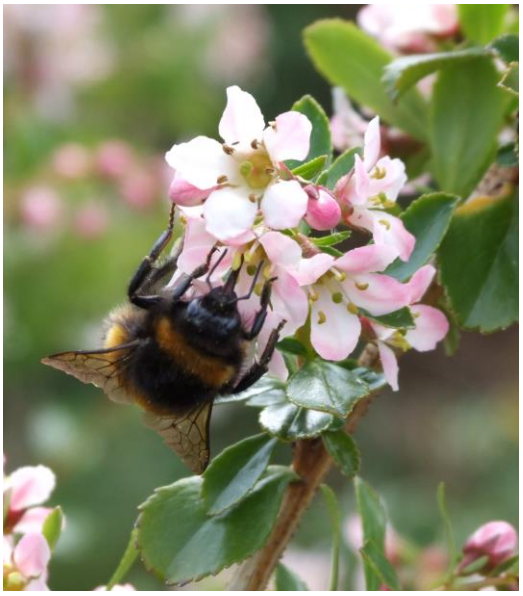
Introduction

The Importance of 'Wildlife at Work'



Biodiversity, or the variety of life around us, is an essential part of our environment and is fundamental to our quality of life and contributes to our social and economic well being. Everyone, including business depends upon the natural world for their livelihoods, quality of life, and to provide basic ecological services on which all life depends. It helps to stabilise the climate and provide clean air and water, services vital for a stable operating environment.

Wildlife is disappearing at a frightening pace all across the world. This loss of this natural heritage represents a risk to business. As diversity disappears, so do our raw materials and the opportunities for new products, new technologies and new business opportunities.

'Wildlife at Work' Works

The links between nature conservation and business may not seem immediately obvious but here are some of the positive actions 'Wildlife at Work' can bring to your business:

- **Green Credentials:**

Taking action for Wildlife will improve your company's corporate social responsibility image. Confirming to your employees,

customers, suppliers, local community and other companies that you understand how vital the environment is and that you are aware of your local responsibilities. This can lead to a great deal of positive press coverage for your business and the local neighbourhood.

- **Financial Savings:**

Consideration of nature conservation does not have to cost a great deal. In many cases positive actions for your local environment can generate savings.

E.g. Reducing herbicide and pesticides, using native tree and shrub species in landscaping schemes, leaving areas of grass uncut can all help local wildlife and reduce business costs.

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- **Staff and Community Well Being:**

Improve staff morale, health and engagement by involving them with their local environment. Wildlife enhancements also help to create a nicer working environment, improving surroundings for your staff, wildlife as well as giving something back to your local community.

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- **Achievement of Environmental Performance Indicators (EPI):**

Good environmental performance makes good business sense. Key Performance Indicators help companies manage and communicate the links between environmental and financial performance.

Businesses that measure, manage and communicate their environmental performance are inherently well placed to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations, and will enable them to take advantage of new market opportunities.

- **Protecting the Environment:**

Successful management of your natural environment will help your business ensure that it is not only meeting minimum legal requirements for environmental protection but also creating a high quality local landscape. Our natural world performs many crucial environmental services. E.g. wetlands can help control flooding, peat bogs help to ‘soak up’ carbon dioxide and filter our water, trees and woodlands help to provide clean air, and insects pollinate our crops.

Doing your bit for nature conservation

Business gets a lot out of the environment – now it’s time to return the favour. No matter how big or small your site, there’s something in this ‘Wildlife at Work’ pack to help your company make a positive contribution to ecological conservation, which can in turn benefit your business.

Make a start today by:

- Incorporating biodiversity into your company policy.
- Managing your company's land to enhance and conserve its wildlife value.
- Involving staff in nature conservation initiatives and team-building events on your own land or in the local community.
- Making a financial contribution to local wildlife conservation projects and initiatives.
- Carrying out an environmental audit of your company's activities.

Wildlife at Work

Native Hedges for Wildlife

Wildlife Hedges

Why have a plain ugly fence, when a green, living boundary can bring the riches of flowers, scent, berries, rich autumn colours and wildlife? Yes, a hedge can be all that, and one made out of thorny species will deter uninvited guests too. Hedges can define property boundaries, break an area up into rooms, act as a windbreaker and can be evergreen or deciduous. What is more a thick hedge, that is not over-pruned, will provide homes and food for many insects and birds, who will shelter, hibernate and nest in it and feast on the flowers and berries. Climbers can also add extra thickness and interest. This fact sheet shows you how to create and maintain a wildlife-friendly hedge.

