5 Creating new opportunities for wildlife

5.1 Introducing woodland shade plants

When plant introduction is appropriate
Plant introduction is most appropriate for improving the species diversity of isolated, recent (secondary) woodlands with a sparse field layer, and little prospect of colonisation by shade-tolerant plants. A wide variety of such species can be successfully established in these woods over a period of three to seven years. Small-scale introductions are unlikely to swamp wild populations, especially when they are spatially remote from ancient woods, and local collections can maximise genetic diversity. But if overdone, there is a danger that introductions could obscure natural biogeographical boundaries, so that recent woods may begin to resemble ancient woods, which would not be good conservation practice.

When not to introduce plants
For nature conservation reasons, introducing herbaceous plants into the woodland field layer of ancient woodland, including PAWS, should generally not be undertaken. In the past, species such as wild daffodil and bluebell have been planted to make woods look 'more attractive', or in the belief that woodland biodiversity can be increased by planting species which would otherwise be unlikely or very slow to colonise. This assumes that the species introduced would naturally occur in that particular area or habitat. However, such planting risks bringing non-local ecotypes into the local landscape which could be detrimental to other components of the woodland ecosystem. Introduced plants may also have a narrow genetic base resulting from their artificial selection in a nursery and, in some cases, non-native species can be accidentally introduced, which are more vigorous and subsequently hybridise with native species. Spanish bluebell is a good example, which may now be present in up to 15% of Britain's woodlands. If Spanish or hybrid bluebells are present in your wood, they should be removed to prevent them spreading further into the countryside; for identification and further information see '*Bluebells for Britain*' (Plantlife, 2003).

Existing semi-natural herbaceous plant communities in ancient woodland rarely need to be artificially modified through indiscriminate planting for aesthetic purposes. There may be a better argument for reintroducing species which have been lost, but even this must be carried out very carefully. Planting into recent woodlands in close proximity to ancient woods is also to be discouraged, to avoid risks to the ancient woodland flora. In any case, a woodland so positioned has a better chance of natural colonisation by the desired species, although the rate will be very slow for most ancient woodland species. However, there are exceptions, and some ancient woodland species may colonise the margins of recent woodland (Table 5.1), but even these species must compete with faster colonising shade-tolerant plants such as common nettle and bramble.

Table 5.1
Examples of ancient woodland plants capable of dispersal from lowland ancient woodland into the margins of recent woodland.

Black bryony	Enchanter's-nightshade	Remote sedge
Bluebell	Moschatel	Three-nerved sandwort
Common spotted-orchid	Pendulous sedge	Wood speedwell
Dog's mercury	Pignut	Yellow archangel

Selecting and sourcing plants

If the conditions for introducing plants into the woodland field layer fit the above criteria, there are several options for obtaining seed or plants. Ideally, you should carefully select a mix of species based on site conditions in your wood and on the ground flora present in local woodland reference sites (refer to surveys described in Section 2.4). A range of woodland herbs, grasses and sedges should be specified, although species with limited distributions would not normally be included. The cost per species from a commercial wildflower seed company will be higher than if you purchase their standard woodland mixes, but may be less expensive if fewer species are specified. A useful reference to support species selection is the Highways Agency's *'The establishment of an herbaceous plant layer in roadside woodland'* (Highway's Agency, 2005) available on their website, which includes lists of native herbs and grasses appropriate to the Forestry Commission's seed zones throughout the British Isles, together with their preferred soil types and conditions.

Commercial seed companies also offer 'generic' woodland and hedgerow mixes which typically contain 15–20 wild flowers alone, or mixed with grasses. However, the wild flower component often includes species chosen for their colour and reliable germination, and may not have been collected locally (Table 5.2). Some grow well both in light and shade on moderately fertile soils, but others are less tolerant of shade. Only a small proportion of ancient woodland plants are usually included in a mix. Wild flowers are likely to do less well when mixed with grasses which compete for the same resources, particularly in mixes containing a high percentage by weight of turf grasses such as common bent and smooth meadow-grass. Herb mixes alone, or supplemented with a low density of local woodland grasses such as wood meadow-grass are more likely to succeed.

A more expensive option is to plant small patches with cell-grown plants, particularly those species which are difficult to propagate by seed. The range of plants available commercially is more limited, but includes species such as primrose, bluebell, violets, woodruff and yellow archangel. Again, the provenance of plug plants purchased from commercial companies may not be local.

