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Managing Woodland For Pollinators

Woodlands provide a range of habitats and features that are beneficial to pollinators. This guide highlights why woodlands are important for pollinators and how they can be managed to provide additional benefits

The important habitats of woodland and their management

Woodland edges provide valuable food and shelter for pollinators. Many woodlands (for example fenced off woods) have little edge habitat, so creating a few metres of uncultivated or unmown habitat where Hogweed, Cow parsley, thistles, knapweeds, ragwort and some bramble can grow will be extremely beneficial to pollinators. These areas can be sown as wildflower strips, however naturally occurring or regenerating plants will be most beneficial to pollinators.

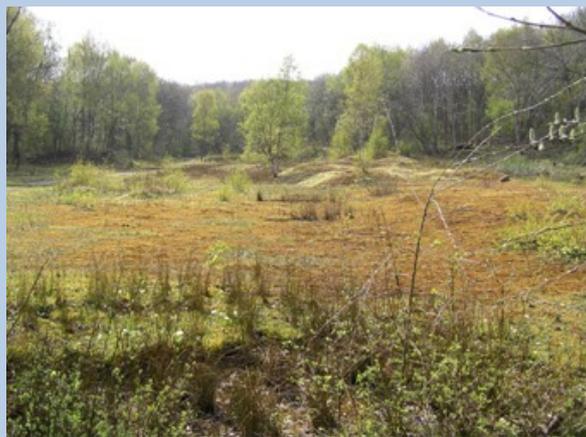
East and south-facing edges, which get the sun and warm up first in the morning are useful to the many pollinators that forage early in the day. These edges also tend to provide better shelter from the prevailing wind (wind can significantly reduce foraging activity). West-facing edges get the sun too late in the day and are often more exposed to winds, and so cooler. Shady north-facing edges can be useful to pollinators during droughts or hot periods.

Rides and clearings extend sunny conditions into the heart of a wood and are valuable for pollinator foraging. They must be sufficiently large and sheltered to provide warm, sunny conditions. If they are too small, the shade thrown by trees will produce less flower-rich habitat and reduce their value for pollinators. 'Scalloping' edges through tree and shrub clearance, or by regular coppicing, can be used to create rides of varying widths containing sheltered glades or embayments. South-

facing embayments that get lots of sunshine and warm up quickly are particularly important.

Blossoming shrubs and trees (sallows, Blackthorn, Gorse, hawthorns, Wild cherry and Crab apple), along with brambles, roses and taller flowers such as Hogweed and thistles should be encouraged along the edges of rides and clearings, especially in areas that get the most sun. The best rides for pollinators have a mix of habitats; with bare ground in the middle flanked by grassland or heathland, then scrub and tall herbs, and finally trees. Managing rides (both cutting of woody material and mowing of grassland areas) in rotation and in relatively short sections at a time will produce more diverse conditions, and ensure that woody species do not shade out other habitats. It is important not to mow or cut the entire ride system of a wood from one side to the other in a single year; a 3-5 year mowing rotation is ideal for pollinators.

Careful management of ride intersections can create clearings that catch the sun from morning until evening. These are some of the best places to encourage larger blossoming tree and shrub species such as Wild cherry, Goat willow or Rowan. Many pollinators do not like to fly through shady woodland interiors, so well-connected rides and clearings provide easier access to all of the potential breeding or foraging habitats.



A wide ride (top left) with zoned edges is much better for pollinators than a narrow shaded one (top right); coppicing is a good way of keeping rides wide and varied (bottom left); a large woodland clearing (bottom right).

Coppiced areas can be of high value for pollinators. Newly coppiced areas often produce spring blooms of flowers such as violets, Bugle, Lesser celandine, Primrose and bitter-cresses. Violets are the food plant for several species of fritillary butterflies and queen bumblebees favour Bugle. The warm ground and low foliage in newly coppiced areas are important for sunbathing insects (many pollinators need to maintain a high body temperature to forage and mate, and need to warm up as early as possible in the morning to maximise their activity). Isolated coppice areas ('coups') surrounded by dense woodland can be difficult for pollinators to access, so coppicing works best for pollinators where coups are linked to each other and to rides.

Dead wood associated with living trees (e.g. heart rot, decaying roots, rot holes, sappy wounds, attached dead branches or partially dead coppice stools), or with dead standing trees, dead fallen trees, detached branches or old stumps provides vital habitat for pollinator nesting and larval development. Dry dead wood in warm, sunny locations is particularly important for aerial nesting solitary bees such as mason bees and leafcutter bees.

