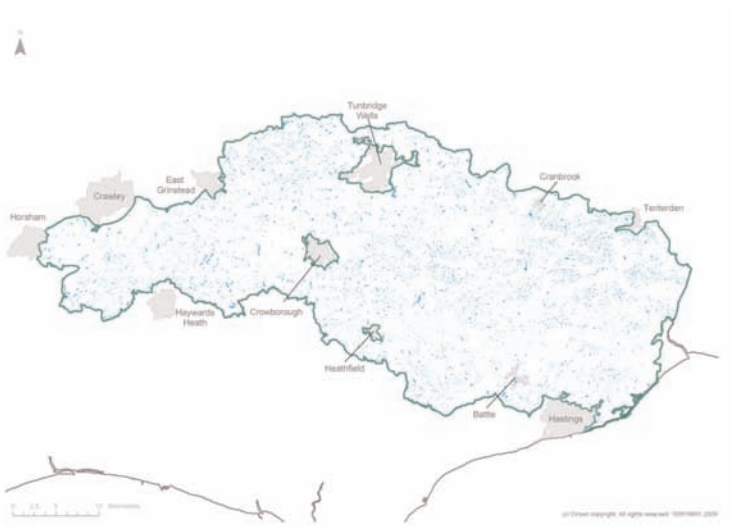
Ponds in the High Weald Landscape

A closer look at any Ordnance Survey map reveals thousands of beads of blue – an indication of the number of ponds that dot the area. Sometimes natural, but often the by-products of past industries, they are found hidden in woodlands, tucked in field corners, next to farmsteads and occasionally at the centre of villages and hamlets.

Number, distribution and loss

The High Weald has one of the highest concentrations of ponds in the South East of England. Pond numbers were at their peak in 1840 when most of the human activity that led to their creation began to decline. There are 13,408 mapped ponds in the area, largely associated with the Wadhurst Clay, approximately 9 per kilometre square. Across Britain, around 75% have been lost in the last 100 years.



Distribution map of ponds in the High Weald

Use and management

1. **Natural ponds** in the High Weald can be found where there is lots of water, such as in river valleys, wet woodland and by springs, however the majority have been developed as by-products of past human activity.

2. **Drinking ponds** for people and livestock were often created within farmsteads and villages, sometimes a by product of digging clay to make the bricks for the construction of local buildings. Some had flint bases? to enable cart wheels to be washed.

High Weald farm pond

3. **Ponds that are stream fed and dammed at one end.**

In the High Weald the control and management of its numerous gill streams and rivers played an important part in the exploitation of its resources. The numerous, fast flowing streams were often too small to power machinery directly and thus they were embanked and empounded, creating ponds and lakes to provide a suitable head of water to power the grinding stones of the flour mills, and the hammers and bellows of the forges and furnaces. In order to achieve a regular supply through the summer months, penstocks or smaller ponds were created by embanking the gill streams often a mile or more upstream from the operating site. Many former hammer ponds became mill ponds powering corn and/or fulling mills. Others were used as fish ponds or incorporated into more formal landscapes.

Whilst some of the smaller pen stocks still retain water, others have become silted up and returned to farmland or woodland. Normally only the breached bay or dam may survive. By contrast the main pond - more often called a 'hammer pond' after the large hammer used in the forges - may still hold water and survive as a significant landscape feature.

4. **Small, deep, irregular ponds by field boundaries** tend to be marl pits created by the digging out of the bluey/grey calcareous Weald clay which was subsequently spread on adjacent fields as a soil improver. Marl pits could be up to 5 metres deep, depending on the depth of the deposit and the level of the water table. Occasionally there may be spoil mounds associated with them.

5. **Ponds arising from the extraction of minerals** e.g. iron are found all over the High Weald. Many of these water-filled pits have been preserved within the area's woodlands. Some ponds can be quite deep with a clear working face and access track where the material was hauled out. Sometimes the line of a deposit can be traced along a valley by the location of pits in a woodland shaw.

6. **Homestead moats** are rare water features - rectangular ponds sometimes with associated fish ponds and earthworks, which surrounded a homestead and its outbuildings. These features were mainly created in the 13th century as a status symbol but also gave some defence to the homestead, as well as a regular supply of fish. Most moated sites are today recorded and statutorily protected as scheduled sites.

7. **New ponds**

Over the last 30 years many new ponds have been created in the High Weald, for aesthetic, wildlife and leisure (largely fishing) purposes. They vary in location and are usually off-line i.e. not stream-fed, in line with Environment Agency policy.

