

Biodiversity in Community Gardens, Orchards and Allotments



Making way for nature...



Wildflowers at the Scottish Crop Research Institute's "Living Field Centre"
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INTRODUCTION

The statistics are worrying – in the UK 97% of our flower-rich meadows have been lost, so have 75% of our wild ponds, 95% of our tree sparrows and 52% of our skylarks. Once common ‘garden’ species such as the song thrush, bull finch and blue tit are in serious decline. So are some species of bumble bees, butterflies and moths.

In Tayside we have lost a quarter of our hedgerows (that’s 1,000km lost since the 1940s), and a third of our heather moorland. Yet there is much to be proud of in the region: internationally-significant arctic alpine plants in our uplands, Britain’s largest continuous stand of reedbeds and the national stronghold for breeding Marsh harriers.

The Tayside Local Biodiversity Action Plan (TLBAP), published in 2002, is focussing action on threatened habitats and species – both urban and rural. The Tayside Biodiversity Partnership’s many members are actively taking forward over 50 projects and contributing to both local and national targets. The latest set of Action Plans includes “Community Gardens, Orchards and Allotments”, “Burial Grounds”, “Urban Watercourses”, and “Ponds and Pools”.

Allotments are especially important habitats for wildlife as they provide food, shelter and breeding sites. Britain has lost at least two-thirds of its traditional orchards, but many communities and schools are now planting their own.

As they are not commercially managed, they are important refuges for wildlife. Community Gardens are as varied as our own back gardens – many are rich in wildlife, and many more could welcome more wildlife with just a few simple changes.

As more and more species are threatened with extinction and more and more habitats are degraded, many of us do not know how to make a difference. The UK’s gardens, however, cover 1.25 million hectares. Add allotments, community orchards and community gardens and suddenly there is a great deal we can all do to help preserve ‘the web of life’.

We can provide biodiversity havens and encourage a network of wildlife corridors around them to let species move or feed in other areas. We do not know the consequences of losing our wildlife, except that it will diminish the quality of life for all of us. By gardening with wildlife in mind, we can benefit as much as the other species we share the Earth with.

This booklet brings together some of the best ideas to enhance our community spaces: allotments, community gardens and orchards. Many of these ideas are very simple and can be easily incorporated into the everyday management of these sites.



What is **Biodiversity**?

It simply means “the variety of all living things”: it includes the tiniest insects and the largest trees – and us.

HEALTHY EATING, HEALTHY EXERCISE AND LOCAL FOOD

Assisting in a community garden or orchard, or working on an allotment, are activities which can be enjoyed alone or with families or friends who want a shared recreation. Plenty of fresh air and healthy exercise is involved, plus the mental stimulation of planning next year's crop, deciding what to grow and making it possible with physical work. There is a cost-saving in growing our own fruit and vegetables, plus the satisfaction of knowing exactly what we are

eating. It becomes very easy to be part of the "5 a Day" campaign with fruit and vegetables providing vitamins, fibre and antioxidants which in turn helps reduce the risk of heart disease, stroke and some cancers. We help to lower our food miles and become part of the local food movement. If children are also involved in growing vegetables and picking fruit they are much more likely to eat it. This helps to establish healthy eating habits early on.

COMMUNITY SPACES – GARDENS, ORCHARDS AND ALLOTMENTS

As gardeners we quickly learn that we are just one of many species in the natural world of a garden. This biodiverse habitat teems with life throughout the seasons and is a partnership from which we all benefit when we follow good gardening practices.

Remember:

No matter what you grow, the garden, orchard or allotment is still a habitat for wildlife and you don't need to have a wilderness to attract it. 'Wild corners' can be helpful in attracting beneficial insects, but if they are inappropriate, you can still make a real difference by observing what is around you and considering how your usual gardening activities affect wildlife. Some of the neatest gardens and allotments are exceptionally rich in wildlife because of the type of plants grown and the way they are managed.

Ten Top Tips to Safeguard Wildlife

1. Site nestboxes and bat boxes in quiet areas, sheltered from extremes of weather and away from cats and other predators. Clean out each winter.
2. Avoid using chemicals - they kill beneficial insects and can endanger hedgehogs and birds.
3. Grow nectar-rich flowers in early spring to help queen bumblebees, then plant nectar-bearing summer plants for the rest of the colony.
4. Pollen and nectar-rich plants are needed by other insects, including butterflies.
5. Dense shrubs and hedges help conceal small birds and fledglings from predators.
6. Move bonfire material to a fresh site before setting alight so that hedgehogs, frogs or toads escape incineration.
7. Undisturbed places provide somewhere for wildlife to hide in the summer and shelter in the winter.
8. Check undergrowth before strimming to ensure hedgehogs, toads and frogs are not present.
9. A bowl containing pebbles, filled with water allows butterflies, birds, amphibians and mammals safe access to water.
10. A sink 'pond' or tub is safe for all the family, but still provides water for wildlife. Different depths will prevent birds from drowning.



STARTING UP A COMMUNITY GARDEN

A community garden is simply a garden built by local people for the enjoyment of local people (and visitors). It can be of any size, any type. It can also be a welcome home for wildlife.

A community garden can be an important focus for community activity, as well as providing an oasis for quiet walks or meeting friends. Such a garden can help create a green corridor between private gardens and other landscape features such as hedges and treelines, rivers and burns, greenspace and allotments. These vital 'natural bridges' help many mammals (in particular bats, hedgehogs, and red squirrels) and invertebrates move from garden to garden and out into the surrounding countryside.

The Federation of City Farms and Community Gardens has published a Scottish Community Garden Starter Park. It covers the complex issues of negotiating for a site and then developing a community garden. There is advice on legal obligations, fundraising and employing staff. Further details are available from <http://www.farmgarden.org.uk/scotland>. The Scottish Natural Heritage's booklet "Community Gardens - Places for People and Wildlife" also offers advice and provides a wealth of case studies showing examples of different types of garden - from church garden to medical centre, from maternity hospital to school garden (www.snh.org.uk).