Saproxylic insects (species which depend on dead or decaying wood) use a range of tree species, but Aspen, Beech and willows support a number of unique species. Saproxylic hoverflies often prefer damp or shaded dead wood such as wet heart rot, water-filled rot holes and decaying roots that have attained a porridge-like consistency underground.

It is important to maintain a variety and good amount of dead wood habitat, both naturally occurring and from spare wood from felling. Log piles should be created in both sunny and shaded locations and new supplies of fresh dead wood provided periodically, as some is only suitable for the first one or two years.

Topography - Most woods will have small-scale features such as wood banks, exposed root plates of windblown trees, ditches and small pits and quarries. When located in warm, sunny and dry conditions these can be very valuable for ground-nesting bees. Where absent it is possible to develop these features by creating low banks along rides or using any spoil arising from, for example, ditch management.

Tree stock and its replacement - Dense conifer woodlands have limited value for pollinators. Felling of conifers provides an opportunity to create new open spaces and to replace the conifers with more pollinator-friendly species. Woods with good systems of rides and clearing have greater value for pollinators. If a wood lacks spring blossoming trees and shrubs these could be introduced at the edges of rides and clearings or along sunny woodland margins.

Many woods, even ancient ones, now have fairly artificial or heavily modified tree communities, so tree communities can often be managed to better serve pollinators without substantially damaging the ecological, historical or economic value of a woodland.

Some individual tree species are important for particular pollinators. Several hoverflies and moths are associated with Aspen, many other moths specifically require oaks, birches, willows, limes or elms and several mining bee species only collect pollen from willows. A number of widespread hoverfly species are associated with aphids on conifers, or the dead wood of conifers. The diversity of tree and shrub species will have a significant effect on pollinator diversity, particularly hoverflies and moths.

Wet habitats - Wet woodland and other wet features, including ponds, ditches, seepages and watercourses can be very valuable for pollinators. For example, shallow water, wet mud, wet mosses, and semi-submerged woody debris are used by some pollinating flies to breed in. In unshaded conditions wet habitats tend to be very flowery from early spring until early autumn, providing food for many pollinators. It is important that wet woodland is not drained. Limited tree-felling to create marshy clearings can be beneficial for pollinators, but as shaded wet woodland is also important it is useful to maintain both open and shaded areas. It may be beneficial to create a new pond or non-draining ditch within a wood that lacks wet features.

Invasive species can provide pollen and nectar for pollinators, however they often impact detrimentally on pollinator habitats. Sycamore invasion can be an issue in some woodlands, as it can spread quickly to the detriment of other tree and plant species. However Sycamore does provide valuable spring blossom and its foliage supports strong aphid colonies providing food for

predatory ladybird larvae. Rhododendron flowers are liked by bumblebees, however rhododendrons have a pronounced impact on the ground flora and can eventually displace other spring flowers and shrubs. Some conifers, most notably Western red cedar can also become invasive species, displacing other native species while not providing either food supplies or good dead wood habitat. Other invasive woody species that may require control include Cherry-laurel, Portuguese laurel,

Rare pollinators - The needs of rare pollinators can be highly precise and may require specific management regimes. Information on scarcer woodland butterflies is relatively easy to come by through Butterfly Conservation, however information for scarce bees, hoverflies or beetles is less easily sourced. If you have a rare pollinator in your wood and would like advice please contact Buglife. If the wood is a Site of Special Scientific Interest, you should also contact the relevant statutory organisation (i.e. Natural England, Scottish Natural Heritage, National Resources Wales and Northern Ireland Environment Agency).

Some rare pollinators of woodland (excluding wood pasture specialists):

Bees: Oak mining-bee (*Andrena ferox*), Long-horned bee (*Eucera longicornis*), Hairy-horned mason bee (*Osmia pilicornis*)

Butterflies: Duke of Burgundy (*Hamearis lucina*), Heath fritillary (*Melitaea athalia*), Marsh fritillary (*Euphydryas aurinia*), Pearl-bordered fritillary (*Boloria euphrosyne*), Purple emperor (*Apatura iris*), Wood white (*Leptidea sinapis*)

Hoverflies: Pine hoverfly (*Blera fallax*), *Caliprobola speciosa*, Logjammer hoverfly (*Chalcosyrphus eunotus*), Sooty cheilosia (*Cheilosia carbonaria*), Aspen hoverfly (*Hammerschmidtia ferruginea*), *Melangyna barbifrons*, Grey-backed snout hoverfly (*Rhingia rostrata*)

Beetles: Noble chafer (*Gnorimus nobilis*)



Turkey oak, Holm oak, Japanese knotweed, Snowberry and Cotoneaster.