To overcome some of these concerns, you might consider collecting your own seed from local ancient woods on similar soil types, in which case its local provenance would be assured. Collections also offer the chance to maximise genetic diversity and reduce the risks to co-evolved species such as insect feeders and pollinators. It is important though to avoid over-harvesting; plants should not be dug up, and there is still the risk of imposing artificial selection pressures in small collections. The landowner's permission will be required, and collecting seed can be time-consuming. Many species seed early in woodlands:

Table 5.2
Herbs which are typically found in commercial mixes of woodland plants.

Ancient woodland plants	Faster colonising woodland herbs	Shade-tolerant herbs
Bluebell	Foxglove	Agrimony
Nettle-leaved bellflower	Garlic mustard	Betony
Pignut	Greater stitchwort	Cowslip
Primrose	Hedge woundwort	Hedge bedstraw
Ramsons	Red campion	Meadowsweet
	Upright hedge-parsley	Perforate St John's-wort
	Wood avens	Ragged-robin
	Wood sage	Selfheal
		Tufted vetch
		Yarrow

some will need to be collected from May onwards and stored in a dry, cool place. If you miss the critical time, the seed may already have been shed – ramsons, for example, loses most of its seed within a week when ripe. The sowing conditions are important and a good seedbed is essential for effective germination and establishment. Suitable preparation can be provided by light surface cultivation or, if much vegetation is present, it can be pre-treated with herbicide and the seed sown directly into the killed sward. Alternatively, if the vegetation is sparse, the seed can be broadcast and covered with a thin surface mulch of leaf litter or other suitable material. Sowing into a continuous cover of vegetation without any ground preparation will achieve nothing.

Introduction methods

Introducing herbaceous plants into large areas of woodland would be prohibitively expensive and unnecessary. Sowing or planting in discrete patches should both enhance the diversity of the woodland field layer, and allows for plants to colonise other parts of the wood. A number of factors to consider when determining the suitability of the site are listed in Table 5.3. Most of these parameters need to be met if the introduction of plants is to be successful, with appropriate light levels and lack of weed competition being especially important; so planting in open areas or under the deep shade of conifer plantations for example will not be successful.

Plants of the woodland interior such as bluebell, primrose and ramsons are likely to establish best in shady areas where there is little competition, but even these species will struggle if light levels are too low. The fast-germinating woodland edge herbs included in commercial woodland mixes would do better in areas with more variation in sunlight, such as the shrubby margins of rides and glades. More rapid growth and flowering is likely to occur in this environment, but competition from bramble, ivy, bracken or grasses such as cock's-foot may be more of a problem.

In established woodland where the ground vegetation is sparse, there should be no need for any special ground preparation. Sow the seed in the autumn (September–November), avoiding waterlogged soils, or early spring before the frosts finish (February–April) to provide the chilling required by many woodland species. Sowing rates depend upon which species are being sown, but rates of 1 g per m^2 for grass/herb mixes and 0.5 g per m^2 for

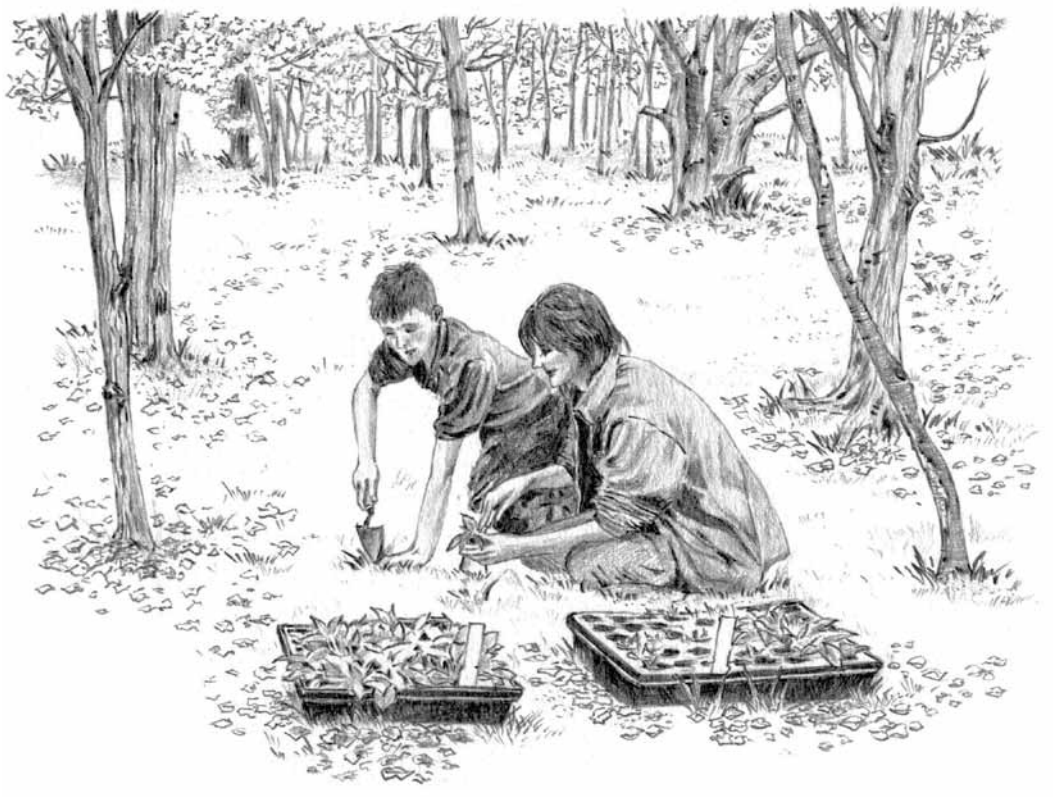
Table 5.3
Site suitability for introducing field layer herbaceous woodland plants (after Highways Agency, 2005).