Choosing Your Plants

The most beneficial hedges for wildlife are those that consist of a mixture of native shrub species as shown below:

Native Shrubs Suitable for Hedges			
Hawthorn	Blackthorn	Hazel	Guelder rose
Dog rose	Crab apple	Spindle	Holly

Buying your plants

Hedge plants are normally sold as bare rooted whips (small plants up to 80cm). These will establish better than large plants provided the roots do not dry out. The roots are very delicate and can be easily killed in no time at all by winds, frost, sun or snow. To prevent this happening, keep the whips in plastic bags up until the very moment they are planted. If the plants arrive before you are ready to plant them, heel them into the ground as quickly as possible to safeguard the roots.

Planting a Hedge

- Plant between November and March when the ground is not frozen or covered with snow.
- Dig over your selected site, removing all weeds and roots. If possible, mix in plenty of well-rotted mature or other organic matter this will improve moisture retention and provide the new hedge with plenty of food. If the soil is heavy clay, add some grit and sand to improve drainage further.
- To achieve a thick hedge, it is advisable to plant 6 plants per metre, in double staggered rows.
- Mark out the rows with lines of string and dig a hole for each plant or a trench. Place the plant in the hole ensuring the roots hang straight. The plant should be planted to the same depth as it was in the nursery. A slight change in colour will indicate the level, known as the root collar. Back fill with soil and gently firm in with the heel of your boot. Water well. If rabbits are present, protect each plant with a tree guard or erect a rabbit proof fence.

Wildlife at Work

Native Hedges for Wildlife

Aftercare of New Hedge

- Water regularly during the first summer after planting.
- During the first 5 years after planting, remove any weeds. These will compete for water nutrients and hinder the establishment of the hedge. A layer of mulch will help suppress weeds and reduce the amount of weeding required.
- In the first spring, cut back the shrubs to 45-60cm above the ground. This will encourage bushy growth resulting in a thicker hedge.
- Replace any dead plants in the autumn to prevent gaps forming in the hedge.

Long-term management for well-established hedges

- Deciduous hedges

For a thick hedge, prune each side alternately, every 3 years between November and February. If possible, try to cut sections of hedge at different times, so there is always an undisturbed place for wildlife. To promote a thick base, trim the hedge to a rounded or topped 'A' shape.

- Laying

If a hedge has been neglected and it has grown tall and gappy, it can be laid. This involves cutting branches partway through, laying them horizontally, and pegging them in position in order to create a strong thick hedge. This will extend the life of the hedge and encourage thick growth at the base.

Climbers

Once a hedge is established, climbers can be introduced to add extra thickness and biodiversity interest. A thick hedge is better for nesting and provides more shelter and food for wildlife.

Climbers for hedges	
Honeysuckle	Common native Ivy
Old Man's Beard	White and Black Bryony

Hedgerow Plants

Additional wildlife value can be added by the introduction of native wildflower seed or plugs at the base of the hedge.

Native Plants Suitable for Hedges	
Foxglove	Herb Robert
Primrose	Red campion
Hedge bedstraw	White deadnettle
Hedge woundwort	Tufted vetch

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Insect Interest

Attracting Insects

Butterflies and bees are some of Britain's most colourful wildlife. Much loved by children and adults, their high dependency on a limited number of plants makes them especially vulnerable in a changing landscape where habitats and food plants are being lost. This has unfortunately led to the extinction of some species, whilst others are in decline.

Bumblebees are insects of temperate climates. Quite different than honey bees and solitary bees, they live in small colonies of up to 200-300 and with their densely furry bodies can be active even in dull conditions. They are constantly, foraging for nectar and pollen, helping to pollinate flowers as they do so. Up to 25 species of bumblebee live in the UK, covering a wide range of habitat from moorland to coastal areas. Bumblebee numbers have halved in the last fifty years, with three species now extinct and nine endangered. The reason for this dramatic decline is mainly due to the reduction of wild flowers in the countryside, which means less food for our bees and other insects.

However, business sites can offer these enigmatic creatures real hope if a variety of plants are grown in sunny, sheltered spots. To help you create a colourful border attractive to butterflies and bees we have provided a few hints and tips and a list of suitable plants. Many of the plants will be attractive to a variety of other insects. These in turn will provide natural food for birds and bats, especially if a few night-scented plants are included for nocturnal moths.

Planning a Nectar Border for Bees and Butterflies.

- Select a site**:**

  Choose a sunny, sheltered spot. Butterflies need the sun to warm them up and get them going. They will not visit flowers in the shade and enjoy basking in the sun.