Newly created pond

Biodiversity value and current threats

Ponds are important to the High Weald's biodiversity, supporting more than a thousand species including uncommon ones that are of national importance. Birds, mammals, amphibians and insects all use ponds for food, shelter and to complete their lifecycles. In the High Weald over-deepening, over-management and the introduction of fish, wildfowl ad non-native plant species are the main threats to pond habitat and their archaeology. Seasonal ponds, which dry up in summer, and silted up and shaded ponds, are as valuable for wildlife as more open, static ponds.

Value of ponds

1) A unique wildlife habitat.
2) Important part of our history, culture and past agricultural practices.
3) Visual focus in many landscapes.
4) An amenity for communities.
5) Source of recreation and education.
6) Drainage.

Water Vole

What is a pond?

A man made or natural waterbody of still, fresh water between 1m and 2 ha squared in area which holds water for 4 months of the year or more.

Protected species that a High Weald pond can support:

- Great Crested Newt.
- Water Vole.
- Shining Ramshorn Snail.
- Medicinal Leech.

What is biodiversity?

Biodiversity is a term now widely used to describe the variety of all life forms (plants and animals) and the interactions between them and the area they live in.

Ponds are sensitive habitats and can be adversely affected by;

- Water pollution from fertilisers, chemicals getting into the water.
- Urban development.
- Natural succession.
- Introduction of 'alien' plants.
- Inappropriate management ie: addition of fish stocks.
- Public perception– ponds viewed as dangerous.
- Infilling/agricultural intensification.
- Water abstraction.
- Climate change.

Ponds are a great asset to the High Weald and these threats can be minimised by sensitive management.

Caring For and Maintaining a Pond

1) Pond restoration

Does my pond need restoring?

Every pond is unique depending on factors such as location, management and its current state and can be valuable for different wildlife. Ponds, if left to nature will silt up and dry up through natural succession, the natural way habitats change over time. Each of the stages provides an equally important habitat.

Before starting it is important to establish whether a pond needs restoring (it could be more beneficial in its current state). A silted up pond can be important for specialist wildlife because it has been undisturbed for several years, with de-silting losing these species. It may be better to create a new pond nearby instead of clearing out the existing one!

If however a pond has no signs of wildlife and is swamped by rubbish and one type of vegetation, then it would benefit from restoration. Remember suddenly introducing management can drastically alter a habitat; contact groups in www.highweald.org [guidance] for advice before starting.

Dried up pond

Signs of a pond needing restoration

- Silted up.
- Dense shade.
- One plant dominating the water area.
- Thick covering of algae.
- Accumulation of rubbish.
- No buffer zone (see below).

Never assume that a pond has no conservation value

Surveying a pond

The first task before doing any work is to look at the wildlife in and around the pond. Unless your pond is extremely neglected or polluted, surveying the plants, animals and history, will help you to decide whether a pond needs managing and if so, what is the most appropriate management. A survey will help determine whether you have protected creatures living in or around the pond such as the Great Crested Newt. Although there are some general management techniques used for ponds, each one is individual so the management should be tailored to suit (for more advice on management or surveying see www.highweald.org [guidance]).

What is a buffer zone?

A buffer zone is the surrounding area which protects a habitat ie: a pond, from damage or disturbance, for example long grass or scrub around the pond edge.
They are very valuable for wildlife.

Factors that will indicate the potential conservation value of a pond

- Water quality.
- Water quantity and supply.
- Amount of sediment in the water and how quickly it builds up.
- Use of nearby land.
- Range of plants in the pond and on surrounding banks.
- Extent of trees and shade around the pond.

What do I need to do to restore a pond?

The management will depend on your aim and it's current state. Surveying will help you to decide what needs to be managed and how to undertake this. Management will vary from pond to pond but the general processes needed for restoration are summarised as:

- De-silting.
- Removing algae.
- Removal of leaves and rubbish.
- Managing water depths & levels.
- Cutting/thinning of bankside vegetation.
- Reducing vegetation in the pond.

It is always worth looking first at the reasons behind the need for restoration. Excess weed or algae indicates poor water quality - is there a source of nutrients into the pond i.e. fertiliser drift or manure pile near the pond causing the growth? Is the amount of bankside vegetation and tree cover due to lack of management?

You may find that you need to only adopt one of these options such as thinning out bankside vegetation which will help to restore your pond to a functioning wildlife habitat.