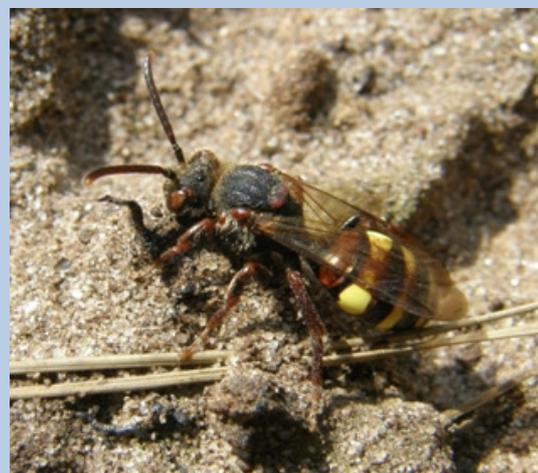
Herbaceous invasives that could impact on pollinator populations include Himalayan balsam, skunk cabbages, Snowdrop and Spanish bluebell. Himalayan Balsam can dominate wet woodland and the banks of watercourses. Snowdrop often flowers in late winter and is forgotten by summer, but its dense bulbs may be displacing other native flowers that flower in spring.

Recreational activities can have both positive and negative impacts on pollinators. Trampling along drier woodland tracks or bridleways can help maintain a strip of bare ground and adjacent short sward that is ideal for ground-nesting bees. Public access can also be a strong incentive for maintaining rides and undertaking coppicing. However, in suburban woods where recreational pressure is very high, ground flora can become highly impoverished. Bridleways through woods can provide an additional input of horse dung that

promotes the populations of certain fly pollinators and supplements any dung input from deer and Badgers.

Native pine woodland is a fantastically rich habitat for pollinators, supporting a high diversity and high abundance of bumblebees and hoverflies. Continuous cover forestry management typical of these woodlands helps to provide a range of conditions and habitats which supports diverse pollinator communities. Key species include Bilberry, Cowberry, Eared willow, Rowan, Bird cherry, Broom, bird's-foot-trefoils, Marsh thistle, heathers and Devil's-bit scabious. Management principles are the same as for broadleaved woodland, i.e. the need for open spaces, dead wood and flowery areas. Upland heath, boggy areas and woodland lochs associated with native pine woodland are all important for sustaining pollinator abundance and diversity.

Old-growth Aspen woodland is another rare woodland type of the Scottish Highlands that supports some rare pollinators.



Sparsely-vegetated dry ground, especially that of south-facing slopes in sunny spots are important for ground-nesting mining bees and furrow bees and their associated parasites like nomad bees. Clark's mining bee (*Andrena clarkella*) and Early nomad bee (*Nomada leucophthalma*) featured.

How do pollinators use woodland?

Hundreds of pollinator species can interact with woodland, including butterflies, moths, bees, wasps, hoverflies, and also many other types of fly, sawfly, beetle and bug. They do this in a various ways:

Food - Woodlands can provide a wide range of flowers between March and October, providing nectar and pollen for many pollinators. These flowers are used not only by pollinators breeding in a wood but will attract others from some distance away. Woodland flowers generally occur in warmer and more sheltered locations, which means they can be better exploited on cooler, windier days. Woodland flowers can also be important in heat-waves and drought periods, when the shade and higher humidity of woods can allow foraging that is difficult in more open countryside.

Breeding - Woodlands can support breeding and nesting habitats for a variety of pollinators. Important features include:

- Pools, puddles, ditches, springs, seepages and water-filled rot-holes of trees, which provide habitats for hoverflies and other pollinators with aquatic larvae
- Dead wood and old trees which provide habitat for flies and beetles with 'saproxylic' larvae, for aerial-nesting bees and wasps, and for hibernating insects

- Old rodent burrows and dense vegetation are used for bumblebee nesting
- Banks and dry ground in sunny rides and clearings provide habitat for ground-nesting bees (e.g. mining bees) and their flower-visiting parasites (e.g. bee flies and nomad bees)
- Dung for various flower-visiting flies e.g. dung flies, anthomyiids, muscids and *Rhingia* hoverflies
- Carrion for flower-visiting blowflies (e.g. bluebottles and greenbottles)

Overwintering - the sheltered nature of woodland, and the presence of dead wood, old trees, leaf litter and dense vegetation makes it a valuable habitat for hibernating adult insects such as queen bumblebees, queen social wasps and certain butterflies and hoverflies. It is also important for overwintering larvae, pupae and eggs of resident species.



Autumn: Wild angelica, Devil's-bit Scabious and Ivy are very important late season forage plants that can attract large numbers of pollinators. Red-shanked carder bee (*Bombus ruderarius*) and a Hornet (*Vespa crabro*) featured.

