Oxeye daisies © Ruth Feber

Field margins

Field margins are among the most extensive and ubiquitous uncropped habitats on farmland and have the potential to provide habitat for a range of wildlife. Over-wintering sites for invertebrates, refuges for small mammals, nectar and pollen resources for pollinators, and nesting and feeding sites for birds can all be encouraged by establishing field margins. As well as being habitats in their own right, field margins protect other features, such as hedgerows or watercourses, from farm operations. They can also act as corridors, helping wildlife move through the landscape.

Key points

- **Field margins or buffer strips will benefit a range of farm wildlife species**
- **Different field margin options are possible, such as sowing with a tussocky grass mixture, including wildflowers to benefit nectar feeders, or cultivating margins for rare arable plants**
- **Aim for a mosaic of patches of taller and shorter vegetation around the farm, cut infrequently once established and do not cut in summer.**

Field margins

Female common blue butterfly © nutmeg66 CC BY NC ND 2.0

© Emily Ledder/Natural England

Simple grass-only margins (above) provide breeding and overwintering habitats, while the addition of wildflowers (below) can greatly enhance their value to wildlife

© Michael Trolove CC BY SA 2.0

Field margins are the strips of land between the field boundary (such as a hedge) and the crop. Field margins can be deliberately managed to benefit key farmland species and buffer strips are one of the most popular agri-environment scheme options.

Field margins may contain a great diversity of plants, including those characteristic of woodland (hedge bottoms), wetland (ditch banks), grassland (grass margins) and arable (field corners and crop edges). Field margins can be established around both arable and grass fields; in arable areas they are especially valuable as they provide undisturbed breeding and overwintering sites for wildlife. They act as buffers, protecting hedgerows, ditches and streams from farming operations, and they form a network across the landscape, often linking bigger areas of wildlife habitat, such as woodlands or wetlands.

Establishing and managing field margins

Field margins can be established and managed in several ways, described below, which will have different consequences for the wildlife that use them.

Sown field margins or buffer strips

Many buffer strips are established by sowing with a simple grass mixture, often including tussocky species such as cocksfoot. Tussocky margins encourage invertebrates such as carabid beetles, which predate aphids, and they can act as a source from which predatory invertebrates can colonise fields. They also provide cover and nesting sites for many small mammals, and habitat for amphibians and reptiles. Wild grass seeds are less important in the diet of farmland birds than broad-leaved weed seeds, but they are consumed by a number of finches and gamebirds.

Field margins help buffer other features, such as ditches, from farming operations

© Rosalind Shaw

Naturally regenerated margins are the best conservation option on light or shallow soils without grass weed problems

© Evelyn Simak CC BY SA 2.0

However, grass-only strips rapidly form dense swards and can exclude naturally colonising wildflowers, often resulting in low species diversity. Including wildflowers (such as yarrow, black knapweed and oxeye daisy) in the seed mixture will greatly increase the value of margins for wildlife, providing a greater diversity of seed sources and host plants for invertebrate larvae, as well as pollen and nectar supplies for pollinators. Choosing species that flower and set seed at different times throughout the season will be even more beneficial.

Naturally regenerated margins or buffer strips

Field margins can also be established through natural regeneration. If soil fertility is relatively low, and the soil seed bank and local flora relatively rich, these swards may have a higher conservation value than sown ones, making this method of establishment the most beneficial option. The decline of rare arable plants, such as the cornflower, can also be helped through naturally regenerated buffer strips on light or shallow soils that are cultivated every one or two years. Varying the depth and timing of cultivation can enhance plant diversity.

Naturally regenerated margins can also provide important food resources for birds, both in summer and winter, in the form of weed seeds and grain from volunteer crops and a range of invertebrates. The patchy sward may make it easier for birds to find their prey. However, on very fertile soils, where the existing plant community is poor, or where there is a grass weed problem, naturally regenerated strips may be difficult to manage, and sown grass and wildflower mixtures would be the better option.

Grassland field margins

Field margins, or buffer strips, benefit wildlife in grassland as well as arable situations. Grassland margins can be established by leaving a strip uncut around the edge of grass fields. These measures allow a taller, tussocky sward to develop. This encourages seed production and increases invertebrate abundance, both of which provide food for other wildlife. Field margins in grass fields also buffer other habitats such as hedgerows and ditches, in a similar way to margins in arable fields.

© Ros Shaw

Field margins can develop from the existing grassland, or a grass and wildlflower seed mixture can be used to create them, following guidelines for arable fields. The margins will need occasional management, either through grazing or cutting, to prevent too much scrub developing. Agri-environment scheme funding is available for grassland field margins.

Field margins

Margins should not be cut in summer, to allow plants to flower

Cutting management

Most margins are managed by some form of mowing, initially to aid establishment, and in later years to prevent the encroachment of scrub and maintain floral diversity. In the 12-24 months following sowing, frequent cutting may be needed to help the margin establish but, after this, mowing should be carried out not more than once every two years, or less often if possible. A diversity of structure is especially valuable (Box 1), and this can be encouraged by only cutting margins infrequently, cutting different margins in different years, or cutting half the margin and leaving half uncut. If possible, leaving some woody vegetation or scrub to develop will add to the habitat diversity for wildlife.