There are two community gardens in Perth and Kinross - the Hayfield Wildlife Garden in Kinross, managed by volunteers until recently, but now managed by Perth & Kinross Council. The garden has areas of spring and summer meadow, as well as native trees and shrubs.

The 'Coalyards' in the village of Glenfarg was created by two local people, but open to the public. The garden has now been gifted to Perth & Kinross Council. It has a wide variety of formal plantings, native flora, a pond and stream running through it and a water "flowform" at the garden's entrance. The informal species-rich meadow areas are hand-cut to maintain the floral diversity.



The new wall and plantings at Meigle Community Garden
© Sue Cole



View from the pond at Coalyards, Glenfarg
© C A G Lloyd

ALLOTMENTS FOR ALL AGES

The main purpose of an allotment is to provide land for growing fruit and vegetables, but Scottish planning policy now recognises that allotments are particularly important elements of greenspace networks in increasingly built-up urban areas.

The Convention of Scottish Local Authorities (COSLA) has published guidance notes for Scottish Councils regarding allotments – local authorities have a statutory duty to respond to demand for the provision of allotments. A recent Scottish study suggests there are 6,300 plots across the country, just 23% of them independently owned. Nationally there are 3,000 people on waiting lists.

It is not just individual tenants who benefit from working an allotment. Gardening is highly therapeutic and groups on allotments have health and well-being as key objectives. Allotments also support lifelong learning opportunities - Dundee university students use allotments as a study resource as part of their art, planning and environmental courses. Another city allotment site is used by trainees aged between 15 and 18 years who are not in education or employment. The emphasis is on developing vocational and personal skills in addition to improving the young people's health. Elsewhere, Eco Schools take allotment plots to hone their Citizenship skills as well as environmental awareness.

Barnardo's Hopscotch Allotment Project has a plot in Arbroath – its aims are to promote better mental health for vulnerable people who are affected by parental alcohol and drug misuse.



A tea break at the Law allotments, Dundee
© Dundee Photographic Society

Top Tips for Gardens and Allotments

Add compost: In spring earthworm activity is increased when organic matter such as composted vegetation or farmyard manure is worked into the soil. This keeps it open and aerated and retains moisture near to the roots of summer crops.

Rotate vegetable crops: This helps to prevent the build-up of crop specific, soil-based problems, but also helps maintain the nutrient balance across the whole cultivated area.

Grow a range of fruit, vegetables and herbs: The early flowers of gooseberries and currants offer nectar to emerging bees and other insects. Later in the season the flowers of vegetables and herbs provide nectar. Different flowers attract different insects and pollination depends on their visits.

Companion plant: Certain plants grown together help reduce attack by pests and disease. For example, onions or leeks grown with carrots help deter the carrot fly. French marigolds grown with tomatoes make whitefly infestation less likely. Pollination can also be improved by planting flowering herbs among the vegetables: sage with carrots or brassicas, borage with tomatoes (or amongst fruit trees). The benefit to us is that it looks attractive too.

Grow some native flowers and berried bushes: Plants native to Scotland tend to cope well in our climate and soil conditions, producing flowers, berries and seeds. Many 'exotic' plants are, however, just as good for wildlife so they do not need to be dismissed. The simpler the flower, the easier it is for bees and hoverflies to access them: bear this in mind if choosing many double-flowered 'exotics'. More than 70% of our birds depend on insects which in turn, depend on plants, so our choices are important.



Provide water: A regular supply of water can be provided in a shallow dish. Ponds or water features such as a water sink or barrel, flowforms or bog gardens can be a welcome feature in many community gardens and allotments.

In the autumn provide food and shelter for wildlife: Leave seed heads and foliage on herbaceous perennial plants, tidying them away only in the spring - many beneficial insects hibernate in plant stems. A pile of fallen leaves and other vegetation will give shelter to frogs, toads, hedgehogs and field-mice.

Garden or allotment buildings - if suitable, enhance with bird feeders, bird or bat boxes, or consider a "green roof" of sedum, mosses or wildflowers.

STARTING UP A COMMUNITY OR SCHOOL ORCHARD

In the past, Tayside has been well-known for its orchards. Many of these were within walled gardens or as commercial plantings for jam making. The Carse of Gowrie orchards started life nearly 800 years ago as part of the great medieval 'grange' farms managed by local abbeyes. Many Scottish varieties emanate from this area, including the Bloody Ploughman, Tower of Glamis and Lady of Wemyss. Elsewhere in Scotland, new community and school orchards are being enthusiastically planted and tended. It is happening here too, the Orchar Park orchard in Broughty Ferry being one of the first specifically planted by the local community. Developers and housing associations are beginning to consider the planting of fruit trees in either the front or back gardens of new-builds. Local Authority parks are safeguarding existing trees or considering planting new orchard areas or fruit tree avenues.



A community orchard can provide a focus for community activity, provide a quiet retreat for relaxation, or an attractive place for walking or picnicking. It creates a distinctive green space and can provide a source of fresh fruit for local people. It also helps to safeguard the local varieties of fruit - not just apples, but also pears and plums for which Tayside is well-known. As in a community garden, community orchards can help to link private gardens and parks to create a vital green corridor through an urban area. This benefits the movement of wildlife – mammals, birds and insects. The orchard itself can be a biodiversity hotspot, especially if there are knarled old trees or standing deadwood. Many windblown trees still continue to bear fruit and are extremely important to retain for their biodiversity value.