- Choosing your plants:

  Pick some that flower in spring, summer and autumn to provide a continuous supply of nectar. Old-fashioned varieties tend to be more nectar-rich, whilst double flowers and new hybrids have very little.

- Planting:

  Flying takes up a lot of energy – a third of bumblebee's daily energy

Insect Interest

intake is spent foraging for more nectar and pollen. Plant groups of the same species in 3s or 5s. This will give a strong visual sign to passing bees & butterflies and provide better scent.

- Shrubs:

  Grow a variety of pollen and nectar rich shrubs at the rear of your borders.

- Caterpillars:

  Include some food plants for the young, without these butterflies will continue to decline. Nettles in sunny locations will host the caterpillars of the peacock, red admiral, small tortoiseshell and comma.

Nectar Rich Plants for the Herbaceous Border		
Spring Flowering	**Summer Flowering**	**Autumn Flowering**
Alyssum	Verbena	Lavender
Cowslip	Thyme	Russian sage
Grape hyacinth	Marjoram	Michaelmas daisies
Honesty	Yarrow	Ice plant
Primrose	Betony	Fuchsia
Aubrietia	Goldenrod	Red valerian
Forget-me-not	Tickweed (Coreopsis)	Catmint
Leopard's Bane	Globe thistle	Phlox
Polyanthus	Fleabane	Scabious
Wallflower	Cranesbill	Monkshood?

Amazing Bee Facts

- Honey bees can fly up to 5 miles from the hive in search of food.
- It takes about 2 million flowers being tapped by bees to make just 1 pound of honey!
- In one trip a honey bee will visit about 50 to 100 flowers.
- Some bumblebees can carry up to 75% of their own body weight in pollen and nectar.
- Initially bumblebees prefer violet and blue coloured flowers, until they get used to the process.

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Insect Interest

Nectar Rich Border Shrubs	
Blue Spiraea (*Caryopteris Clandonensis*	Lavender (*Lavandula angustifoia*)
Butterfly Bush(*Buddleia davidii*)	Globe buddleia (*Buddleia globosa*)
Rosemary (*Rosmarinus officinalis*)	Hebe (*Hebe salicifolia*)
Honeysuckle (*Lonicera periclymenum*)	Heather (*Calluna vulgaris*)
Barberry (*Berberis thunbergii*)	Mallow (*Lavatera arborea*)
Escallonia *(Escallonia 'Langleyensis')*	Flowering Currant (*Ribes sanguineum*)
Hyssop (*Hyssopus officinalis*)	Thyme (*Thymus vulgaris*)

Cunning Containers

Pots and containers are one way of introducing wildlife features into more formal areas of your site e.g. entrance, reception areas. For smaller areas, containers are perfect. Herbs in particular make good container plants; they attract lots of wildlife, have great scent and may be less susceptible to drying out. There are also many ingenious planting schemes that can be tried. Sow your own mini-wildflower meadow in a window box, or line a pot with plastic to make a potted pond or bog garden.

Top Insect Plants for your Containers	
Pot marigold (*Calendula officinalis*)	Tobacco plant (*Nicotiana alata*)
Thyme (*Thymus vulgaris*)	Sweet alyssum (*Lobularia maritima*)
Rosemary (*Rosmarinus officinalis*)	Nasturtium (*Tropaeolum majus*)
Marjoram (*Origanum vulgare*)	*Lobelia (Lobelia erinus)*
Candytuft (*Iberis amara*)	Verbena (*Verbena x hybrida*)

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Insect Interest

Making a bumblebee nest for the garden.

In early spring new queen bumblebees come out of hibernation and start their long search for a suitable nest site. They often build their nests in old mouse and vole nests on or below ground level. Heat insulation and avoiding dampness are of great importance and sometimes nests are covered over with moss.