Great Crested Newts

- Highly protected species by UK and EU legislation making it illegal to disturb or harm them or their habitat in anyway.
- Largest newt species in the UK.
- Declining due to loss of ponds, pollution, stocking ponds with fish, silting up of ponds.
- Breed in ponds and live in neighbouring rough grassland, woodland, hedgerows and scrub.
- South East England supports greatest numbers.
- Specifically listed in the Kent Biodiversity Action Plan, an action plan detailing how to conserve and manage certain threatened species and habitats (see contacts for Biodivesity Partnership).
- Any activity which could involve the disturbance of newts or their habitat in any way requires a licence from Natural England (See W ww.highweald.org [guidance] for contact details).

Do I need permission to restore or manage a pond?

Simple dredging and maintenance of a pond such as reducing vegetation and removing leaves & rubbish, usually does not require permission. However, if you de-silt a pond, the silt is actually a controlled waste and should not be moved from the site. It is always best to contact the Environment Agency before you start any works (see www.highweald.org [guidance])

Pond requiring restoration by removal of rubbish and vegetation

2)Creating a pond

How do I know if a new pond is appropriate in the local area?

It is important to consider the surrounding landscape in deciding whether a pond is suitable in a specific area. Consider whether ponds were a traditional part of the landscape and have been lost in recent years. It is often useful to look at old photographs and literature on an area to discover whether ponds have been a feature of a particular landscape.

The quantity of ponds, state and their linkage to existing wetlands such as rivers and ditches is important to wildlife.

Planning a pond

Before you begin to actually create a pond, it is important to plan where the most appropriate location is, its size and its purpose. Carefully planning and thinking about your pond will help to increase its success. Always remember, the most important factor is water quality and therefore a new pond shouldn't be near to a known cause of pollution.

Pond creation

The most favoured time of year for digging a new pond is late autumn / early winter allowing plants and wildlife to establish in the following spring. It is important for ponds to have a range of depths as different wildlife and plants prefer different water levels. A maximum depth of 1 - 2 metres in a pond is sufficient as only a few creatures live in deep water – the majority are found in shallow depths. Check to see whether you need planning permission for the pond (see factors to consider).

Consider the factors on the next page before you actually begin to dig the pond!

Areas to be avoided:

- Areas with existing value for wildlife such as flower-rich meadows.
- Public rights of way – it is illegal to obstruct a public right of way by any means.
- Buried pipes or cables.
- Buried archaeological remains.

The three most important factors for a pond:

1) Good water quality.
2) Close proximity to other wetland areas such as ponds.
3) Varying shape, slopes and shelves within the pond.

Local conditions to consider

Specific location

The location of a pond must be chosen with great care. It is crucial to site a pond so it 'looks' right in the surrounding landscape. If you are unsure of where to site a pond, seek professional advice.

Climate (rainfall & temperature)

Position a pond so it gets at least half a day of full sun (too much shade will inhibit plant growth. A balance is needed as continuous sun will mean water will evaporate more quickly from the pond.

Soil type

Some soils are better at holding water than others, for example, a clay soil is non-draining therefore will retain water.

Size of site

This will directly affect the size of the pond that you will create. Remember to leave sufficient land around it for management and ease of access.

Newly established pond with good marginal vegetation

Land use of adjacent land

To minimise the decline of water quality, site the pond away from agricultural or urban run off. Ponds are linked to the surrounding habitats such as grassland and hedges. Many species that use ponds also need a variety of other habitats.

Factors to consider before creating a new pond

Aims and objectives

What are the benefits of a pond? What is its main purpose going to be – to enhance the landscape, to provide a wildlife habitat, amenity value?

Local conditions

What are the conditions of your area?

Existing wildlife

Assess the existing flora and fauna of the area before deciding where to locate the pond. Refer to www.highweald.org [guidance] for organisations able to offer advice.

Archaeological interest

Check whether the proposed site has heritage value. You may need to get professional guidance if it has.

Legal aspects

There may be legal requirements that you must stick to before you can create a pond. The Environment Agency should be contacted in the first instance to discuss the size of the pond, its water supply and its proximity to a river. You may need planning permission from your Local Authority or if the proposed site is near a SSSI, Natural England should be contacted.

Water supply

Does the site receive sufficient rainwater throughout the year? Where will the supply of water for the pond come from – surface, ground or spring water? Tap water is not the best option to fill a pond as it adds nutrients to a pond leading to algal growth.

Water Quality

This is crucial to the success of your pond - potential sources of water pollution (for example fertiliser drift) should be considered before deciding on the location.