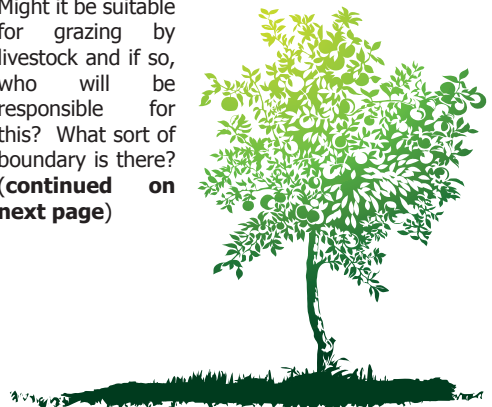
The start of the Apple Arch at Alyth Primary School
© Alison Bowman

Managed without the use of chemicals, the orchard can be a very species-rich refuge: from mammals and birds to insects and plants. Newly planted or managed veteran trees - all orchards can engage the local community and all ages can get involved. The same goes for school orchards:

the children can help plant them, tend them and then finally collect the harvest and celebrate Apple Day with longest peel competitions, artwork, cooking the produce or helping to prune the new fruit trees. The orchard can also be used for scientific studies, including researching old varieties, measuring growth rates, mapping local orchards, photography and drawing.

Advice Notes are available via www.centralcoreorchardnetwork.co.uk. Regular practical training sessions are also held on winter and summer pruning, pollination and how to take grafts. Local varieties can be sourced from many local garden centres or from: www.butterworthsorganicnursery.co.uk

Where to start? A survey of the proposed site should be undertaken - what's there now, what changes there will be, how the orchard is going to be managed. Will the grass beneath the trees be kept cut or will it be a wildflower meadow? Might it be suitable for grazing by livestock and if so, who will be responsible for this? What sort of boundary is there?
(continued on next page)



(continued) Is there room to add a native hedge and to leave a wildlife corner? How many people will be available to volunteer or work on the orchard to get it established? How will it be maintained? What wildlife is there already and what new wildlife will be attracted?

An orchard does not have to be a square plot: linear orchards can be just as good: an avenue of

fruit trees along a path in a community garden or school grounds, for instance. If the site is relatively small, an apple arch can be planted or the trees can be pleached or cordoned against a wall. There are "step over" fruit trees suitable for making a low hedge. You can also use tall-grown fruit trees as a live boundary - trimmed to form a narrow wall of fruit trees at the back of a garden or school.



Although the new community orchard at Orchar Park (Broughty Ferry) has been vandalised the project is still ongoing. Local volunteers from the Broughty Ferry Environment Project have created a stunning apple tree mosaic at the entrance to the park.

The mosaic at Orchar Park,
Broughty Ferry
© C A G Lloyd

Top Tips For Orchards

Wild corners: equally relevant in allotments and community gardens, uncut grass strips or difficult-to-use corners can be left to provide shelter and food for over-wintering insects, birds and mammals. They will also provide a hunting ground for kestrels and barn owls. Native hogweed and other umbellifers such as cow parsley, are especially good for attracting beneficial insects.

Boundary walls or hedges will give welcome shelter, not just to the fruit trees planted within, but to the rich biodiversity that inhabits them - from lichens, mosses and liverworts on walls to nesting birds, mammals and bumblebees in the hedges.

Trim hedges once every two years - and then only in late January or February. This will provide food for the birds during much of the winter.

Wildflower meadow areas grown beneath orchards will greatly increase the invertebrate numbers (especially bees) to help pollinate the fruit. Managed carefully, the meadow area can be of great visual interest, helping create a special "contemplation" or "festival" zone during the spring and summer months.

Veteran trees: planting new trees, either in an existing orchard, or a relatively new one, will provide important habitat in the next few decades as the trees age. Many orchard insects rely on decaying wood using splits in the bark, rot holes or hollow trunks in dead trees or veteran trees. Most old trees are still good fruiterers - even if they are windblown and on their side. Holes in old trees are vital as roosting sites for bats, or nesting places for a variety of birds (including woodpeckers).



Pear orchard on the Carse of Gowrie
© C A G Lloyd

Sustainable Gardening For Allotments And Community Gardens

SOIL

The key to successful gardening, with biodiversity in mind or not, is healthy soil. Sustaining the goodness in the soil is vitally important for healthy plants / vegetables and fruit. This can either be done using artificial fertilizers and finite natural resources such as peat or by using products and processes which are natural. If we garden in harmony with the natural processes already happening on our plot, biodiversity will benefit as well as protecting our health and the health of our environment.

Compost

Composting is part of the natural cycle of growth and decay. Numerous microscopic organisms of both vegetable and animal origin break down the vegetable matter and release nutrients into the soil in a form which plants can use. In turn, the plants provide food for the insects which then become food for the birds. We disturb this cycle by removing part of the natural ecosystem. If we continue to remove and not replace plant material, the soil becomes unproductive because it is deficient in essential nutrients.

Artificial fertilizers are often used to provide nutrients. However, they do not support the growth and the activity of the beneficial micro-life in the soil, nor do they improve the soil structure. They do, however, deplete the world's fossil resources.

More information on how to make your own garden compost can be found on the internet: try www.homecomposting.org.uk or www.rhs.org.uk or just search for 'compost'. Alternatively check the recommended book list.

Organic fertilizers

Natural fertilizers such as bone meal, blood and fish meal can be used to improve the nutrients in the soil. However, many gardeners are reluctant to use these animal by-products.

Farmyard Manure

Farmyard manure is a good source of nitrogen, but garden compost, because of its more varied micro-organisms produces a much wider variety of nutrients.

Green Manure

Green manures are ideal whenever a patch of land is going to be free of crops for six weeks or more, and they are particularly useful to vegetable gardeners and allotment holders. Although many green manures can be sown all year round, they are ideal when sown in the autumn to over-winter, when vegetable plots are generally empty. For more information visit www.bbc.co.uk/gardening.

Rock Dust

Pioneered by the SEER Trust near Pitlochry, rock dust contains a very wide range of slow release minerals and trace elements. Organically approved, the dust increases microbial activity, reduces odour and improves fertility in compost.

Peat

Using peat-free alternative products such as coir will help protect Scotland's fast disappearing peat bogs which have taken thousands of years to create.