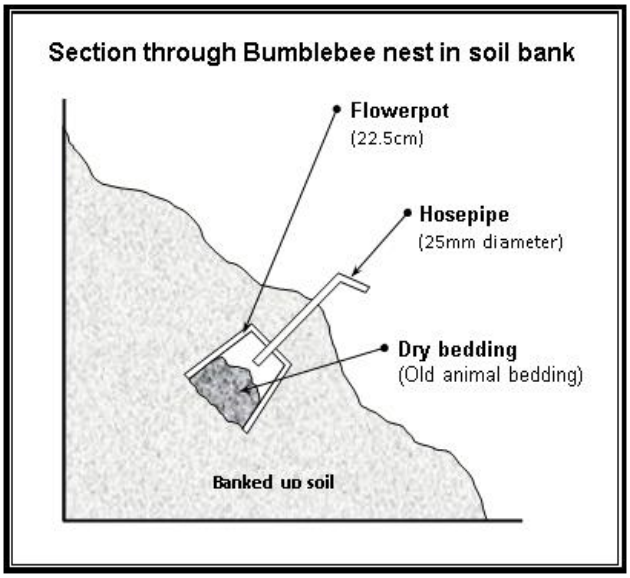
Bumblebees don't fly very far, rarely going further than a few hundred metres, so their nest needs to be near their feeding areas. Follow the directions below to create a nest in your grounds:

Half bury a 225mm deep clay flowerpot in a dry, well drained, sheltered, sunny flowerbed or hedge bottom so that the drainage hole in the base faces outwards.

Attach a short length of hosepipe (25-30mm wide) to the flowerpots drainage hole.

Add some bedding material such as pets bedding, dry grass, straw, or upholsterer's cotton (not cotton wool.)

Cover over the rest of the pot with soil or vegetation so that the pipe sticks out. Plant a 10cm tall stick upright nearby – bees may use this as a 'marking post' to help them find their way back to the nest.



Create an Insect Hotel

Insect hotels replicate natural features sought by wildlife in your grounds - particularly by invertebrates. They're not a substitute for well-structured vegetation and dead and decaying wood though, so ideally, try and provide them as well.

Choose a level, firm site in the sunlight or light shade - most invertebrates prefer moist areas of dappled shade. Find somewhere easily visible, perhaps close to a hedge, shrub bed or pond.

The main structure of the insect hotel is made out of wooden pallets packed with recycled or natural materials such as dead wood, hollow canes, straw, dry leaf litter, bricks and blocks with holes to name but a few.

Wildlife at Work

Trees and Shrubs

Trees and Shrubs

Native trees and shrubs are excellent for wildlife, providing nectar-rich flowers, buds, berries, fruits, seeds and nuts as food for insects, birds and mammals; as well as places to breed, shelter and hibernate. Trees can also act as windbreaks, screens, frame views, and provide privacy, security, shade and height. If chosen carefully, a tree can be accommodated in the smallest of areas.

They can be a great way for your business to leave a lasting legacy for the future.

This factsheet shows you how to plant trees and shrubs and provides suggestions for brightening up shady areas with colourful plants.

Mother Nature knows best

Native trees generally support many, often hundreds more species than exotic and ornamental varieties. So by choosing native trees and shrubs for your grounds you will be making a significant contribution to helping wildlife.

Trees and plants that grow in the wild locally are specially adapted to local conditions, and the seed they produce will be genetically unique to one area and locality.

Buying Trees

It is cheapest to buy bare rooted trees and plant between November and March. Trees are sold as whips or standards; whips are economical for mass planting and standards are good for specimen trees, although take longer to establish.

Going Native: Some trees for your grounds		
Common oak	Sessile oak	Alder
Small leaved Lime	Aspen	Wild cherry
Downy birch	Yew	Bird Cherry
Crack willow	Scots pine	Crab apple
Ash	Silver birch	Rowan

Shrubs and Small Trees		
Hawthorn	Hazel	Holly
Blackthorn	Dog rose	Gorse
Elderberry	Native privet	Goat willow
Guelder rose	Broom	Osier

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Trees and Shrubs

Tree Aftercare

- Water the tree well during the first year after planting.
- Weeding: Remove all vegetation growing around the base of the tree during the first 5 years.
- If you attached a tree tie, remember to loosen it each year to allow the tree to grow.
- Remove the stake and tree tie completely after 3 years.
- If necessary, protect saplings under 5 years old against rabbits and deer with tree guards. Remove the guards when the trees are 5 years old.

Planting Trees

- Plant trees between November and March during the tree's dormant period.
- When choosing a tree, think about its ultimate height, the shade it will cast and its proximity to buildings. (A useful rule of thumb is to plant the tree at least its mature height away from the nearest building.) Some species need different conditions such as damp, acidic or alkaline soils.
- Try to ensure that the roots are covered **at all times**. (The delicate root hairs dry out and die very quickly.)
- When you have chosen a spot for your tree, dig a hole twice the size of the root ball; try to keep the topsoil and the subsoil separate if you can.
- Add some well-rotted manure or peat – free compost into the bottom of the hole. Mix the spoil from the hole with compost or with the topsoil.
- If your tree is more than 2 metres tall, drive a metre long stake into the ground on the windward side. Short stakes enable the tree to move in the wind, stimulating stronger root growth than a tall stake.
- Remove the tree from its container and place it in the hole. If it is a bare rooted tree, ensure the roots hang down straight.
- Backfill the hole with the soil. For bare rooted trees, give the tree an occasional light shake (this gets the soil particles down amongst the roots.)
- When the hole is filled up, firm the soil around the trunk with your heels and water well.
- A mulch can be added around the base of the tree. If you used a stake, secure the tree to this with a tree tie; make sure the tie is not too tight or it will damage the tree.