Structural diversity of vegetation helps beneficial invertebrates such as spiders

Margins and buffer strips should not be cut during the late spring or summer, as this removes sources of pollen and nectar when they are crucially important, and may disturb nesting invertebrates, small mammals and birds. Where cutting is needed, for example to maintain the plant diversity of grass and wildflower sown buffer strips, or to control scrub, cutting in autumn will open the sward and reduce competition in winter (Box 2). However, it is still important to leave some patches or strips of the margin uncut each year to provide undisturbed areas for overwintering invertebrates and other species.

Ideally, cuttings should be removed. Leaving cut hay lying, rather than removing cuttings, may slow down the decline of annual weeds, such as black grass, and increase some perennial weeds, such as common nettle. Over the longer term, if the cuttings are left on the margins, plant species able to exploit higher soil nutrient status tend to increase, resulting in a less diverse sward.

Tussocky beetle banks help predatory invertebrates to colonise arable fields

Beetle banks

Beetle banks are linear grassy ridges about 2m wide, created across the middle of large cereal fields. Tussocky grass species, such as cocksfoot, are sown on the bank to provide over-wintering cover for invertebrate predators of cereal aphids. Beetle banks also help to reduce field size, enabling predators, such as ground beetles and wolf spiders, to fully colonise the crop before the start of an aphid invasion. The banks do not extend to the field margin so farm machinery can pass, and the field continues being used as a single unit. Tussocky grasses sown on beetle banks also provide ideal habitat for small mammals and are used by ground-nesting birds.

Knapweed is an important component of nectar flower mixes

Margins are best situated next to other features, such as hedges

Linking field margins across a landscape increases their value to wildlife

Wild bird seed mixture and nectar flower mixture

Typically, wild bird seed mixture comprises a variety of species, planted in blocks or strips, including cereals, millet, kale, quinoa and sunflower. In general, kale seems to support high densities of the widest range of birds (insectivorous and seed-eating species). Quinoa can support large numbers of finches, sparrows and buntings.

Nectar flower mixtures, designed to provide food resources for invertebrates, contain at least four nectar-rich flowering plants, for example, red clover, birds-foot trefoil, common knapweed and sainfoin. Nectar flower mixtures are particularly valuable for supporting populations of pollinators.

Siting of field margins or buffer strips

Permanent grass only, or grass and wildflower, sown margins should not be sited where there are populations of rare arable plants in the crop edge, as the arable plants will not be able to compete with the grassy sward. Cultivated margins are, instead, appropriate for arable plants, as these species need regular disturbance to survive.

Field margins are often best situated next to other features such as hedgerows or wetland features such as ditches. Field margins can help buffer hedgerows and ditches from farm operations, and a diversity of habitats in close proximity will have wildlife benefits, providing a greater range of food resources, shelter and breeding habitats, especially benefitting less mobile species. Corners of fields can be particularly valuable. In general, wider field margins or buffer strips will be best for wildlife.

Field margins should ideally be established in such a way that they link to each other, and link other habitats across the farm. Increasing the linkages will help maximise their effectiveness as movement corridors for wildlife around the farm and across the landscape. Wood mice, for example, use different habitats at different times of year, often moving out of fields and into woodlands after harvest. A network of field margins, especially alongside other habitats such as hedgerows, will help them move and disperse safely.

Peacock butterfly © Roy Stead CC BY NC ND 2.0

Patchy margin management is best for butterflies

Field margins are important breeding areas for butterfly species on arable farmland. Two of the most well known butterflies are the peacock and small tortoiseshell. These butterflies hibernate in the winter and, after emerging in the spring, lay clusters of eggs on nettle plants. Although an extremely common plant, our studies showed that nettles must be of a certain height and in the right place to be suitable for the caterpillars.

Small tortoiseshell butterflies chose small plants, often young nettle regrowth, on which to lay their eggs. Such leaves are typically higher in water and soluble nitrogen than older leaves, providing better nutrition. Peacock butterflies chose the tips of much taller nettle plants for their eggs, perhaps because the typically larger clusters of caterpillars needed more plant material on which to feed.

Aspect was an important factor for egg-laying, particularly in spring, when clumps of larvae were found on margins that received maximum sunlight. More larval clumps were located on south-facing margins than on any other aspect, for both species. Warmth can increase caterpillar survival rates.

Mowing some areas and leaving other areas uncut will result in structurally more diverse swards, providing greater opportunities for egg-laying and feeding for butterfly species and other invertebrates. Mowing different areas in different years, or not mowing the entire margin width, could be used to help achieve this effect.