Mulching

Adding a protective layer of compost, bark chips or coir helps retain moisture in the soil and suppresses weed growth down. As the mulch rots down it also helps to add nutrients to the soil.



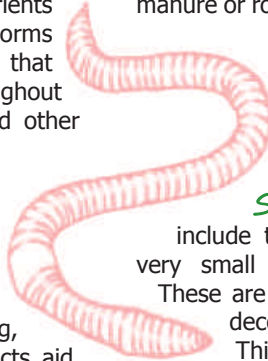
THE LIVING SOIL

Earthworms are a key species of the soil. Besides the minerals in the soil they require organic matter in the form of decaying vegetation. The casts they produce breakdown to provide nutrients for the roots of plants. Earthworms create a vast network of tunnels that help air and water circulate throughout the soil, benefiting plant roots and other soil living organisms.

Other beneficial soil living organisms include moles, millipedes, centipedes, woodlice and ground beetles which all improve the soil. Their burrowing, feeding activities and waste products aid the incorporation of organic matter, help soil drainage, aeration and prevent soil compaction.

Organic matter is deposited all the time from fallen leaves, dead and living plant material, remains of dead animals and animal waste. We can add farmyard manure or rotted down compost. This helps to improve the structure of the soil as it breaks up heavy clay and increases the moisture retentive properties of sandy soil.

Soil micro-organisms include tiny fungi, bacteria, protozoa, very small insects, larvae and worms. These are all involved in the process of decomposition of organic matter. This is a complex process with many stages which is extremely beneficial to the soil and the ecosystem as a whole.



PLANTING FOR WILDLIFE

There are excellent leaflets available from Scottish Natural Heritage's "Garden for Life" series – and many books on the subject of Wildlife Gardening. However, the following is a brief overview of the types of plants that will attract a variety of wildlife into allotments, gardens and orchards.

Top Tips For Wildflower Planting

1. Use single-flowered cultivars so that insects can reach the nectar more easily.
2. Grow night-scented plants to enjoy yourself and attract moths (and bats).
3. Plant for each season – bees and butterflies need a long season of nectar-rich plants.
4. Plants in pots are just as good as herbaceous borders – herbs by the kitchen door, for instance.



BOUNDARY BIODIVERSITY

Some of the richest wildlife areas can be found around boundaries. A few simple actions can increase biodiversity, improve security and enhance the view at the same time.

Hedges

A thick hedge around the garden, orchard or allotment is invaluable as it can deter unwelcome intruders, lessen traffic noise and provide food for insects, birds, mammals - and us. It is an effective windbreak, a shelter belt and a superb wildlife habitat. A hedge can also act as a green corridor which allows wildlife to move from place to place in relative safety. (See Table 1)

A good native hedge should be planted in a double row 15cm wide with 25cms between plants. Hawthorn attracts over 200 species of insect which in turn are important food sources for birds, bats and mammals. A mix of hawthorn and blackthorn as the main hedging plants is ideal and they can be interspersed with other species such as holly, hazel and dog-rose to give a variety of flowers and berries throughout the seasons. This will provide a variety of attractive, nectar producing flowers in the spring, nest sites during the summer and berries for essential winter food.

A new hedge should be pruned hard in its first two years so that there is thick growth at the base. It takes about four years for a hedge to mature, after which a trim every other year will ensure a selection of flowers and berries. Faster growing plants such as roses and brambles (where appropriate), can be used to fill gaps. Small trees: crab apple, rowan, bird cherry or hazel, increase the diversity of the plant species and provide additional food for the wildlife. Standard trees can provide song posts for some of the more territorial birds.

If a particularly strong barrier is required, the hedge can be laid - cutting the branches almost through and interweaving them. Planting thornier species can also help make an impenetrable hedge.

Alternatively, attractive "soft hedges" can be grown which are wildlife-orientated: lavender, pyracanthus, box, or rosemary. These often look best as low hedges grown to delineate certain areas of the allotment or garden.

Fences, pergolas, gateways and arches - even sheds can be used as frames for attractive climbing plants such as clematis, roses, honeysuckle and ivy - all good for wildlife. As a year-round wildlife plant, ivy cannot be bettered as it provides winter berries for birds, very early nectar for bumble-bees, nesting for sparrows and hibernation areas for bats. Existing features can be enhanced to look good and assist wildlife. Vegetables such as runner beans or French beans can be grown on pergolas and arches, and hanging baskets can be filled with Tom Thumb tomatoes, chillies, herbs and nasturtiums.

Stone or brick walls can host a wide variety of lichens and mosses, and provide a home to mason bees. Where appropriate, small plants can be allowed to gain a foothold to add visual attractiveness and give another dimension to the garden wildlife. Un-mortared stone walls can provide insect food for wrens and other birds and important hibernation places for lizards and toads.



An undisturbed log pile against the boundary gives a home to frogs, spiders, millipedes, centipedes and ground beetles and will often be exploited by birds such as wrens.

Wild areas - in many allotment and garden areas there are small pieces of ground - under trees, compost heap corners, wet or stony patches - that can be left alone as they provide excellent refuges for amphibians, reptiles, bumblebees and butterflies. Alternatively, a planted wildflower strip, either in a communal area, or along one side of an allotment can add bright summer colour and attract pollinators such as bees and butterflies. This can be replicated in a community garden or orchard too.

POND AND WATER FEATURES

Making a pond is one of the most effective things you can do to improve an allotment or garden's biodiversity; the results can often be seen in a very short time.

Ponds not only provide breeding places for frogs, toads, dragonflies and newts, but also provide drinking places for other wildlife such as birds, field-mice and squirrels. Even a small pond or water feature will be used, especially if there is another pond nearby.



© C A G Lloyd

Building a pond:

- Choose a sunny, sheltered spot. Include some border planting to give light shade for some of the day.
- Avoid over-hanging trees, leaves rotting in the water reduce the amount of oxygen in the pond and can kill some of its wildlife.
- Make one area of the pond fairly deep to allow aquatic wildlife to hide and survive extremes of temperature.
- One side should slope up to ground level so that frogs, toads – and hedgehogs - can easily get out of the pond. Alternatively, gently step the base to provide different depths for a variety of plants.
- The shallowest step could be separated from the main pond by a water-permeable barrier, filled with soil and planted as a bog garden.