Seasonality

Woodland, exhibits strong seasonality in the food resources it provides to pollinators. The variety and combination of flower resources, along with the availability of habitats for breeding and overwintering, will impact the pollinator community present. Flowering periods vary across the British Isles, and woodland floras are influenced by location, underlying geology and soil type, the age and historic management of a wood, the tree species present and hydrology.

Spring

The first woodland flowers and pollinators appear in March. Cherry-plum, Goat willow, Grey willow, Common gorse, Lesser celandine and Primrose are important for queen bumblebees, the early solitary bees, butterflies such as Brimstone, Small tortoiseshell and Peacock, and an assortment of flies (especially hoverflies, blowflies and dung flies). In April, blossoming Blackthorn, Bullace, Wild cherry and Crab apple, along with violets, Wood anemone and Wood sorrel provide important pollen and nectar supplies for hoverflies, bees and butterflies and queen bumblebees which are starting to establish nests. Wet woods have Marsh marigold, Butterbur, Cuckoo-flower, golden-saxifrages, Blackcurrant, Redcurrant and willows such as Osier and Crack willow. In May important flowers for pollinators include Bluebell, Greater Stitchwort, Bugle, Yellow archangel, Wood spurge and Ramsons. In rides and clearings Hawthorn, Field maple and Guelder-rose and flowers such as Cow parsley, Creeping buttercup, White dead-nettle, dandelions, Daisy, forget-me-nots and speedwells provide valuable pollen and nectar. On acid soils woodland may also contain flowering Rowan, Bilberry, Holly and Common gorse, while on chalk and limestone Wayfaring tree and Whitebeam are important.

Summer – shade now concentrates pollinator activity into rides, clearings and woodland edge. Important flowering shrubs in June include Elder, Dogwood, Guelder rose, brambles, roses and Honeysuckle. Sweet chestnut and Small-leaved lime will also flower during the summer. Important summer flowers include Hogweed, thistles, Black knapweed, ragworts, burdocks, hawk's-beards, bird's-foot-trefoils, clovers, Self heal, hemp-nettles and figworts. Woods on acid soils may also contain Foxglove, Catsear, Tormentil, Wood sage, heathers and Alder buckthorn and those on chalk and limestone may contain Wild parsnip, Hairy St John's-wort, Wild privet and Traveller's-joy. Important plants of wet woodland include Meadowsweet, Wild Angelica, Fool's-water-cress, Water mint, water-cresses, Yellow iris and Great willowherb.

Autumn - Flowering tails off after August but plants such as Heather, Wild Angelica, Common ragwort and thistles continue to flower into September. Of particular importance in September is Devil's-bit scabious, which can attract large numbers of pollinators, especially hoverflies, butterflies, queen bumblebees and Hornets. Ivy is one of the most important autumn flowers and once the Ivy flowers go over (usually mid-October), pollinator activity in woodland usually becomes negligible.

Further reading

- Clarke, S.A., Green, D. G., Bourn, N. A. & Hoare, D. J. 2011. Woodland Management for butterflies and moths: a best practice guide. Butterfly Conservation. On-line version: <http://butterfly-conservation.org/3976/woodland-management-for-butterflies-and-moths.html>
- DEFRA 2014 Woodland – tailored advice on managing land for pollinators: http://www.wildlifetrusts.org/sites/default/files/6192_defra_info_sheet_woodlands_final.pdf
- Forestry Commission 2010. Practice Guide - Managing ancient and native woodland in England. Forestry Commission, Bristol. On-line version: [http://www.forestry.gov.uk/pdf/FCPG201.pdf/\\$FILE/FCPG201.pdf](http://www.forestry.gov.uk/pdf/FCPG201.pdf/$FILE/FCPG201.pdf)
- Kirby, P. 1992. Habitat Management for Invertebrates: a practical handbook. RSPB.
- Buglife - Managing Urban Areas for Pollinators: www.buglife.org.uk/sites/default/files/Urban%20Pollinator%20Sheet%20Final.pdf
- Buglife - Managing Transport Corridors for Pollinators: www.buglife.org.uk/sites/default/files/Transport%20Corridors%20Pollinator%20Sheet%20Final_1.pdf
- Farm Wildlife - <http://www.farmwildlife.info>
- Buglife. Managing priority habitats for invertebrates: www.buglife.org.uk/advice-and-publications/managing-priority-habitats-invertebrates
- Buglife Managing farmland habitats for invertebrates (four leaflets: Grassland, Woodland, Hedgerows and Cereal Field Margins, and Ponds and Ditches. Available online: <https://www.buglife.org.uk/farmland-advice>

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