People and Safety

This will need to be considered especially if the pond will be near a public footpath and where it may pose a danger to children. It is also worth considering that people can also be a disturbance to wildlife.

Costs

The cost of the work will influence the size of the pond, how it is managed etc.

Management

Generally ponds require minimal management if maintained regularly such as clearing out leaves from the water surface each autumn. You will need to think about whom is going to manage the pond. Do you need extra equipment to manage it, for example, a net for removing leaves in autumn?

Disposal of spoil

Calculate the amount of spoil to be removed and where and how it is going to be removed (disposal can be costly). If you are moving spoil away from the immediate pond area, you will need to speak to the Environment Agency to find out how to dispose of spoil legally as you may require a licence.

How do I actually create a pond?

Unless the proposed pond is in a waterlogged or high water table area, you will need to line your pond. Most commonly used is a flexible liner to create your own size and shape of the pond.

Lining the pond

The three main types of liner are pre-formed shape, puddled clay or flexible liner. Pre-formed shape liners are mainly for small-scale garden ponds.

Puddled clay is the most natural form and traditional method for lining a pond. Clay is obtained from a local source, spread over the dug hole, mixed with water and then pounded ending up with a plastic consistency. It is a specialist task with the clay layer at least 15cm thick and with no gaps, otherwise water will escape.

Flexible liner is often the preferred option as you can make the pond the dimensions that you want. Butyl is the most durable of liners, therefore is likely to be the most cost effective in the long term. You need to buy underlay if using flexible liner, which acts as a buffer to the liner directly onto the ground. Using a liner will create a smooth surface that is less natural and it can be harder for marginal vegetation to establish.

Alternatively, if you are in a waterlogged area or where the water table is high, it may not be necessary to line the pond. This is quite important as where these features occur may indicate an appropriate pond location. However, it is still important to consider the location carefully to ensure that you will not lose existing good habitat for example wet grassland.

Measuring up for flexible liner

Size of liner and underlay required = actual length of the pond (+ 2x maximum depth) X the width of the pond (+ 2x maximum depth).

important note about SSSIs

You will have been told by Natural England if part or all of your landis within a site of Special Scientific Interest (SSSI). Owners of SSSIs must give Natural England written notice if any operations listed in the original notification are likely to damage the features of special interest.

Process for creating a pond using a flexible liner

1) Measure the size of liner and underlay required and order.

2) Obtain any permissions that you may require, for example from Environment Agency/Natural England.

3) Mark out the shape and size of the pond, using stakes and tape.

4) Drive a stake into the middle of the pond to the required depth to act as a marker.

5) Remove turf around the perimeter of the pond. It is recommended that the turf is cut from the edge to 50cm back. Keep the turf for later to go back around the pond.

6) It is useful to make a sketch of the pond to show the profile so that you don't end up digging out a basin with no shelves!

7) Dig out the pond. Maintain some spoil near to the pond and dispose of the remainder in an appropriate way. Minimum depth for wildlife should be 60cm to enable wildlife to escape if ice occurs in winter. Aim for a saucer-shaped pond.

8) Remove any stones, roots or anything that could risk puncturing the liner.

9) It is crucial that the pond is level all around. You can use a length of timber and put it across the pond checking with a spirit level.

10) Get the underlay and lay it over the pond. Mould it to the shape of the pond.

11) Put the liner over the top of the underlay. Be careful not to tear the liner! Smooth out the creases working from the centre of the pond to the edge.

12) Fill the pond with a small amount of water so that the liner starts to mould to the shape of the pond. Stretch the liner out as necessary to minimise creases.

13) Fill in the remainder of the pond with water.

14) Replace the turf into its original place around the edge of pond, tucking the liner underneath. Cut off any liner that is sticking out. It is useful for the turf to hang into the water by about 10cm as this will allow animals to get in and out of the pond easily and creates a natural edge.

Now my pond is dug, should I plant it up?

In general, it is not necessary to plant up a pond. Native plants and animals will find their way to a new pond rather quickly. You may even find that beetles establish within a few hours!

Ponds are really only ever planted up for aesthetic reasons and it is crucial that only native species are planted. Plants can be added to a pond at any time of year but late spring to early summer is the best time as warmer water will help them establish and grow. It is not necessary to add topsoil as this can also cause algal problems. If you find during the first few years that certain plants are dominating the pond, then cut the plants back as necessary. It is often better to get native plants from nearby ponds but take care you do not gain unwanted invasive species with the plant material. Be sure to ask the landowner for permission first!