Planting a pond:

- Plant enough vegetation to give cover for amphibians and give escape routes for dragonflies and damselflies.
- Leave enough open space for birds to come down and drink.
- Add oxygenating plants to deter algae – use plants such as water buttercup or one of the native pondweeds.

- Avoid rampant growers - planting in pots controls the growth of plants in small ponds.
- Choose a selection of plants: different types will encourage different wildlife.

Other Water Features

If a pond is not appropriate, but there is still a damp area that cannot be used for anything else, consider making a bog garden. After a lot of rainfall, bog gardens will often resemble ponds, but they will dry out and make attractive features if planted with wet-loving species such as purple loosestrife, ragged robin, flag iris. Bog plants often prefer lots of organic matter, rather than pond plants which prefer a low-nutrient environment, so ponds and bog gardens provide very different habitats.

If neither a pond nor bog garden is suitable, or if there are young children or elderly people on site, water can still be a feature: consider sink or half-barrel ponds, a pebble pond – or even a “flowform” water sculpture.



The flowform at Glenfarg - a sculptural water feature
© C A G Lloyd

Top Tips For Ponds & Water Features

1. Ornamental fish eat tadpoles and insect larvae and can make the water murky. In most cases it is best to avoid using them in 'wildlife ponds'.
2. Top water levels up in dry weather: rain collected in a water butt is ideal.
3. Clean the pond in the autumn to avoid disturbing any hibernating wildlife; leave vegetation or silt at the side of the pond for at least a day to allow any trapped pond life to escape back into the water.
4. Avoid using fertilisers nearby as run-off can pollute the water.



Caution - ponds should not be accessible to small children

OTHER THINGS TO THINK ABOUT

Water

Save water: collect rainwater in water butts from shed or greenhouse roofs and use a watering can to water only the plant roots where it is needed.

Timber

Use local wood from sustainably managed plantations. British grown hardwoods and spruce, pine and larch from other European countries are available in many stores, but check it is 'FCS standard'.

Reuse timber wherever possible and consider treating the wood with one of the natural wood preservatives containing vegetable oils and tree resin. Untreated wood will not last as long, but will help lichens and mosses.



Small garden ponds are a haven for wildlife
© David Williamson



Feed the birds

Food shortages can occur throughout the year so if you start to feed birds, it is best not to stop. A well-managed wildlife garden will provide most of the needs of adults and young birds, but you could supplement with high protein foods in the summer (ensuring your choice does not harm young chicks). Further advice is available from www.rspb.org.uk and www.bto.org.uk.




Pesticide Alternatives

Find out about the life cycle of pests or diseases so that preventative action can be timed: for example, use a barrier to deter a pest, put out a slug trap, pick off caterpillars by hand or prune diseased and damaged stems. Consider 'companion planting' to safeguard against pests.

TABLE 1 - BOUNDARY BIODIVERSITY

<i>Hedging Plants</i>	<i>Flowers & Fruit</i>	<i>Benefits</i>
Blackthorn (sloe) Prunus spinosa	Flowers March to April. Sloes in autumn.	Pretty blossom in spring. Jam and sloe gin.
Worcesterberry Ribes divaricatum	Flowers in March. Fruit July to August. Hybrid with gooseberry and blackcurrant parents.	Jam and stewed fruit.
Holly Ilex aquifolium	Evergreen. Flowers April to May. Berries (poisonous) in autumn.	Christmas decorations.
Cotoneaster Rosaceae family (there are 200 species)	Flowers late spring with many berries in autumn.	Visual interest in winter and spring.
Hawthorn Crataegus monogyna	Flowers May to June and haws in autumn.	Pretty blossom in spring. Jelly.
Guelder Rose Viburnum opulus	Flowers June to July. Fronds of red berries in autumn.	Visual interest in autumn.
Firethorn Pyracantha (many species)	Evergreen. Flowers early summer followed by berries in autumn.	
Sweet Briar Rosa rubiginosa	Flowers June to July. Rosehips in autumn.	Rose hip syrup (for Vitamin C)
Honeysuckle Lonicera periclymenum	Flowers June to September with berries in autumn.	Fragrant flowers.
Dog Rose Rosa Canina	Flowers midsummer; large hips in autumn.	
Ramanas Rose Rosa Rugosa	Flowers all summer and autumn; large fruits in autumn.	
Hornbeam Carpinus betulus	Nuts in the autumn.	
Winter Honeysuckle Lonicera Purpusii	Winter-flowering.	Visual interest in winter and early spring.
Bramble Rubus spp.	Flowers July to September. Fruit August / September.	Pies, jam and jelly.
Buddleia Buddleia davidii and Buddleia globosa	Flowers summer to autumn.	Can be invasive, so needs careful management
Hazel Coryllus avallana	Catkins in early spring. Nuts in Autumn	Good shelter. Visual interest in early spring.
Box Buxus sempervirens	Evergreen.	When unclipped, fragrant flowers in the spring.