Key results

- **Even common butterfly species often have precise habitat requirements for feeding or breeding**
- **Managing field margin vegetation to create structurally different areas will help provide a range of habitats**
- **Leave some areas uncut, mow different areas in different years, or do not mow the entire margin width**

Cluster of peacock caterpillars on common nettle © Ruth Feber

Grass and wildflower mixture © Ruth Feber

Wildflowers on field margins

In a large-scale field experiment we investigated how mowing affected the performance of different sown wildflowers on field margins. The greatest effect was that margins mown in spring and autumn, with cuttings removed, had more species compared to cutting at other times. More germination opportunities in margins that were more open during the autumn and winter appeared to be a critical factor in helping species establish and persist.

Open swards and reduced competition during the winter was particularly beneficial to winter-green species such as lady's bedstraw. Other species, such as cowslip and oxeye daisy required some cutting to maintain their frequency. In contrast, common knapweed did best when it was left uncut in summer and able to regenerate from seed.

Where the local flora are impoverished or the conditions are unsuitable in other ways for naturally regenerated buffers or margins, sowing a mixture with even just a few wildflower species rather than grasses only will have many conservation benefits. Choosing species with similar management requirements can help maximise return on the investment.

Key results

- **Timing of mowing affects wildflower species in field margins differently**
- **If mowing is required, mowing in autumn encourages wildflower species to persist. Mow different areas in different years**
- **If only a few wildflowers are sown, choose species with similar requirements and tailor the management to suit them**

Scabious is a valuable nectar source for many insects © Kate Jewell CC BY SA 2.0

Field margins

Management summary		
	Key actions	Potential benefits
Grass-only margins	• Include tussocky grasses such as cocksfoot and cut infrequently • Margins situated next to hedgerows and ditches are especially valuable	Benefits all small mammal species and predatory invertebrates such as carabid beetles Creates a diversity of habitats
Grass and wildflower margins	• Include nectar sources such as knapweed, scabious and oxeye daisy • More species-rich seed mixtures will enhance plant, seed and invertebrate food supplies • Cut infrequently, and not in summer once established	Benefits pollen and nectar feeders, other invertebrates, and a range of wildlife species
Naturally regenerated margins	• Preferred establishment method on light, less fertile soils	Encourages local flora and provides conditions suitable for rare arable plants if cultivated
Beetle banks	• Create beetle banks across arable fields • Include tussocky grasses and manage as grass-only margins	Benefits small mammals and predators of cereal aphids, such as spiders and carabid beetles
Wild bird seed mixture and nectar flower mixtures	• Sow in strips or plots	Encourages nectar feeding invertebrates and a range of bird species

Options especially relevant for field margins		
Code	Countryside stewardship options	Tier
AB1	Nectar flower mix	Mid
AB3	Beetle banks	Mid
AB8	Flower-rich margins and plots	Mid
AB11	Cultivated areas for arable plants	Mid
AB16	Autumn sown bumblebird mix	Mid
OP2	Wild bird seed mixture	Mid
SW1	4-6m buffer strip on cultivated land	Mid
SW2	4-6m buffer strip on intensive grassland	Mid
SW3	In-field grass strips	Mid
SW4	12-24m watercourse buffer strip on cultivated land	Mid
SW11	Riparian management strip	Mid
WT1	Buffering in-field ponds and ditches in improved grassland	Mid
WT2	Buffering in-field ponds and ditches on arable land	Mid

Find out more at:
www.wildlifetrusts.org www.rspb.org.uk www.plantlife.org.uk www.gwct.org.uk
www.naturalengland.org.uk

Mixed species mature hedgerow, Herefordshire © Tree Council Image Bank

Hedgerows

Hedgerows are among the most important remaining areas of semi-natural habitat on lowland farmland. Many of our hedgerows are ancient and of historical interest, and all hedgerows are able to provide a host of resources for wildlife: food, shelter, nesting sites, refuge from farm operations and corridors across the landscape. A whole range of wildlife species, common as well as rare and declining, depend on hedgerows for their survival.

Key points

- **Hedgerows are of huge value to farmland wildlife**
- **Trim not more than every three years in January/February and aim for a variety of hedge heights**
- **Hedge-laying or coppicing can rejuvenate hedges**
- **Protect hedgerow trees**

Hedgerows

Hedgerows are important for the declining yellowhammer © Malene Thyssen GNU

Hedgerows are the most important wildlife habitat over large stretches of lowland farmland and are essential for a great variety of plants and animals. They are especially important for farmland birds, butterflies and moths, bats and dormice, with at least 47 species of conservation concern using hedgerows as their main habitat. The Hedgerow Biodiversity Action Plan concludes that over 600 plant species, 1500 insects, 65 birds and 20 mammal species have been recorded at some time living or feeding in hedgerows.