If you do decide to plant up your pond instead of letting it colonise naturally, it is important to include plants in all of the zones explained below. Each zone of vegetation is important to different wildlife so including a balanced mixture will help make your pond appealing to a range of wildlife.

Marginal/marsh zone

Plants found here thrive at the water's edge or in wet soil. This is very important for pond animals as many live in surrounding vegetation and only in a few centimetres of water. Recommended plants include

- Bugle.
- Marsh marigold.
- Meadowsweet.
- Ragged robin.
- Marsh woundwort.
- Lady's smock.
- Water mint.
- Purple loosestrife

Emergent zone

Plants that prefer to have their roots in shallow water, including rushes and reeds. Some emergent species can be highly invasive even if they may be native such as bulrush. Avoid bulrushes in small ponds as these can take over the entire pond. This vegetation provides shelter for water voles and is important for dragonflies.

Tall emergents

- Flowering rush.
- Branched bur-reed.
- Greater pond-sedge.
- Water violet.
- Reed sweet-grass

Digging pond by machine. Depending on the size of your pond, you can dig it by hand or machine.

Shallow water emergents

- Water forget-me-not.
- Lesser spearwort.
- Arrowhead.
- Brooklime.

Submerged zone

These plants are often the most difficult pond plants to establish. Only add these to your pond if water quality is good. Best to add plants from nearby sites to increase the chance of survival.

- Curled pondweed.
- Water starwort.
- Rigid hornwort.
- Water crowfoot.
- Water milfoil.

Zones of vegetation

Floating zone

These plants live on the water's surface.

- Amphibious bistort.
- Broad-leaved pondweed.
- Frogbit.

Different types of vegetation are needed within and around a pond

A pond that has been taken over by reedmace (often called bulrush)

Plants to avoid

The following plants should be avoided as they are not native to the High Weald and can spread rapidly. Choking ponds and waterways, they are responsible for disrupting habitats for native plants, invertebrates and fish.

- Parrot's Feather (Myriophyllum aquaticum)
- **New Zealand Pigmyweed (Australian Swamp Stonecrop) (Crassula helmsii)**
- **Indian (Himalayan) Balsam (Impatiens glandulifera)**
- **Floating Pennywort (Hydrocotyle ranunculoides)**

Pond choked with Parrot's Feather

3) Managing a pond

Managing a pond can be necessary to ensure it functions effectively, remains a useful wildlife habitat and is maintained as an important landscape feature. Ponds will follow natural processes eventually filling in and drying out. By managing a pond, this process is halted. Ponds actually require very little management, indeed too much maintenance to a pond can be detrimental.

The pond habitat includes the surrounding land, many species use the surrounding land for breeding and hibernating for example newts. Management undertaken on surrounding land can directly affect a pond such as dredging of a nearby ditch or removal of a hedgerow.

Any management work undertaken should ideally be done from September – November, avoiding periods when wildlife breed and hibernate.

Principles of pond management

- Take a look at what's already there - an unattractive pond can still be valuable to wildlife.
- Take on board any previous management. Changing the management such as suddenly clearing vegetation or dredging the pond could have a drastic impact on plants and wildlife.
- Protect ponds by creating a buffer zone around them such as allowing longer vegetation around the pond edge
- Create variety - avoid making all ponds look the same
- Take care not to over manage your pond – this can be detrimental to wildlife

Removing silt

This may be necessary if there is no or very little wildlife in the pond. Undertaking a survey of the pond will help decide the value of the pond in its current state. When removing silt, it is important not to remove all at once as some wildlife may be living in it. De-silting should be carried out from September to November when it will cause least disturbance. Depending on the size of the pond and ease of access, silt can be removed by hand or using machinery.

Removing algae

A covering of algae occurs due to the high nutrient levels in the water. You can help ensure that algal blooms are minimised in the future by placing barley straw in the water. It is best to do this in spring as algae is most active in summer. You only need 10g per square metre – a few handfuls for small ponds. Put the straw loosely into a mesh sack with a plastic bottle in it to act as a float. Then anchor it in deeper water so it floats just below the surface of the water. You can get hold of barley straw from a local pet shop or farm, for larger quantities. This technique has been used to maintain clean water since the 12th Century!

Clearing leaves and rubbish

It is beneficial to take the majority of fallen leaves off of the water surface in autumn. Some will break down and add to the sediment at the bottom of the pond which is beneficial. But if too many leaves do this, nutrients may be increased into the water which could lead to algal blooms.