Wildlife at Work

Trees and Shrubs

How to plant a wildlife-rich shady corner.

Plant bold groups of shade tolerant plants amongst the trees and shrubs, or semi-shade loving wildflowers along hedgerows and woodland edges.

Choose native plants from the following list:

Plants for Shade and Partial Shade			
Monkshood	Ground ivy	Bugle	Dame's violet
Wood anemone	Lords and ladies	Woodruff	Great wood-rush
Foxglove	Wood vetch	Dog violet	Primrose
Red campion	Ivy	Male fern	Lesser celandine
British Bluebell	Wood forget-me-not	Solomon's seal	Wood spurge
Wood avens	Ramsons	Wood sorrel	Herb Robert

Logpiles

A logpile is an excellent feature to include in a shady corner. So ensuring a wooded area is not 'tidied' and branches, twigs and any logs from routine maintenance are retained provides a great habitat for a wide range of wildlife.

Use different sizes and species of wood and leave the bark on if possible.

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Wildlife at Work

Wildflower Grassland

Wildflower Meadows

Gone, but not forgotten, are the heady days of fields full of rich and vibrant wildflowers. Victims of increased herbicide use and 'improved' agricultural practices; some arable 'weeds' are now quite rare. However all is not lost. Wildflower areas can be created within business grounds, or grown in flower borders or containers if there is limited space. Not only are wildflowers pretty to look at, they are extremely important for our native wildlife, providing hunting and feeding grounds for many insects, mammals and birds. Indeed they have evolved together and many species are inter-dependent for their survival. This fact sheet shows you how to help conserve our rich flora and fauna.

What do you have already?

You may be surprised if you can leave an area uncut at what comes up naturally, this will give you a good indication of your soil type. Local suppliers and local provenance will also give good guidance on what is likely to flourish on your site, which can avoid expensive mistakes or unrealistic expectations.

Spring or Summer Flowering?

Wildflower grasslands fall into two broad camps:

- Spring Flowering: February – May
- Summer flowering: July – August

Unfortunately, you cannot have both in the same area because they require different mowing regimes. They can however, be grown in different parts of a site. In addition, you can plant an annual or perennial wildflower seed mix.

Plants for Spring Flowering Meadows			
Salad burnet	Ribwort plantain	Meadow buttercup	Cowslip
Red clover	Bird's-foot trefoil	Bluebell	Selfheal
Common vetch	Black medick	Sweet cicely	Red campion
Primrose	Hoary plantain	Ox-eye-daisy	

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Wildflower Grassland

Plants for Summer Flowering Meadows			
Autumn hawkbit	Tufted vetch	Red clover	Red campion
Meadowsweet	Pignut	St John's Wort	Salad burnet
Field scabious	Ox-eye-daisy	Ribwort plantain	Lesser knapweed
Musk mallow	Wild carrot	Yarrow	Devil's-bit scabious
Bird's-foot trefoil	Greater knapweed	Yellow rattle	Lady's bedstraw
Selfheal	Meadow cranesbill	Kidney vetch	Small scabious

Grasses can complement perennial wildflower mixes. The following native grasses will not out-compete the wildflowers:

Native Grasses		
Red fescue	Common bent	Crested dog's tail
Quaking grass	Meadow foxtail	Yellow oat grass

Creating and Managing Your Wildflower Meadow

1. Preparing the soil *on a dry day*

As well as choosing the correct plants for your habitat, good ground preparation is the key to success. Perennial wildflowers require a soil low in nutrients. Highly fertile soils are better suited to cornfield annuals. For most areas, you will need to reduce soil fertility by removing the top soil which will also help to get rid of unwanted grasses and weed seeds. However, if the soil is already poor quality, cut back existing vegetation and rake over before sowing seed. Don't dig over the soil, as this can bring unwanted weed seeds to the surface.