Hawthorn flowers provide nectar and pollen, and the berries provide food over winter
© Dave Key, Hedgelink

Many different aspects of hedgerows are important for wildlife. Species-rich hedges will provide a variety of foods at different times of year, with flowers supplying nectar and pollen for insects in the spring and summer, and fruits and berries sustaining birds and mammals over the winter months. Hedges are used as nesting sites, while bats will use tall hedgerows to commute between feeding and roosting areas. Hedgerow trees provide shelter for insects such as moths, and may act as stepping stones across farmed landscapes. Hedges and hedge base vegetation provide many species with cover from predators and refuge from farming operations such as ploughing and harvest.

Hedgerows and dormice

Dormouse occurrence in hedgerows has declined by 64% since the late 1970s. Dormice need species-rich hedgerows that can provide different foods at different times of year, such as hawthorn flowers in spring, insects in summer, and hazelnuts in autumn to build fat reserves for the winter. Hedgerows can support breeding populations of dormice and are also used as dispersal corridors, linking copses that are too small to support viable populations on their own. However, even small gaps in a hedgerow can prevent dormouse dispersal, so sympathetic management is crucial.

Dormice leave tooth marks on the outside of hazelnut holes, while neat gnaw marks follow its circumference, smooth to the touch © PTES

Gappy hedge, probably due to flailing at same height for many years © Rob Wolton, Hedgelink

Hedgerow management

Hedgerows are still being lost from the English countryside but, over recent years, this has been due more to neglect or harmful management, particularly repeated annual cutting to the same height for many years, rather than grubbing out. Many remaining hedgerows are in poor condition. The main problems are excessive gaps, a structure that is too short or too thin (especially at the hedge base), or low fruit (e.g. berry) production. Hedges need to be rejuvenated through laying or coppicing, as well as cut on a rotation that allows growth and flowering, both of which will have benefits for the health and vigour of the hedge as well as for the wildlife that use it.

If hedges need to be cut, aim for different heights around the farm © Rob Wolton, Hedgelink

Cutting

Recent studies show hedges should be cut on a minimum of a three year cycle to deliver more benefits for biodiversity. Hedge shrubs produce few flowers in the second year and, since many hedges are cut early in the autumn, any berries that are produced are removed before they can be taken by birds and other wildlife. Cutting not more than once every three years will result in much better flowering and fruit production, and will help birds, and insects such as the brown hairstreak butterfly, whose eggs need to safely overwinter on young blackthorn stems. Trimming in January or February rather than the autumn will allow berries to be used by wintering birds, and will avoid the destruction of birds' nests during the spring and summer.

Rather than trimming all hedges to the same height, it is important to aim for a variety of hedge heights and widths to provide a range of habitats for wildlife. Yellowhammers and partridges, for example, prefer short hedgerows with grass margins, while bullfinches prefer wide hedgerows over 4m tall. Dormice and many species of bat benefit from tall hedgerows, especially if they link patches of woodland.

Brown hairstreak caterpillar on blackthorn
© Rob Wolton, Hedgelink

Trim hedges not more than once every three years to increase fruit supplies
© Rob Wolton, Hedgelink

Hedgerows

Laying a hedge in the Midland style © Rob Wolton, Hedgelink

A hedge one year after laying
© Durham Hedgerow Partnership, Hedgelink

Newly coppiced hedgerow
© Durham Hedgerow Partnership, Hedgelink

Hedge laying

Hedge laying was once common practice on nearly all farms and its decline has resulted in a decrease in the value of hedges for wildlife. Hedge laying is another form of hedge management. Each stem is partially cut through, then the stems are laid over and woven together to produce a thick living barrier which re-grows from the base. There are over 30 styles in the UK, each developed over many years to suit different climates, farming practices and tree and shrub types. Laying the hedge rejuvenates it, encourages new shrub growth and keeps it bushy and healthy. Once laid, trimming should keep the hedge in good order for up to 50 years when it may be laid again.

Coppicing

Coppicing involves cutting stems to ground level and allowing the stools to re-grow. It is particularly useful if a hedgerow is ready for rejuvenation but has too few stems for hedge-laying, or if the hedgerow is very wide. If the re-growth is protected from grazing by deer and livestock, a thick dense hedgerow can be recreated in this way in just a few years. It also gives the opportunity to plant up any gaps.

Hedge base vegetation

The value of a hedge for wildlife can be greatly enhanced by managing the hedge base to encourage plenty of vegetation. Hedge bases may have remnant populations of woodland flowers such as primroses, or plants such as cow parsley and hedge garlic, all of which provide important sources of nectar for a range of pollinator species. Tussocky grasses at the hedge base provide safe places for invertebrates, amphibians, reptiles and small mammals. Roots and woody stumps provide additional wildlife habitat.