TABLE 2 - BIODIVERSITY BENEFITS

Beneficial Creatures	SPRING	SUMMER	AUTUMN	WINTER
<p>Bats</p>	<p>Males and females come out of hibernation and need to feed well to get into good condition.</p> <p>April- May: females gather in warm places to give birth.</p> <p>Planting a variety of night scented flowers, trees and shrubs and creating ponds helps provide insect food and shelter for bats.</p>	<p>Females give birth to just one baby in mid summer: the young are fed milk.</p> <p>The males do not help to raise the young. By July young bats are learning to fly.</p> <p>Adult bats feed on insects – craneflies, aphids, moths and midges.</p>	<p>Most bats search out a cooler roost for Autumn, but some will use the same roost all year around.</p> <p>Bats concentrate on feeding and resting to build up fat for hibernation.</p>	<p>Bats hibernate - they need cool, moist, undisturbed places, safe from predators. They will wake up occasionally to stretch their wings, drink or move site.</p>
<p>Hedgehogs</p> 	<p>Hibernation end and breeding begins. The young are born in a nest specially built by the female.</p>	<p>Hedgehogs sleep all day. An adult male can travel 3km in one night.</p> <p>They feed after dark on a diet of slugs, snails, beetles and worms.</p>	<p>A hibernation nest is built of piles of grass or leaves beneath a hedgerow.</p>	<p>Hedgehogs hibernate and emerge as the days warm up. If the winter is mild they will need plenty of food to survive.</p>
<p>Blue Tits</p> 	<p>7-12 eggs are laid in late spring. On average a pair of adults rear two broods each year.</p> <p>All birds keep pests at bay all year round in their search for food.</p>	<p>Fewer eggs are laid in summer. Adults visit the nest to feed their young hundreds of times in one day.</p> <p>Blue tits feed on insects and larvae (especially caterpillars).</p>	<p>Berries, fruits and seeds are eaten.</p> <p>Plant hedging which contains native species - hawthorn, holly and dog rose; they provide both shelter and food.</p>	<p>Blue tits shelter in tree cavities in the winter.</p> <p>Grubs in tree bark offers essential fat-rich food. They also need berries and grass seeds to survive.</p>
<p>Frogs and Toads</p> 	<p>Frogs and toads eat almost any live prey they can find including insects, slugs and snails.</p>	<p>Provide a small pond, bog garden or damp grassland. Remember to add a few rocks or logs in different areas, or leave a wall unmortared to provide resting or hibernation areas.</p>		<p>Frogs and toads hibernate in the bottom of ponds. If you carry out work to a pond in the winter, do not do it all at once and leave the silt to one side for a few days to allow wildlife to escape.</p>

Bumble Bees



The mated queen bee emerges from hibernation and feeds on nectar and pollen from spring flowers. She begins to lay her eggs and worker bees hatch three weeks later.

Bumble bees are much better pollinators than honey bees.

Eggs continue to hatch and bees feed from nectar and pollen rich flowers throughout the summer.

Plant a variety of native wildflowers as well as cultivated varieties to flower over as long a season as possible.

The mated young queen bee searches for a hibernation place, e.g. a pile of leaves, tussocky grass, or an undisturbed hedge bottom.

The old drones, worker bees and queens die at the first frost. Only the young queen survives to hibernate over the winter.

Butterflies and Moths



Overwintering adults emerge from hibernation and lay eggs. Species that over-winter as eggs, caterpillars or pupae emerge later and start feeding on fresh new leaves.

Butterflies pollinate a wide variety of plants as they feed on the nectar of flowers.

A time of breeding and dispersal. Some species (including those that over-winter as adults) may start a second generation, but most species have one generation a year.

Grow plants with purple, violet, orange or yellow flowers such as buddleia, hebe and most herbs (remember that buddleia is a non-native species that can become invasive). Nettles are the only plant the caterpillar of the small tortoise-shell butterfly will eat.

Adults feed up (often on over-ripe fruit) before searching for somewhere to hibernate. Most caterpillars go into hibernation in early autumn before plants start to die back.

Adults over-winter in sheds or deep in vegetation. Many caterpillars spend the winter in dense vegetation or under the soil.
Retain patches of dense vegetation.

Ground Beetles

Slugs, snails, cutworms, flatworms and root maggots are devoured by these busy creatures.

Provide them with shelter under a pile of logs or stones in a corner.

Adults over-winter in bark litter or tree stumps.

Ladybirds



The adult emerges from hibernation and lays her eggs in aphid colonies. The ladybird larvae feed on aphids.

Ladybirds and their larvae feed on large quantities of aphids, mealy bugs, whiteflies, mites and scale insects throughout the summer.

They seek out places in which to hibernate for the winter.

Retain standing or lying dead wood.

Hoverflies and Lacewings

Adults are useful pollinators. Larvae devour aphids, mites, mealy bugs, thrips and other small pests.

Grow plants such as yarrow, poached egg plant, marguerite and French marigold; herbs such as lavender, thyme and rosemary.

Plant yarrow, goldenrod and asters.

TABLE 3 - FLOWERS FOR WILDLIFE

WINTER	
Snowdrop	An excellent nectar source for insects (especially bees) coming out of hibernation early
Snowflakes (naturalised in many parts of the UK)	An attractive alternative to snowdrops (a nice mixture is snowdrop, snowflake and winter aconite)
Winter Aconite (naturalised in many parts of the UK)	An important pollen source for the first insects of the year, especially bees.
Crocus (non native)	Often attacked by sparrows and starlings who leave them ragged. Good source of nectar and pollen for bees.
Heather	An excellent nectar source for insects (especially bees) coming out of hibernation early
Winter Jasmine (and Jasmine)	An excellent nectar source for insects
SPRING	
Daffodils (most non native)	Not very wildlife orientated; the more natural, smaller varieties of narcissus are better. The value lies in leaving the grass surrounding the plants long for an extended period. The more natural narcissus looks good in window boxes or tubs.
Grape Hyacinth (non native)	Very easy to grow; good for window box planting. Attracts butterflies (especially tortoiseshells) and bees - superb early nectar source.
Squill	A pretty bright blue easily-grown ground-hugging plant useful as a pollen source for early insects (excellent under trees or in the border)
Tulips (non native)	If allowed to fully open out the flowers are a good pollen source for bees and bumblebees. [Best type - Water Lily Tulip]
Honesty, Aubretia, Columbine, Foxglove and forget-me-not	Butterflies and bumblebees
Spring plants suitable for planting into grass - cowslip (only buy as plant plugs); self-heal, lady's smock, cat's ear, salad burnet, red campion (all native plants)	All excellent for butterflies, hoverflies and bumble bees.
Shaded or slighted wooded areas - Primrose, bugle, lungwort, red campion, sweet violet, common dog violet (native)	All extremely good for butterflies and bumble bees.
Damp ground - flag iris, purple loosestrife, water mint, meadowsweet	Excellent for dragonflies, toads and newts (they use the leaves for egg-laying)