2. Sowing the seed

Sow a wildflower and grass seed mix using 5g/m2. Once the soil has been prepared as above, you are ready to sow your seed. Mix the seed with a little sand so you can see where you have sown it and scatter it on the ground. This can be done in autumn or spring. Once the seeds have been sown, roll the soil or walk over it to ensure the seed is in good contact with the soil. Water lightly.

Wildflower Grassland

To make life easier it is possible to purchase bespoke seed mixes, which are specific to your site conditions. Additionally plug plants or wildflower seed mats can also be purchased which may establish faster although they will initially require a greater degree of maintenance i.e. watering!

3. Management *first year*

To help the flowers establish well, the meadow will need to be cut during the summer. The grass should be kept at 50mm and the cuttings removed. Unwanted weed growth like docks should also be removed . A perennial meadow will not usually flower in its first year.

4. Managing Established Meadows *after the first year*

The mowing regime for spring and summer meadows is different. A spring meadow is left uncut until late June or early July. A summer meadow is often cut to 50-100mm height in March/April and then left uncut until late September. The grass should never be cut too short; a height between 50mm and 100mm is recommended. All cuttings must be removed to prevent nutrients building up in the soil.

Cornfield Annuals

Annuals grow and flower in the same year and will be happy in rich fertile soils, unlike native perennials which prefer a nutrient poor site. Annuals, often known as 'cornfield annuals,' can be sown in spring or autumn, although spring sowings often give a more colourful and varied display. The site will need to be cleared of vegetation and then deeply dug over or rotovated prior to sowing. After flowering and once the seeds have set (Aug/Sept,) the area can be cleared and dug over or rotovated each spring to promote seed germination. Additional seed should be added every year to build up the seed bank in the soil. Seed should be sown at 5g/m2. Roll soil after the seeds have been sown and water lightly.

Native Cornfield Annuals		
Field poppy	Cornflower	Corn marigold
Corncockle	Corn chamomile	

Butterflies such as the ringlet and the meadow brown need meadow grasses on which to breed.

Wildlife at Work

Wildlife Ponds

Wildlife Ponds

Welcome to the wonderful watery world of the wildlife pond. This fact sheet shows you how to create and maintain your very own pond and about the birds, animals and other pond creatures that may come to visit.

Since 1950, over half of the UK's ponds have been lost, due to large-scale drainage schemes, chemical pollution and neglect through disuse, along with all the wildlife that depended on them. Great Crested Newts have declined by 50% since 1966. Since 1970, 10% of breeding dragonfly species have become extinct.

Ponds and Business

A wildlife pond is one of the single best features for attracting new wildlife to your grounds, they can provide a refuge, home and valuable water source for a multitude of creatures. It is thought that some amphibians, such as frogs, are now more common in urban ponds than in the countryside. Many pond creatures will travel far and wide to find new ponds, discovering a potential new home in no time at all. So a well-designed wildlife pond can play a big part in helping to preserve our natural biodiversity, as well as being an attractive feature enjoyed by employees and wildlife alike.

Designing the Wildlife Pond

The siting, depth, profile and pond surrounds are of great importance if the pond is to be successful in attracting a range of wildlife.

- **Siting the Pond:** The ideal place for a pond is on level ground, in an open, sunny area, the sunnier the better, and well away from any trees. To achieve a range of conditions, it may be beneficial to choose a spot that receives a little shade at some point during the day. A location that is already damp or waterlogged is not really suitable, being at risk of constant flooding. An area that is too shady will inhibit the growth of essential oxygenating and other plants.
- **Pond Profile:** To be attractive to wildlife, a pond should have: sides with gentle slopes, not steep ones; extensive shallow areas 30cm wide and 4 – 20cm deep, especially to the south and west. A deeper zone of 60-100cm is also important.
- **Pond Edges:** Providing extra habitats around the edge of the pond will be of great benefit to wildlife e.g. by placing stones, logs and tall plants around the pond edges. Allow some long grass or other vegetation to grow up on at least one side of the pond. Build scalloped pond edges rather than straight ones. This will provide many different micro-conditions with variations in shade, depth and temperature. Ideally, create an accompanying unsubmerged bog area to the north-north east side of your pond. (Details are given below)