A mature oak hedgerow tree
© Tree Council Image Bank, Hedgelink

Hedgerow tree with protective tree shelter
© Emily Ledder, Hedgelink

Recently planted hedge
© Durham Hedgerow Partnership, Hedgelink

Hedgerow trees

Hedgerow trees are traditionally part of the UK landscape and havens for wildlife (Box 3), but their numbers have declined dramatically because there are not enough young trees to replace specimens that die or are felled, mainly because saplings are prevented from growing by hedge cutting. Mature or dead hedgerow trees should be replaced by avoiding some saplings of native species during hedge trimming, or by planting new trees. If they are not a hazard, some old or dead trees can be retained, as they support important insect communities and may be used by hole-nesting birds. In 2010, Entry Level Scheme (ELS) options were introduced to support the tagging of young hedgerow trees and to protect the root systems of mature hedgerow trees by creating buffer strips.

New hedgerows

A good hedgerow, planted in the right place, can provide shelter, make a stock-proof barrier, enhance the landscape and benefit wildlife. New hedgerows that link with existing ones or with other habitats will be particularly valuable (Box 4), and hedgerows in combination with other features, such as ditches or field margins, may be especially valuable.

Planting hedgerow species that have a diversity of flowering and fruiting times will help wildlife. In general, native plants, such as blackthorn, hawthorn, and hazel, will support more species than non-native plants, and hedge plants that are characteristic of the local area will fit best into the landscape and be most likely to establish well and flourish. The best time to plant hedges is in the winter, and they may need protection from livestock and wildlife for the first few years. Detailed information on how to plant hedgerows can be found on the Hedgelink website.

Hedgerows and the Single Payment Scheme

To meet the conditions of the Single Payment Scheme, hedge trimming between 1 March and 31 July must be avoided, and hedgerows must have at least a 2m wide uncultivated strip from the middle of the hedge.

Swallowtail moth © Rob Wolton, Hedgelink

Hedgerow trees for moths

The importance of two key farmland elements - field margins and hedgerow trees - was assessed for moths, by light trapping over four summers across Upper Thames farmland. We recorded a total of 311 larger moth species, many of them spectacularly beautiful.

Our findings highlighted the importance of hedgerow trees, and wide field margins, in the conservation of wider-countryside moths. Wide field margins were beneficial for moths, but hedgerow trees had an even greater impact. Why did hedgerow trees increase moth numbers? When we looked at the types of moths found, we discovered that even those species whose caterpillars did not feed on the trees were in greater numbers. This suggested that hedgerow trees do not merely act as food resources, but provide important shelter for many moths in exposed agricultural landscapes.

Hedgerow trees may act as 'stepping stones' for some moths, especially less mobile ones, helping them to cross open agricultural landscapes in search of resources. They could become increasingly important, since they may help species to move northwards in response to climate change. Since 2010, options for tagging and buffering hedgerow trees are included in Environmental Stewardship.

Key results

- **Hedgerow trees are even more important for many moths than wide field margins**
- **They provide shelter in open agricultural landscapes**
- **Support for hedgerow trees is now available through Environmental Stewardship**

Hedgerow trees provide shelter for moths
© Ruth Feber

Bank vole © Michael J. Amphlett

Hedgerows and small mammals

We wanted to find out which features of hedgerows were most important for small mammals. Using live-trapping methods (the animals are released after capture), we surveyed 180 hedgerows in four pastoral farmland locations throughout England and south Wales for five different mammal species (wood mice, bank voles, field voles, common shrews and yellow-necked mice). We also recorded information about each of the hedges we surveyed.

The results showed that the wider the hedgerows, the more small mammals they supported. Another important feature was how well linked the hedgerows were to each other and to woodland patches: higher levels of connectivity of a hedgerow increased the numbers of wood mice found. Conversely, the more gaps there were in hedgerows, the fewer bank voles were found. Where hedgerows had other habitats associated with them, such as ditches and conservation headlands, we also found increased numbers of small mammals.

The ages of animals captured indicated they were resident and breeding in the hedgerows, rather than using them as migration routes alone. These results further highlight the importance of hedgerow habitats on farmland.

Key results

- **Wider hedgerows support more small mammals**
- **Hedgerows that are connected to other hedgerows and woodland are especially valuable**
- **Hedgerows next to other habitats such as margins and ditches had more small mammals**

Hedgerows well linked to others have more wood mice ©Tree council Image Bank, Hedgelink

Hedgerows

Management summary		
	Key actions	Potential benefits
Hedge management	• Cut hedges on a rotation and do not cut more than once every three years	Will allow growth and fruiting of hedge
	• Aim for hedgerows of different heights around the farm	Will provide a variety of suitable habitats for different birds and mammals
	• Lay or coppice hedges to rejuvenate them	Laying or coppicing will give them a new lease of life
	• Avoid repeated cutting to the same height	Relaxing the cutting regime encourages a dense growth of healthy hedgerow stems
Hedge planting	• Use a mixture of native species, preferably those that are locally common	Will provide the best food resources for wildlife, and fit best in the landscape
	• Where possible, try to link areas of woodland, other hedges or semi-natural habitats	Hedgerows can help wildlife move through the landscape from one patch of habitat to another
Hedgerow trees	• Encourage and protect hedgerow trees	Hedgerow trees are very valuable for wildlife