Reducing plants

If a pond has not been managed in a long time, it may have become swamped by one species of plant such as the bulrush. If this is the case, it is necessary to clear out some of the vegetation. It is recommended that no more than one third of vegetation is removed from a pond in any one year. Cleared vegetation should be left on the bank for 24 hours before being removed to allow slower creatures to escape back to the water. If you discover any non-native and invasive plants, then these must be disposed of carefully - contact the Environment Agency for further advice. Autumn is a good time for management of vegetation when the breeding season is over for wildlife. If you have any protected species contact Natural England first before any works begin (a license will probably be needed).

Vegetation removed and left by pond to allow animals to escape

Managing water depths and levels

An old myth of ponds is the deeper the better! This is not the case as actually most species can live in just a few centimetres of water! Fluctuations in water level from summer to winter are normal. Deepening a shallow pond can be very detrimental to wildlife. Many plants can survive periods of drought. Some ponds will dry out on occasional years. These temporary ponds are very valuable for wildlife and shouldn't be deepened. Although it may be tempting to fill with water from elsewhere, this is likely to cause disturbance to the pond and could lead to the loss of species.

Managing bankside habitats

A mix of habitats around a pond is beneficial. The use of hard edges such as concrete limits the natural vegetation.

Bankside vegetation – trees

Traditionally it has been thought that trees cause excess shading to ponds and should be removed. However, shade provided by trees can create another habitat that is favoured by certain animal and plant species including Greater Tussock Sedge, Yellow Iris and common duckweeds. Rotting wood, leaves and submerged roots from nearby trees provide an important habitat. Great Crested Newts often use roots of trees and larger vegetation to hibernate in during winter months.

Woodland pond with mature overhanging trees

However, trees around a pond may need to be managed from time to time if they are causing the pond to be heavily shaded. Ponds require sunshine in order to survive; if a pond is heavily shaded, it may be productive to remove a selected number of trees. Allowing more light into a pond creates conditions for a variety of plants to grow. Piling up cut wood in the undergrowth near the pond, provides an important habitat for species particularly insects.

Removing trees around ponds in long established woodlands may not be appropriate due to wildlife having adapted to these conditions over many years.

Other vegetation

If the pond is surrounded by trees or scrub, thinning out an area among the surrounding vegetation can again create another habitat by allowing light to get to the ground. This should be done in stages in rotation over a period of years so that wildlife and plants are able to adapt to the changes. Coppicing may be appropriate here which involves cutting trees to ground level which then sprout up again (See woodlands section for more information).

Remember, it is illegal to harm Great Crested Newts or their habitat so never remove trees and vegetation from a pond known to have these without permission. Contact Natural England for further advice.

Other considerations for management

Ducks

Feeding ducks and geese is often a popular activity on village ponds providing great enjoyment for people. However, ducks can cause problems for ponds such as water pollution, algal bloom (through rotting bread), and loss of plants due to grazing and bare ground from trampling. It is best not to encourage ducks onto any wildlife pond.

Fish

Many ponds would not naturally have fish in them – they are likely to have been introduced by man. Fish are often not suitable in wildlife ponds because they are efficient predators of creatures such as young frogs, young newts, water beetles and dragonflies. A pond without fish will have a greater variety of wildlife. If you are going to add fish into a pond contact the Environment Agency in the first instance.

Dos and Don'ts of pond management

DO:

- Clear leaves from the pond surface in autumn. Build up of rotting vegetation will lead to algal blooms and a green pond!
- Use manual methods instead of machinery wherever possible as this minimises disturbance to wildlife.
- Manage little and often.
- Manage in autumn or winter which is the most suitable time.
- Always plant native species.
- Avoid using pesticides and fertilisers on plants near the pond.
- Look out for signs of bad water quality e.g. algae.
- Look out for non-native invasive species.
- Always seek advice if you are unsure how to manage your pond appropriately.

DO NOT:

- Over manage a pond.
- Leave any leaves and plants removed from a pond on site after a 24 hour period. (Leave for 24 hours to allow trapped animals to escape, then remove).
- Plant non-native species!
- Introduce or encourage fish or wildfowl to wildlife ponds.
- Spray fertilisers and pesticides near a pond.
- Make sudden or drastic changes to the pond and its surrounding area.

A Frequently Asked Question

What is the green covering on my pond and how do I get rid of it?

This green covering is known as algae and is caused by a build up of nutrients. Taking the algae off by skimming a net over the surface is advisable. Then place barley straw in the water to prevent further algal growth. Look into the potential source of the nutrients.

A pond swamped by algae needing restoration.