Planning pond creation
- Constructing ponds
- Managing ponds after creation

Detailed information on all topics can be found in *Factsheets 4* to *8*.

## What is a pond?

Ponds are permanent or seasonal waterbodies between 1m$^2$ and 2 hectares in surface area (about 2.5 football pitches).

This definition includes temporary ponds that dry up during the year, as well as tiny pools and very shallow ponds like 'wader scrapes'.

## How to create a clean water pond

**To create clean water ponds for wildlife, follow three basic principles:**

1. Find a place with a clean water source.
2. Leave the pond to colonise naturally.
3. Make sure the pond is protected from damaging impacts during its lifetime.

## 1. Pond Design

Designing new ponds is fun – there are many different types of ponds, and many features which can be included. To maximise the wildlife value of a pond site:

- Create pond complexes or multiple pools including both permanent and seasonal ponds of varying areas and depths, rather than a single waterbody.
- Make broad, undulating drawdown zones.
- Make sure that most pond slopes are shallow (less than 1:5).
- Create underwater bars and shoals to benefit aquatic plants.
- Design according to your landuse and site management (e.g. grazed or ungrazed meadow) and think about how the site will develop in the longer term.
- Use design to minimise future problems – think about how the pond will be used by people and animals.

If there are uncommon or protected species you want to attract to the site, also refer to the appropriate *Species Dossiers*. In particular, consider how natural factors, such as grazing pressure or shade, can be used to create the conditions the species needs, so that the ponds are self-sustaining, without requirement for regular management.

For more design information and ideas, see *Factsheet 4* and the *Pond Design Bank*.

## 2. Choosing a site and finding a clean water source

Choosing the site for a pond is the most important decision you take in pond making and will make a big impact on how good it will be for wildlife. The main issues are summarised below.

### Clean Water

As stressed often in the Pond Creation Toolkit, it is important that ponds have clean water. To ensure this:

**(i)** Make sure the landuse in the pond catchment is non-intensive. Within this catchment area:

1. Look for a site which will provide the pond with an unpolluted water source. Choose areas like rough grassland, wood or heath.
2. Ensure that there is no arable or other land where the ground is regularly disturbed or is likely to be high in nutrients. Avoid intensive grassland where fertilisers or pesticides are applied and could run off.
3. Avoid places likely to receive run-off from roads, tracks, houses, yards or spoil heaps. Roof run-off is usually pretty clean, but other urban surfaces are usually not.

**(ii)** Generally avoid stream, ditch or drain inflows into ponds. Across most of Britain inflows bring polluted water and silt into ponds. The silt they carry also rapidly fills ponds up reducing their lifespan by decades and sometimes centuries. The best sources of water for ponds are usually (a) groundwater or (b) rain and surface water draining into the pond from non-intensive areas.

**(iii)** Think carefully before locating ponds near to public paths or open access areas with high levels of public pressure (e.g. commons, amenity grasslands) or design to avoid impacts on wildlife.

If there are concerns about water quality, move the pond to another location or check whether water quality can be improved by, for example, de-intensifying the area of land from which water drains.

If these remedies are not possible, do the best you can with the site and water sources you have. The pond may not contribute to achieving the targets of the Million Ponds Project, but ponds that are not 'pristine' can still be valuable for many freshwater species, and will support the freshwater network as a whole.

### Making sure the pond will hold water

In most cases, 'natural' ponds without artificial liners are the best type of pond to create. If you are not sure whether a pond on your site will hold water naturally, or are concerned about water levels, then investigate the local hydrology and geology and other waterbodies in the area (see *Factsheet 10* for further details). Ponds don't have to hold water all year round: seasonal ponds are an important pond type in their own right. And water quality is more important than quantity.

### Strategic locations for ponds

Across the UK as a whole, it is important that clean water ponds are spread around and dug in a wide range of landscape types. It is this mix of locations that will protect the widest range of freshwater biodiversity.

This said, it can be useful to locate some new ponds more strategically:

- Dig ponds near other wetlands to improve connectivity – stepping-stones between waterbodies.
- Dig ponds where uncommon species occur to help strengthen their populations.

Or it may be important not to dig at all:

- Don't dig ponds where there are existing valuable habitats.
- Don't dig ponds where this might damage uncommon species.
- Don't dig up peat, except where there are very good reasons.
- Don't dig up our archaeological heritage.