Site parameters	Preferred state
Overall quality	Good structural diversity in canopy, understorey and leaf litter, leading to varied light conditions.
Light level	Shady to control competitive light-demanding weeds; 15–40% daylight at ground level
Canopy composition	Mixed canopy of native broadleaves and/or native Scots pine, avoiding dense single species plantations
Existing ground vegetation	<30% existing ground vegetation
Dominant weeds	<10% bramble, ivy or bracken; no grassy sward
Soil characteristics	Humid and moist, avoiding winter waterlogged or compacted areas
Aspect and slope	North, east or possibly west-facing slopes, and those less than 1:1.5 are less likely to dry out
Leaf litter	At least 30% cover of leaf litter on soil surface to provide good germination conditions
Patch size	Minimum area 5 x 40 m (0.02 ha)
Location of wood	>1 km from ancient woodland

herbs alone should suffice. If a standard woodland mix is used, the fast-germinating herbs will initially dominate, with interior woodland species not becoming prominent for three years or so. This may not be a problem if you design a woodland interior mix, rather than accepting a proprietary mix.

The more light-demanding species planted along the woodland edge will also benefit from periodic management of the scrubby edge by coppicing and thinning (see Sections 3.3 and 4.1), providing this does not result in too much competition from invasive weeds. If bramble, ivy, bracken, common nettle, thistles or sward grasses become a problem, their spread can be controlled (see Section 4.1), remembering that these species are also valuable components of the woodland flora.

For cell-grown plants, Francis *et al*. (1992) found that 6–9 plants per m^2 gave good results, with species such as bluebell, primrose and wood sage, and that this could be reduced to 3–4 plants per m^2 for species with good vegetative spread such as bugle and yellow archangel. Cell-grown plants are best planted out in spring whilst the soil is still moist, in small groups, possibly in combination with sown plants.



Introducing cell-grown wild flowers into 'light' shade of a young, recent woodland can be a family occasion.

5.2 **Bird nestboxes**

Bird nestboxes can make an enormous difference to the populations of some species, but in many woods they are simply not necessary. First of all you need to assess the availability of natural nest holes in your wood. Mature woodland which has good structural diversity and trees of a wide age range, including older trees with holes and cavities and similar nest sites, is unlikely to benefit from nestboxes. This conclusion may be confirmed if you find evidence of the presence of good populations of a range of hole-nesting birds: consider carrying out a woodland bird survey in spring (see Section 2.3). If there are already enough nesting places, boxes can actually upset the balance of species if they encourage the populations of commoner birds such as blue tit, which can compete aggressively with much rarer species such as marsh tit for nest sites and food (Symes and Currie, 2005). Nestboxes might be considered if a particular species such as pied flycatcher or willow tit is declining or absent, in which case boxes could be put up specifically for the target species, especially if suitable nest holes are in limited supply.

Similar issues arise if you have a new woodland at the stage of canopy closure. Here there will be few if any natural hole-nesting opportunities, but putting up nestboxes will attract relatively common species such as blue tit and great tit. These birds normally feed in the higher canopy, but in young woodland, they might compete for food with declining understorey specialists such as nightingale, garden warbler and willow warbler.

In contrast, nestboxes may be much more successful in secondary lowland woodland with poor structural diversity, lacking in older trees, and hence with few opportunities for hole-nesting birds. Mature woods which have been heavily managed, with few old trees remaining, also lack natural tree holes; examples include lowland mixed deciduous woodland converted to conifer plantations or chestnut coppice with few oak standards remaining; and many of the heavily managed upland oak woods in western Britain. Pied flycatcher and common redstart in particular, which have declined in western oak woods, have benefitted enormously from major nestbox schemes, providing the woodland has sufficient food resources available.