LATE SPRING/SUMMER	
Herbs - Chives, sweet cicely, angelica, borage, marjoram, rosemary, mint (all varieties), hyssop, fennel, thyme	Flowers are greatly visited by hoverflies, bees and butterflies
Snakehead fritillary (native to UK, but not to Scotland)	Good naturalised in an urban grass situation. Nectar source for butterflies and other insects.
Bluebell (<i>Hyacinthoides non-scripta</i>)	Never plant the Spanish Bluebell or any of the hybridised varieties (which tend to be pink, white or pale blue). Be very careful where you source the native bluebell corms/seed (further information available from Plantlife – www.plantlife.org.uk). Excellent for bees and butterflies.
Wild Garlic (for a naturalised wooded area where the pungent smell is acceptable!)	Good for a range of insects, including bees.
Crown Imperial lily (non-native)	Provides nectar for blue tits, blackcaps, bees and bumblebees (a 'sculptural plant' - good in pots).
Flowering onions (<i>Allium giganteum</i>), non-native	Great for butterflies, bees and other insects – looks great grown in the herbaceous border
Sunflower	Birds and bees
Shrubs: Rosemary (native); Flowering Currant; <i>Ceanothus</i> , <i>Buddleia</i> (non-native)	Moths and butterflies, bumble bees
Japanese anemone; Lambs Ears; Scabious; <i>Eryngium</i> ; Heathers (summer flowering varieties); Rock Rose; <i>Penstemon</i> ; <i>Verbena Bonariensis</i>	Moths and butterflies, bumble bees
Moth-attractive plants – privet, crab apple, Tobacco plant, evening primrose, red valerian, sweet rocket, jasmine, honeysuckle, night-scented stock, phlox, soapwort.	Moths and butterflies, bumble bees, and bats
Dry ground - forget-me-not, aubrietia, harebell, devil's bit scabious, coltsfoot, ox eye daisy, corn cockle, cornflower, corn marigold, poppy	Bumble bees
Damp ground - ragged robin, butterbur, lesser celandine	Dragonflies, moths, butterflies, bumble bees

AUTUMN	
Wood Anemone	An open-woodland plant, excellent as a nectar plant for bees and other insects (do not plant the double-flowered varieties - most insects can't use them)
Michaelmas daisy, Ice plant, Lavender, Candytuft, Hebe, Red valerian, Knapweed, Caryopteris	Bees and butterflies
Ivy	Bumble bees in spring, birds and bats (nesting/roosting) in summer; birds and bats (feeding/hibernating) in winter.
Plums, pears, apples, crab apples	Late food for butterflies, moths and birds
Hazel, Teazel	Mammals and birds
Autumn Crocus (non-native)	A useful late pollen and nectar source for bees and bumble bees



Photograph © C A G Lloyd

APPENDIX 1

ALLOTMENTS IN TAYSIDE

Dundee

Contact: Tel. Leisure & Communities (01382) 307474

Dundee City Council's Leisure & Communities Department is responsible for four main allotments in the city: Arklay Terrace, MacAulay Street, Ancrum Road, and Magdalen Road.

Other allotments are situated at:

City Road, Dundee, DD2 2AL
Cleington Gardens, DD3 7JN
Gardner Street, DD3 6BJ
Kinnaird Gardens, DD3 6LD
Magdalen Green, Richmond Terrace, DD2 1UH
Magdalen Yard Road, DD2 1UH
Murrayfield Drive, DD4 0BA
Old Craigie Road, DD4 7JB
Stirling Park, Law Road, DD3 6LD
West Law, DD3 6LD

Angus

Contact: Parks (01307) 461460 or (01674) 664138

There are council allotments in Montrose, Arbroath, Monifieth and Kirriemuir. The Carnoustie Allotments Association is looking into creating one in Carnoustie. The contact for the Arbroath Allotment Association is: Frank Gilbert (Secretary), 39 Hill Street, Arbroath, DD11 1AL.

In Montrose there are allotments in Rutland Crescent. In Arbroath there are two sites: Brechin Road, and Hill End Road. Monifieth has one allotment site at Barry Road. In Kirriemuir, the allotments are next to the Health Centre.

Other allotments are situated at:

Arbroath - Dalhousie Place, DD11 2AA
Arbroath - Hayshead Road, DD11 2AZ
Brechin - Cathedral Banking, DD9 6AN
Forfar - Helen Street, DD8 2HX

Perth & Kinross

Contact: Parks Development (01738) 476476
Matthew Young (01738 635319): Moncrieff
Dupplin Estate (01738 622757)

Moncrieffe Island Allotments, Perth, is managed by the Perth Working Men's Garden Association. The Low Road Allotment is managed by Dupplin Estate.

APPENDIX 2

Further Information (if not covered in the booklet)

Allotments

Scottish Allotments & Gardens Society, c/o The Laigh House, Inveresk Village, Musselburgh EH21 7TD
- secretary@sags.org.uk; www.sags.org.uk

National Society of Allotment & Leisure Gardeners (including a discounted seed scheme, and an insurance scheme) – Tel. 01536 266576; www.nsalg.org.uk

Community Food & Health (Scotland) – Tel. 0141 226 5261; www.communityfoodandhealth.org.uk

National Society Allotments & Leisure Gardeners www.nsalg.org.uk

Allotments Regeneration Initiative: Tel. 0117 963 1551 www.farmgarden.org.uk/ari

Planning Aid Scotland (information on planning issues): Tel. 0131 220 9730;
www.planning-aid-scotland.org.uk

Garden Organic (Henry Doubleday Research Association): www.gardenorganic.org.uk; tel. 0247 630 3517; resources for schools: www.gardenorganic.org.uk/organicgardening/schools.php.