### Avoiding later problems

If a pond is going to be located close to a public path or in an area of open public access, think carefully about the impact this may have on its wildlife. The main issues, in rough order of importance are:

- **Ducks:** too many using a pond pollutes the water and makes it cloudy and generally reduces its wildlife value.
- **Dogs:** too many jumping in a pond makes the water cloudy.
- **Fish:** not all ponds should have fish. Too many fish or introduced species like goldfish cause many problems.
- **Invasive plant and animal species:** people often add these to countryside ponds causing problems for our native wildlife.
- **People:** people themselves are fine! Unless there are so many that they wear down large areas of bank or rubbish dumping becomes a significant problem.

See *Factsheet 5* for further information about locating ponds and clean water sources.

## 3. Planning pond creation

At an early stage, it is worth outlining how you will undertake all elements of the pond creation project.

### Pre-site checks

Take care to ensure that pond creation does not cause damage or contravene legislation. In general, the safest approach to pond construction is to talk to all relevant public bodies and other interested parties to ensure that they are happy with what you are doing. Issues to consider are listed below (see Table 1 for a list of contacts):

- **Damage to existing habitats and species:** Ensure that the pond excavation area and routes onto the site don't damage valuable, threatened or protected habitats or species. Ponds are often dug in naturally damp places, so take particular care not to destroy existing wetlands (damp hollows, seepages, temporary ponds and springs) (see *Factsheet 5)*. If in doubt, be cautious: dig ponds in vegetation types that are extensive and uniform.
- **Protected sites:** If there are protected sites close by (e.g. SSSIs, nature reserves etc.) ensure that pond creation won't have a damaging effect on factors such as drainage or water levels.
- **Archaeology:** Check with the Country Archaeologist to find out if there is likely to be any interest.
- **Pond creation on floodplains:** If the site is on a floodplain, there is a legal requirement to ensure that excavated spoil: (a) does not reduce the area's capacity to store floodwater (b) is not piled up causing an obstruction to floodwater movement.

- **Underground pipes and services:** Check if the site is crossed by underground cables and pipes, carrying electricity, gas, oil, water, telephone lines and sewage.
- **Above ground services:** Check if the maximum height of machinery that can be used on site is constrained by overhead power lines. Direct contact with the lines is not necessary – electricity can flashover when equipment gets close.
- **Neighbours:** If ponds lie close to a neighbouring property, and particularly if the land on which the pond lies connects to a neighbour's drainage system, talk to your neighbour to ensure there won't be any conflict.
- **Planning permission:** Consult the local planning authority at an early stage to determine whether the pond needs planning permission, or if there are likely to be other concerns. If you need planning permission, a fee will be charged with the amount dependent on the complexity of the project.

**Table 1. Pre-site checks and people to talk to**

| Topic | Who | Contact details |
|---|---|---|
| Impact on protected species or designated sites | Natural England or Countryside Council for Wales | *www.naturalengland.org.uk* *www.ccw.gov.uk* |
| Tree felling, coppicing etc | Forestry Commission | *www.forestry.gov.uk* |
| Impact on historic sites or archaeological remains | County Archaeologist | At local planning authority |
| Work on a floodplain, impacts on watercourses, concerns over contaminated land, complying with environmental law | Environment Agency | *www.environment-agency.gov.uk* *www.netregs.gov.uk* |
| Impact on other properties e.g. by altering drainage | Neighbouring landowners | |
| Locating and working near buried services and overhead powerlines | Service providers | Contact service providers direct or use a search facility such as *www.linesearch.org* or *www.linewatch.co.uk* |
| Health and safety, risk assessments, CDM Regulations | Health and Safety Executive | *www.hse.gov.uk* |
| Planning permission requirements or other land use concerns | Local Planning Authority e.g. district council or National Park Authority | Contact the authority direct or find contact details of the relevant authority on *www.planningportal.gov.uk* |

## Approaches to pond creation

Depending on the circumstances of your pond creation project, you have three main approaches to choose from – each has merit according to site location and source of funding:

1. **Quick approach:** ponds can be made quickly over hours or days and simply left to colonise.
2. **Phased approach:** if you are unsure about the ponds' final water levels, consider a phased approach digging out deeper ponds in the first year and disposing of all the spoil. Then fine-tune the drawdown zone and margins in years 2 or 3.
3. **Long-term approach:** plan pond digging over a longer time scale, bringing in a digger every few years to create new pools and maybe modify existing ones.