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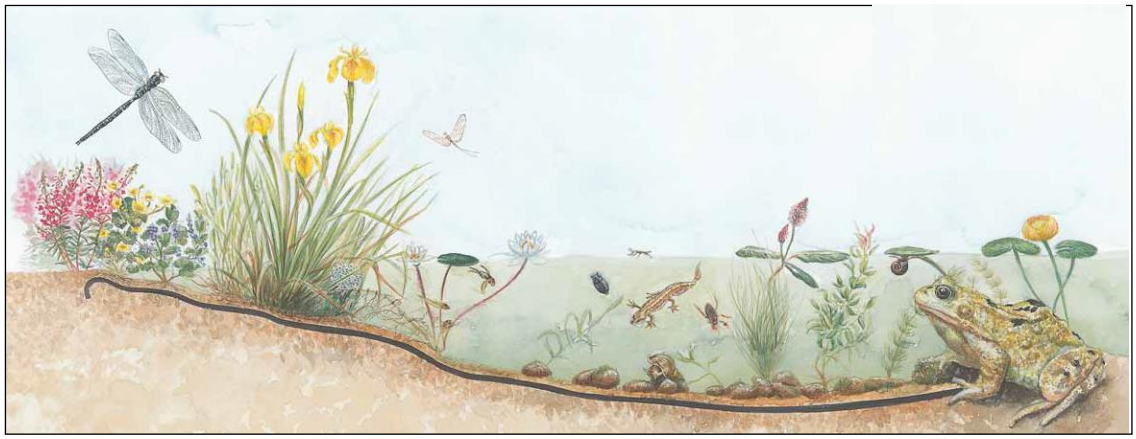
Wildlife Ponds

For ease of maintenance and pond-watching, it is sometimes best to have one relatively formal edge to your pond, with a straighter edge and incorporating paving, gravel path or short turf. The size of the pond is less important than including the features outlined above into the design. Although larger ponds will generally support more wildlife, a small pond will still be an effective home for many creatures.



Building the Pond

1. Choosing a Pond Liner. There are many different sorts of pond liner: plastic, fibre glass, clay and concrete, each with their own advantages and disadvantages. Overall, we would recommend liner made out of butyl rubber, which is durable, flexible, moderately cheap and easy to work with. The size of butyl liner you will need for your pond can by calculated as:

- WIDTH + (2 x maximum depth)
- LENGTH + (2 x maximum depth)

2. Mark out your pond on the ground with a rope or hosepipe first.

3. Get Digging! Dig the hole, ensuring the sides are level with a spirit level on a plank spanning the pond. Dig an extra 25cm depth to accommodate the liner 'under-cushion' (see below) and height of the flagstones at the pond edge. Finally, dig a trench around the perimeter of the pond for the over-hanging pond liner to drop into. If you are building an accompanying bog area, also dig out a saucer-shaped depression 60cm deep on the appropriate side of the pond.

4. Lining the Pond: Remove any sharp stones or other objects from the bottom of the hole and first put down a 5cm+ layer of sand, old carpet or newspapers (or try loft insulation material!) as an 'under cushion' for the liner proper. Unroll the butyl liner over the top with the overhanging edges falling into the trench. Any extra excess liner can be snipped off with scissors. You will need to add a substrate for plants and animals. Sand is excellent because it is sterile and will not harbour any undesirable seeds or microbes. Spread a thin layer over the bottom of the pond. A boggy area can be lined with liner off-cuts, over-hang liner, old plastic sacks or bags, or all of these, basically anything that will help impede drainage. If using over-hanging liner, punch some holes 20cm apart in the bottom of the bog (not the pond!), then cover over with crocks and fill in the bog area with soil.

5. Filling with Water. If possible, use collected rainwater to fill your pond; for most people however, filling from the tap with a hose is usually the most practical method.

Back fill the trench with soil; as the pond fills up, the liner will stretch. As the pond is filling, place turf, soil or flagstones over the exposed liner at the pond edges. Butyl liner degrades in sunlight,

Wildlife Ponds

so try not to leave areas of uncovered liner exposed for too long.

6. Waiting: If you used tap water to fill your pond, in the early stages the water may turn a vivid green colour. Do not worry – this is because tap water is full of nutrients. The colour will fade gradually as nutrients are used up and microscopic plant–eating animals start to colonise the pond. For this reason it is best to wait a week or two before planting any pond plants into your new pond. In the meantime, place stones and logs around the edges to create some habitats for all those future pond-visiting creatures.

Choosing Pond Plants

Pond plants will oxygenate the water and keep it clear. Unfortunately many non-native aquatic plants readily obtainable from garden centres are invasive and will soon dominate the pond completely to the detriment of everything else. Carefully selected native species will ensure the pond remains in a relatively balanced state and will support more wildlife. The best time to plant is in spring or summer when plants are actively growing. Plants can be planted into soil held in baskets or hessian bags.