Options especially relevant for hedgerows		
Code	Countryside stewardship options / capital items	Tier
BE3	Management of hedgerows	Mid
BN5	Hedgerow laying	Mid
BN6	Hedgerow coppicing	Mid
BN7	Hedgerow gapping up	Mid
BN8	Hedgerow supplement - casting up	Mid
BN9	Hedgerow supplement - substantial pre-work	Higher
BN10	Hedgerow supplement - top binding and staking	Mid
BN11	Planting new hedges	Mid
TE1	Planting standard hedgerow tree	Mid

Find out more at:
www.hedgelink.org.uk www.rspb.org.uk www.ptes.org www.hedgelaying.org.uk www.naturalengland.org.uk

Muntjac © Andrew Harrington

Woodland & scrub

Woodland has the potential to be one of the richest lowland habitats for wildlife. From the flowers that carpet woodlands in spring, to mosses, fungi, and invertebrates that, in turn, provide food for many mammals and birds, woodlands are home to an immense number of species. They are especially important in the wider landscape, and much farmland wildlife will use woodlands or scrub at certain times of year for nesting or foraging. The trees themselves can provide timber, shelter, or amenity value.

Key points

- **Farm woodlands and scrub have great potential for wildlife**
- **They provide vital food, nesting sites and shelter for wildlife in the farmed landscape**
- **Encouraging native tree and scrub species, and managing for a range of structures and varying light levels will result in a rich diversity of wildlife**

Woodland & scrub

Primroses are one of the most well known woodland flowers, providing important early nectar for butterflies and bees
© Chris Gardiner/Natural England

Woodlands can support a great diversity of plants and animals. There are around fifty native tree species in the UK and a number of non-native trees (often planted). The range of species present defines the type of woodland and, to an extent, the biodiversity it can support. Ancient and native woodlands are especially important for wildlife, but many are now small in size (almost half of the ancient woodlands in England are between 2 and 5ha) and frequently isolated from other woodlands and semi-natural habitats. Woodland species are often not very mobile, and so are particularly vulnerable to impacts from surrounding land use and the effects of climate change.

Woodlands can have a diverse and species-rich vegetation. Shrubs, such as hazel, hawthorn and holly, often provide an important understorey vegetation, while mosses, ferns and wildflowers appear throughout the year. Among the most characteristic and well known are flowers such as bluebell, primrose, wood anemone and snowdrop, which carpet the woodland floor in spring and provide early sources of nectar for pollinators, such as bumblebees.

Woodland vegetation supports a complex community of invertebrates, birds and mammals. Most UK mammals use woodland habitats for at least some of their time. Some small mammals, such as wood mice, may move into woods from surrounding farmland at times when food or shelter in the fields is scarce. Dormice are much more dependent on woodland, requiring species-rich, structurally diverse woods with good canopy cover. Nearly all bat species found in the UK spend some of their time in woodland, and some are restricted to ancient woodland.

Broadleaved woods have an abundant birdlife, including resident species such as tree creepers, great tits, nuthatches and greater and lesser spotted woodpeckers. Spring and summer visitors to woodland include chiffchaffs and blackcaps, and coppiced woods are especially important for nightingales. The nocturnal tawny owl is a woodland resident, and several species of raptor will use woodland for nesting.

Noctule bats use woodland for roosting and feeding © wolf359 CC BY NC SA 2.0

Tawny owls are found in woodland
© Paul Buxton CC BY NC ND 2.0

The threatened pearl-bordered fritillary butterfly can be found in coppiced woodland clearings in spring © Vince Garvey1 CC BY NC ND 2.0

An abundance of insects and other invertebrates thrives in broadleaved woodlands. Of Britain's native trees, the English oak, in particular, supports the greatest number of insect species. A high proportion of the UK's beetles are associated with woods and trees, especially ancient ones. Some declining butterfly species, such as pearl-bordered fritillary, rely on coppiced woodland for their survival, while other species, such as speckled wood and green-veined white, are commonly found in woodlands. Woodland moths are even more diverse (Box 5).

As well as the species of tree in a woodland (whether native or non-native), how much biodiversity a woodland can support depends on three other main factors: the amount of light beneath the canopy, the age of the trees (and how long woodland cover has been there), and the structural diversity within the woodland. This is affected by management and other factors such as deer browsing (Box 6). Native broadleaved woodland (especially ancient woodland), managed to allow different amounts of light through, and having different habitat structures, will have the greatest diversity of wildlife. Wildlife can nonetheless be encouraged in all woodlands, with the right management.