## Planning the construction phase

The important issues to consider are:

- **Timing works:** There is no best time for pond creation. Avoiding the winter period can be preferable if soils are likely to become waterlogged, particularly if dumper trucks are needed to move spoil. There may also be restrictions linked to breeding or protected species.
- **Access for machinery:** Excavators and dump trucks are tall, broad, and often heavy machines, so ensure that all route ways, bridges, and gates onto the site can accommodate them – it may be necessary to reinforce access routes and prune or remove bordering scrub, trees or hedgerows. Temporary structures may be needed to access some areas of the site (e.g. temporary bridges over ditches). If there are sensitive areas on site, these should be marked on plans and ideally taped-off on the ground.
- **Dealing with spoil:** Disposing of the excavated spoil is often the most time consuming and expensive part of a pond construction project! To minimise costs consider how you may be able to use spoil on-site, either by spreading it thinly or creating useful features for wildlife or to prevent polluted water entering the pond. If the spoil is to be spread, make sure it won't form a rim around the pond which interferes with a clean surface water source. If spoil is to be taken off-site for disposal, the pond creation project may require planning permission.
- **Dealing with topsoil:** Topsoil has very high levels of nutrients and can pollute pond water. Topsoil should not be used either in the pond, on its edges, on the upper banks or anywhere where surface water could wash nutrients into the pond. If it can't be used on-site, consider selling it.

## Designs and drawings

The main reasons for producing sites drawings are (i) to get your ideas straight and (ii) to present them to others: potentially including planning officers, contractors, digger drivers or funders.

Site drawings often begin as a back-of-the-envelope sketch, and sometimes you may not need much more. However, if you are communicating your ideas to others, then include what they will need to know. See *Factsheet 6* and examples in the *Design Bank*.

## Project costs and funding sources

The project cost will vary widely depending on the nature of your project. Small ponds can be dug by hand by volunteers or by using a self-drive mini-digger for a day. Larger, more complex projects may

cost many thousands of pounds. Lining a pond can easily double its cost because of the extra digging, materials, equipment and handling time necessary.

It's useful to include a contingency fund, usually around 10% of project costs, or 5% on large schemes, to cover unexpected costs and price rises.

A list of possible funding sources for creating ponds as part of the Million Ponds Project will be regularly updated on the *project website*.

## Health and Safety

In carrying out practical work on ponds, the first concern should be that the work is carried out safely. Risk assessments are a legal requirement for all companies, and may be a condition on insurance policies. Health and safety should also be assessed once pond creation is completed, particularly where there is public access.

Note that health and safety issues and assessments are always site and project specific. There is simple guidance on a sensible approach to risk management and carrying out risk assessments on the Health and Safety Executive (HSE) website at *www.hse.gov.uk/risk/index.htm*

If a pond creation project falls into the category of 'construction project', the Construction (Design and Management) Regulations apply (CDM Regulations, see *www.hse.gov.uk*) – it is good practice to follow the CDM Regulations for all projects.

If construction work lasts longer than 30 days or involves more than 500 person days of construction, there are additional legal requirements. A notification form should be completed and sent to the Health and Safety Executive (see Table 1), a CDM co-ordinator and a principal contractor must be appointed, a health and safety plan must be in place, and a heath and safety file must be kept as a record of relevant health and safety information and as a reference for future works or maintenance on the pond site.

## Project Risk Management

There are potential risks to the success of any project, and they will differ for each site and each project (e.g. funding falls through, bad weather makes route-ways impassable, unknown drains are encountered). Draw up a list of the issues that could pose a risk to your project, and take action to minimise the level of risk. There is more information about possible risks on the *project website*.

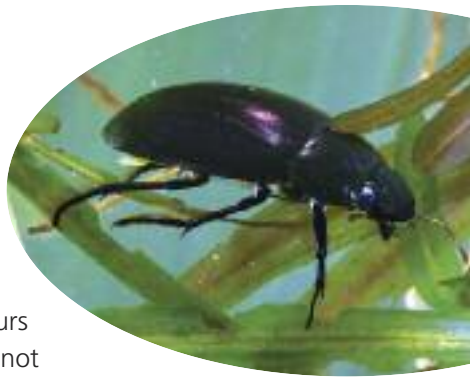
## Finding contractors

If you are using contractors for the excavation phase, try to approach firms who are experienced and skilled in digging ponds. A typical first stage is to prepare a written brief and plan for the work required and get quotes from around three contractors. It can be useful for both you and the contractor to visit the site together. Ensure that contractors are notified of any potential hazards to staff or machinery e.g. steep slopes, soft or unstable areas, deep water, and power lines.