Community Gardens

Federation of City Farms and Community Gardens - www.farmgarden.org.uk/scotland;
Tel. 0131 623 7058

Orchards

Common Ground: www.commonground.org.uk

National Orchard Forum: www.nat-orchard-forum.org.uk

Central Core Orchard Network: www.centralcoreorchardnetwork.co.uk

Butterworth's Organic Nursery, Garden Cottage, Auchinleck Estate, Cumnock, Ayrshire, KA18 2LR;
tel. 01290 551088; mobile: 07732 254300; www.butterworthsorganicnursery.co.uk

Brogdale Orchards, Selling Road, Faversham, Kent. Tel. 01795 858140; www.brogdale.org

Deacons Nursery, Moor View, Godshill, Isle of Wight, PO38 3HW. Tel: 01983 840750 or 01983 522243;
www.deaconsnurseryfruits.co.uk.

Thornhayes Nursery, Cullompton, Devon. Tel: 01884 266746; www.thornhayes-nursery.co.uk

Scotts Nurseries Ltd., Crewkerne, Somerset: Tel. 01460 72306.

APPENDIX 2

General Gardening

Royal Caledonian Horticultural Society: www.royalcaledonianhorticulturalsociety.org

Soil Association: www.soilassociation.org

Royal Horticultural Society: www.rhs.org.uk

Royal Botanic Garden Edinburgh: www.rbge.org.uk

Garden Organic (Henry Doubleday Research Association) - practical gardening advice, including a section for schools: Tel. 0247 630 3517; www.gardenorganic.org.uk

Community Recycling Network (community composting): Tel. 01786 469002; www.crns.org.uk

Trellis: Network of Scottish projects, information & advice on therapeutic gardening – Tel. 01738 624348; www.trellisscotland.org.uk

The Perthshire Organic Gardening Association: www.perthshireorganicgardeners.co.uk

Local Wildflower Plant Sources (all offer mail order):

- Scotia Seeds (Angus) – www.scotiaseeds.co.uk; tel. 01356 626425
- Plants with Purpose – www.plantswithpurpose.co.uk; tel. 01738 787278
- Var Scotica (Perthshire) - tel. 01250 881336; e-mail do620kx@varscotica.com
- Scottish Origins (Kinross) – tel. 01577 861437; www.scotorigins.co.uk
- Scott's Wildflowers (East Lothian) – tel. 01946 830486
- Snowdrops, Snowflakes and Winter Aconites (available 'in the green'): Cambo Gardens, Kingsbarns, St. Andrews – www.cambosnowdrops.com.

Volunteer Organisations

BTCV Scotland (British Trust for Conservation Volunteers): Supports groups taking practical action in their local community, volunteering, training, access to insurance scheme for community groups; Tel. 01786 479697; www.btcv.org.uk

Green Gym: www.btcv.org.uk/display/greengym

Scottish Council for Voluntary Organisations: supports & advises community groups: Tel. 0800 169 0022; www.scvo.org.uk

Ecoschools: Tel. 01786 468234; www.ecoschoolsscotland.org

Community Webnet: information on developing & carrying out projects - www.communitywebnet.org.uk

"Trellis" Therapeutic Horticulture: www.trellisscotland.org.uk; Tel. 01738 624348

APPENDIX 2

Wildlife organisations

BTO Scotland (British Trust for Ornithology): Tel. 01786 466560;
www.bto.org/regional/btoscotland.htm

BRISC (Biological Recording in Scotland): Tel. 01786 474061; www.brisec.org.uk

Buglife: Tel. (01733) 201 210; www.buglife.org.uk

Bumblebee Conservation Trust: www.bumblebeeconservationtrust.co.uk; E-mail -
enquiries@bumblebeeconservationtrust.co.uk

Butterfly Conservation Scotland: Tel. 01929 400209; www.butterfly-conservation.org

Flora Locale: promote use of wildlife planting: www.floralocale.org

Plantlife Scotland: Tel. 01786 478509; www.plantlife.org.uk

The Postcode Plant Database - www.nhm.ac.uk/science/projects/fff

Tayside Biodiversity Partnership - www.taysidebiodiversity.co.uk

Scottish Biodiversity Strategy - www.scotland.gov.uk

Scottish Biodiversity Forum www.biodiversityscotland.gov.uk

Really Wild Flowers - www.ReallyWildFlowers.co.uk

Magazines, Leaflets and CDs:

- The Scottish Garden
- Gardening 'Which'
- Gardeners' World
- SNH Garden for Life series of leaflets
- 'Gardening with Wildlife in Mind' (CD – Natural England and the Plant Press:
www.plantpress.com/wildlife.html)

Publications:

- 'The Hedge Book', FWAG: www.fwagscotland.org.uk
- 'Living Roofs', Natural England: www.english-nature.org.uk/pubs/publication/PDF/LivingRoofs.pdf
- 'No Nettles Required', Ken Thompson
- 'Orchards - A Guide to Local Conservation', Common Ground
- 'How to Make a Wildlife Garden', Chris Baines
- 'The Wild Garden', Lucy Huntington
- 'Natural Gardening in Small Spaces', Noel Kingsbury
- 'The Ultimate Birdfeeder Handbook', John A Burton & Steve Young
- 'The Therapeutic Garden', Donald Norfolk
- 'Finding Scotland's Allotments 2007', Scottish Allotments and Gardens Society
- 'Community Gardens – Place for People and Wildlife', Scottish Natural Heritage
- 'Scottish Community Garden Starter Pack', Federation of City Farms and Community Gardens
- 'Allotments and Biodiversity', Glasgow Biodiversity Partnership

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Tayside Biodiversity Partnership



BIODIVERSITY
THE VARIETY OF LIFE



Coalyards Community Garden, Glenfarg © C A G Lloyd

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