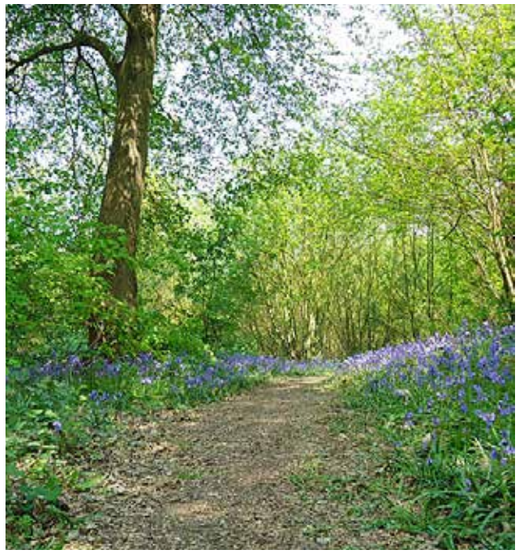
Which trees are best for biodiversity?

English oak © Rob Wolton, Hedgelink

Woodland biodiversity is affected by whether the main tree species making up the woodland are native to Britain or not. In general, native trees will be best for biodiversity.
Tree species introduced from other countries are often unpalatable to native species of invertebrates, which have not evolved to feed on them. For example, over 200 invertebrates are associated with native oaks, compared to fewer than 50 species on introduced larch.

Coniferous woodlands tend to have a lower biodiversity than broadleaved woodlands, partly due to the fact that most coniferous woods in England are plantations of non-native tree species. However, they still have value, often for different species to those which occur in broadleaf woodlands. For example, birds such as goldcrests prefer conifers, and will provide food for predators such as the sparrowhawk, which often uses conifers for nesting.

Woodland & scrub



Coppiced woodland in spring with rich ground flora © Roger Jones CC BY SA 2.0

A coppiced chestnut stool
© Roger Jones CC BY SA 2.0

The striking amethyst deceiver is found in deciduous woods © Rob Wolton, Hedgelink

Woodland management

Coppicing and creation of rides and clearings are effective ways to increase biodiversity within broad-leaved woodlands. Coppicing is an ancient form of management, which involves repetitive felling on the same stump, near to ground level, and allowing the shoots to regrow from that main stump. It is a highly effective method of producing a great deal of fast growing, sustainable timber without the need to replant. Coppiced woods are also exceptionally good for wildlife. Where coppicing is done on a rotation, the areas of varying canopy density through the woodland provide a range of habitats for wildlife. Coppicing, ride widening and glade creation all allow more light into the woodland, encouraging a rich ground flora and an abundance of invertebrates and birds.

Areas of good tree cover and shade should also be present in a woodland. These areas are important for a variety of other plant and animal species which cannot survive in more open areas. The cover and shade provide a damp, cool, sheltered microclimate in which certain species thrive, including a number of invertebrates, mosses, liverworts, ferns and fungi. Many common dead wood invertebrates need rotting wood that is left to decay in the shade, while some of our rarest moths are only found in dark, shady woodlands.

New woodlands

New woodlands can be planted to encourage biodiversity. The choice of species, planting density and management will all affect the wildlife that will colonise and use the new woodland. Woodlands that are linked to other areas of habitat will be of great value, and if the woodland can be designed to have a sympathetically managed buffer zone around it, this will also encourage species that need woodland edge habitats. Care should be taken to ensure the site is not already of high biodiversity interest, such as a species-rich meadow. Much information is available on how to manage existing woods or create new woodlands, and specialist advice is available using the website links at the end of the chapter.

Whitethroats favour young, scattered scrub for nesting © Steve Garvie CC BY SA 2.0

Bullfinches nest in older, mature stands of scrub © Geli CC BY 2.0

Oak tree in arable field
© Rob Watling CC BY NC ND 2.0

Scrub

Many farms that do not have woodland may have scrub. This is a vegetation stage intermediate between open ground and woodland, and can comprise scattered shrubs, young trees, or a dense thicket. Influenced by soil type and location, common scrub species are hawthorn, blackthorn, willow or bramble. Scrub of varied age, species and structure supports the greatest wildlife diversity, through the provision of nectar, pollen, fruits, seeds, shelter and nest sites. Scrub in field corners, along woodland edges and as scattered patches along hedgerows are all highly valuable wildlife habitats, and may also buffer woodland, hedgerows and ditches from farm operations.

Scrub will establish and develop naturally if left to do so, ultimately growing into woodland, and so will require management to ensure the desired balance of habitat is maintained. Older stands can be removed, and younger growth allowed to develop, using rotational management around the farm. Grazing and browsing, as well as mechanical means, can be used to manage scrub, although the grazing pressure needs to be appropriate to allow scrub to regenerate or to control it where required.

In-field trees

Many large, old trees can be found in wood-pasture, or as in-field trees within arable or grassland areas. Ancient in-field trees, such as mature oaks or old pollards, may often be a remnant from a former hedgerow, long since destroyed. Such trees are important for a range of wildlife, including invertebrates, fungi, bats and birds that depend on them for all or part of their lifecycles. At a landscape scale they are highly valuable features, providing 'stepping stone' habitats across farmland, and may help wildlife to move through the landscape. In-field trees are particularly threatened by cultivation and other agricultural activities. Environmental Stewardship support is available to help support their protection.