Confirm responsibilities with the contractor before agreeing a contract. Take particular care to ensure that you are not liable for loss or damage if machines get stuck or damaged.

See *Factsheet 6* for further information about planning pond creation projects.

## 4. Constructing Ponds



- **Managing the phases of construction:**
  - Before work starts on site, mark out important areas such as the pond outlines, where heavy machinery can move about, where spoil should be placed, or out-of-bounds areas.
  - Provide detailed site plans, perhaps laminated so that they can be kept in the cab of the digger for easy referral.
  - Spend time with the excavator driver before the start of the excavation to explain the scheme and stay at least for the first few hours to make sure all is going well. Bear in mind that many contractors are not experienced in creating wildlife ponds. Visit regularly to check progress and adjust the plan or deal with problems as necessary.
  - On completion of the project, check that everything has been done to your satisfaction and the site has been left in good order before signing off – check the contract and any conditions of licenses or consents.
- **Excavation machinery:** A wide range of machines are available. Small self-drive diggers can be hired per day or week from many suppliers. Larger tracked excavators are usually hired with a licenced driver. It is possible to dig very shallow scrape-type pools with a bulldozer if this is available on site. Where spoil needs to be moved around site one or more dumper trucks will be needed.
- **Excavation method:** Depending on the size and location of the pond, soil types, ground water levels, and the machinery used, there are a variety of approaches to excavation and you should discuss the best strategy with the contractor. Bringing back a digger to the site for half a day or so a year after creation can fix most problems and brings additional benefits.
- **Dealing with excavated spoil:**
  - If spoil needs to be moved, have a sufficient number of suitable vehicles to transport it so the digger driver doesn't lose time.
  - Dumper trucks heavily laden with spoil sink deep into damp soils, so ensure there is room for them to vary their route, whilst avoiding sensitive areas identified during the planning stage.
- **Topsoil:** Don't add topsoil to the pond margins or on slopes above the pond. Nutrients draining from the topsoil into the pond will pollute the water. Topsoil is, in any case, unnecessary because native plants grow perfectly well in subsoil, clay or sand, and in a couple of years the end result will be better.
- **Finishing sites off:** Ensure the contractor leaves the site and any access routes in good order, but don't tidy up the excavation area too much. The rough surfaces left by toothed excavation buckets, low heaps of dumped or spilled soil, scuffed turfs and wheel ruts all add to the micro-scale structural diversity of a site for plants and invertebrate animals.
- **Documenting pond construction:** Keep a record of how the pond was constructed – this can be useful for the future management of the site and help others learn from your experience.

See *Factsheet 7* for further information about pond construction.

## 5. Managing ponds after creation

One of the benefits of a clean water pond is that, once made, it should need little management. The less done in terms of adding things to a pond, the better, although a few tweaks in the first few years can sometimes be helpful. The main issues are:

**Don't plant up:** the new-pond stage is very short compared to the whole life of a pond. Many pond species use this early stage of succession – and it is usually very short. It is important not to shorten it further by adding plants or a bucket of sludge from another site to help the pond 'mature' faster.

**Keep an eye on the pond in the early stages:** a little effort may be needed 2-5 years after creation, whilst plants are colonising a pond, so that invasive species such as Bulrush and alien plants do not dominate the new site.

**Temporary fencing:** if wildfowl, stock or people are likely to use the site in considerable numbers, it can sometimes be useful to protect vegetation with temporary fencing. Usually however this won't be necessary unless considerable amounts of silt are eroding into the pond from the bare ground.

**Management in later years:** well designed clean-water ponds should need little management in later years. Pond management may be required in the following circumstances:

**1)** The landuse or management of the site has changed (e.g. loss of grazing so that woody vegetation develops). In such cases there are two main options: (a) periodically manage the site to artificially maintain it close to the original state (e.g. control trees, remove vegetation or create new pools), or (b) leave the site to develop in its own way. As long as the site has a variety of pools of different depths and areas, it is likely that the site, as a whole, will remain diverse and valuable.

**2)** The site is being managed for uncommon species with particular habitat requirements (such as great crested newts, or one of the many rare bare ground plants).

When managing for particular species, think about pond density: as the number of ponds increases, the need for micro-management of individual ponds can often be reduced as the inherent variety of the ponds provides landscape-scale protection.

See *Factsheet 8* for further information about managing ponds after creation.

**For further information about the Million Ponds Project please visit *www.freshwaterhabitats.org.uk/projects/million-ponds* or email enquiries to *info@freshwaterhabitats.org.uk***

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