Suitable Pond Plants

There are four 'zones' in which pond plants may be grown; try to have plants in each zone. The four zones are:

- Totally submerged, in deeper water – oxygenating plants.
- Submerged but with floating leaves also in deep water.
- Emergent, in shallower areas.
- Marginal, growing in the pond edge and bog areas

Plants suitable for each zone are listed below:

Submerged Oxygenators		
Spike water milfoil	Hornwort	Shining pondweed
Horned pondweed	Curled pondweed	Water starwort

Floating-Leaved Plants		
Water Crowfoot	Broad-leaved Pondweed	Frogbit

Emergent Plants		
Amphibious bistort	Arrowhead	Water mint
Flowering rush	Water plantain	Water forget-me-not
Yellow flag Iris	Marsh cinquefoil	

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Marginal Plants		
Lady's smock	Flowering rush	Marsh marigold
Purple loosestrife	Gipsywort	Meadowsweet
Brooklime	Ragged robin	Water forget-me-not
Bugle	Water avens	Marsh woundwort
Hemp agrimony	Fool's watercress	Common spike-rush

Plants to Avoid at all Costs		
Australian swamp stonecrop/New Zealand pygmyweed (*Crassula helmsii*)	Water fern/ fairy fern (*Azolla filiculoides*)	Parrot's feather/Brazilian water milfoil (*Myriophyllum aquaticum*)
Floating pennywort (*Hydrocotyle ranunculoides*)	Himalayan balsam (*Impatiens glandulifera*)	Canadian pondweed (*Elodea canadensis)*
Curly waterweed (*Lagarosiphon major* or *Elodea crispus*)	Nuttall's waterweed (*Elodea nutalli*)	

Top Tips for Planting:
Plant taller, marginal/emergent zone plants on the northern edge where they won't cast shade over the rest of the pond.

A useful rule of thumb is to provide one oxygenating plant per 100cm2 of open water.

Important: a wildlife pond should NOT have any fish, nor pumps, filters or fountains. Fish will eat all the other wildlife; pumps will suck in and destroy all the smaller creatures that other wildlife depends upon for food.

Maintaining Your Pond for Wildlife

General Rules for Maintaining your Wildlife Pond:

- Avoid chemical treatments at all times.
- Be careful when digging or raking near or in the pond – an impetuous spade can puncture a butyl rubber liner very easily; if using a rake make sure the tines are pointing upwards!
- Avoid disrupting the pond in spring and summer; try to carry out maintenance work in autumn and winter instead.
- When introducing pond plants, native species are usually of more benefit to wildlife than exotics. For the wildlife pond purist, pond plants could be native not just to the UK, but also specifically to Northumberland.

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If the pond can be kept in a relatively balanced ecological state, it shouldn't need very much maintenance at all. Problems don't usually start until the pond is over 5 – 6 years old. The main things to watch for are:

- **Build up of Dead Organic Matter:** such as fallen leaves and dead vegetation which reduces oxygen levels of the pond and has a detrimental effect on pond wildlife. However, some dead organic matter is useful as a substrate for plants and invertebrates. De-silting can be carried out approximately once every 5 years. The best time is in autumn before wildlife and minibeasts go into hibernation and after plants have finished flowering. Leave dredging's on the edge of the pond for a few days so that minibeasts can escape back into the pond.
- **Encroaching Vegetation:** After a while, some pond plants may be growing too abundantly; these can be pulled out or divided to reduce their presence by about 30 – 50%. Once again, this should be done in the autumn. Some plants can be grown in a pot, which limits their spread.
- **Caring for Creatures:** Make sure there are sufficient areas of habitat such as logs, stones and rough vegetation at the pond edge, especially during winter when these will be used as hibernation sites by frogs, newts and others.

- **In Winter:** It is important that the pond does not become completely frozen solid in the winter. Ponds deeper than approximately 60cm do not usually become frozen right to the very bottom and should be safe. However, it is still necessary to provide some open water so that oxygen can diffuse into the pond. An easy way is to float a ball on the pond that can be removed, leaving a hole in the ice. Using hammers and boiling water is not recommended, as this sets up shock waves or boils wildlife.

- **In Summer:** the pond may need to be topped up in hot weather. Tap water is the most convenient source, but the high level of nutrients such as fluoride and chlorine may cause algal blooms, whereby the water turns a vivid green pea soup colour. This should fade after a few days as the pond recovers its balance. Rainwater is preferable if you have a water butt. It is better to refill little and often rather than in one go. If you have an adjacent bog area, this may also need to be watered in summer.