Clifden nonpareil © Mark Parsons/Butterfly Conservation

Managing woodland for moths

In the UK, 71 formerly widespread moth species are suffering rapid and severe declines and are listed as Biodiversity Action Plan (BAP) species (in addition to another 80 threatened BAP moths with more specific requirements). Most of the formerly widespread moths use woodlands to a greater or lesser extent.

Using light traps, we surveyed moths in Tytherley woods, on the Hampshire/Wiltshire border. The aim was to find out how moths are affected by woodland management. Moth numbers were lowest in young coppice (characterised by plenty of bare ground) and highest in sheltered standard rides and woodland. Sheltered, dark, humid woodland was especially valuable for some scarce moths, while moths that depend less on woodland, but are nonetheless declining in the wider countryside, preferred wide woodland rides and young coppice. Young coppice can support different suites of species. The results highlight the importance of having a variety of woodland habitats for moths.

We recorded 11,670 individuals and 265 moth species over three months, with some exciting new records. A notable find was that of the beautiful Clifden nonpareil, a rare moth recorded from only a handful of sites in southern England and, until recently, thought to be an immigrant. The numbers of this moth found strongly suggest the existence of a resident breeding population.

Key results

- **Create or maintain cores of dark woodland habitat**
- **Create lighter woodland zones around the darker core by coppicing or wide woodland rides**
- **Having different zones will benefit a range of species, from deep shade- or moisture-loving woodland moths, to moths that prefer lighter, more open, woodlands**

Moths can be sampled by light trapping © nutmeg66 CC BY NC ND 2.0

Roe deer © Don Sutherland CC BY NC ND 2.0

Deer grazing affects small mammals

Long term studies in Wytham Woods, Oxfordshire, suggest that increasing deer numbers may have had significant impacts on small mammals.

We established deer exclosures to study the effects of deer grazing on small mammals. The 2.5m high deer fence around each exclosure excluded all deer but allowed mice and voles to move freely. The fence minimized grazing pressure, leading to a much denser understorey. Between 2001 and 2003, we compared numbers of wood mice and bank voles inside the deer-free exclosures with those in the surrounding deer-grazed woodland. Bank voles were found to occur in much higher numbers inside the exclosures, while wood mice were much more common in the surrounding woodland.

A further study looked at how the three-dimensional forest structure was used by woodland rodents One in five wood mice and one in ten bank voles were caught in trees, up to heights of 2.20m, confirming that arboreality is common in small mammals. Bank voles, however, were less likely to climb as high as wood mice due to their lack of agility and their need for dense vegetation as protection from predators. This may help to explain why densities of bank voles increased significantly where browsing pressure was eliminated, highlighting the potential effect of deer over-grazing on small mammals.

Key results

- **Deer overgrazing can affect woodland small mammals**
- **Bank voles and wood mice will both climb trees but bank voles are less agile**
- **Bank voles need more understorey cover than wood mice**
- **Where deer are excluded in woodland, bank voles increase**

Bank voles in woodland are vulnerable to overgrazing by deer © Evan James CC BY 3.0

Woodland & scrub

Management summary		
	Key actions	Potential benefits
Woodland management	• Coppicing	Opens up areas of woodland and creates a dynamic environment
	• Ride creation or widening	Allows light into the woodland to benefit species such as butterflies
	• Leave darker areas for specialists	Many rarer invertebrates have specific requirements for dark, damp woodland areas
Woodland creation	• Seek advice on existing habitats	Woodland should not be planted in existing areas of high biodiversity e.g. meadows
	• Plant native species	Native species support more wildlife
	• Woodlands that extend existing ones or link other habitats are especially important	Can help species move through the landscape
	• Seek advice on woodland creation and management	
Scrub	• Balance management to have a variety of ages, structures and locations of scrub	Provides good habitat for a range of invertebrates and birds
		Scrub at sheltered field corners and woodland edges is especially beneficial
In-field trees	• Retain and protect in-field trees	Valuable for a range of wildlife

Options especially relevant for woodland & scrub		
Code	Countryside stewardship options / capital items	Tier
BE1	Protection of in-field trees on arable land	Mid
BE2	Protection of in-field trees on intensive grassland	Mid
WD1	Woodland creation - maintenance payments	Higher
WD2	Woodland improvement	Higher
WD3	Woodland edges on arable land	Mid
WD4	Management of wood pasture and parkland	Higher
WD5	Restoration of wood pasture and parkland	Higher
WD6	Creation of wood pasture	Higher
WD7	Management of successional areas and scrub	Mid
WD8	Creation of successional areas and scrub	Higher
WD9	Livestock exclusion supplement - scrub and successional areas	Mid
TE4	Supply and plant tree	Higher

Find out more at:
www.forestry.gov.uk www.woodlandtrust.org.uk www.buglife.org.uk www.naturalengland.org.uk
www.ptes.org www.butterfly-conservation.org