Nestboxes can also be successfully employed for owls in young woodland, or larger open areas associated with mature woodland or plantations. Barn owl boxes erected 3–5 m above the ground on a solitary mature tree or pole may also attract other species such as kestrel and stock dove.

Nestbox design

There is a wealth of literature published by conservation organisations such as the RSPB which describes the construction and siting of nestboxes, and you may derive considerable pleasure from constructing your own boxes. A useful guide to nestbox design is '*The BTO Nestbox Guide*' (du Feu, 2003). However, self-built nestboxes, whilst relatively cheap to construct, tend to suffer from poor durability and may need to be replaced every few years. An alternative material is woodcrete, a mix of wood, clay and concrete, which is available commercially. These boxes are far more durable, secure from predators and provide a better internal environment for young birds, but are more expensive than timber boxes.

You can purchase nestboxes as standard designs for commoner species, and specific designs for those with more specialist requirements. Standard designs have 10 cm high open fronts for species such as robin and pied wagtail, or 6 cm for spotted flycatcher; closed fronts with small holes (25 mm diameter) are suitable for blue tit and coal tit; and slightly larger holes (28 mm) for great tit and pied flycatcher. Large boxes with larger holes support little owl, great spotted woodpecker and starling. All should mimic natural nesting sites.

You need to place nestboxes at a safe distance above the ground to protect the birds from predators such as cats. Nestboxes for tits for example should be 2–4 m up a tree, in a shaded place, or facing north east. Open-fronted nestboxes for robins or wrens should be less than 2 m above the ground, so they need to be well hidden in dense vegetation. In contrast, open-fronted nestboxes for spotted flycatcher should be 2–4 m above ground, preferably sheltered

by vegetation such as ivy. Some additional protection can be provided against predators such as squirrels and great spotted woodpeckers by placing a metal plate around the entrance hole to prevent its widening.

5.3 **Nestboxes and roosting boxes for mammals**

Bat boxes

Bats roost both individually and in small groups, and may use many roost sites over the course of a year. In woodland, bats naturally roost in any species of tree with suitable holes, crevices and so on, which provide them with shelter and protection from predators. These sites are often close to feeding areas. Small cracks and crevices may support individual bats, but larger holes are required for maternity roosts. Bats also roost in tangled climbers such as ivy and honeysuckle, which is a good reason for protecting climbers in your wood. In many parts of Britain, the loss of old-growth woodland has significantly reduced the roosting opportunities for bats. Bat boxes may be able to help to some extent by providing artificial roost sites, particularly in recent woodland and plantations on ancient woodland sites.

If you are considering putting up bat boxes, the first thing to do is to survey your wood following the guidelines described in Section 2.4, to establish what the need might be. If your wood is part of a larger woodland complex, ideally the survey should encompass the woodland as a whole to establish what opportunities there are for bats to roost in the immediate vicinity. If there are plenty of small cracks and crevices in the trees, but a lack of larger holes, then bat boxes could provide opportunities for summer maternity roosts.

Some bat boxes are designed to be used throughout the year, but if they are constructed from normal thicknesses of wood, the bats may be forced to leave during the winter in extremely cold weather. In reality, the majority of bat boxes currently in place are most likely to be used from April to November. At higher altitudes, occupancy might be expected between late May and September. These are generally known as 'summer' boxes. They may be purchased from a number of suppliers or constructed following instructions provided by the Bat Conservation Trust and local bat groups, on their respective websites. Designs may differ, but there are some important generic issues relating to their use. Boxes should be large enough for bats in maternity roosts to cluster to conserve heat, so their internal dimensions should be at least 10 x 10 x 10 cm. Whilst the depth is most important because many species like confined spaces, the width may be increased to 15 cm and the height to 30 cm. Boxes have traditionally been made out of rough-sawn timber so that bats can land to investigate the boxes, cling and climb. Wood preservatives are harmful to bats and should not be used. It is also important that boxes have well-sealed joints giving good insulation and no draughts, to ensure that the internal temperature and humidity remains constant. The entrance is usually a slit at the base, typically 1.5–1.8 cm wide and 4 cm long; anything wider would allow birds to nest in the box. Such boxes may last no more than 10 years. An alternative are the Schwegler woodcrete boxes, which are more expensive to purchase, but are more durable, and have good thermal insulation with less fluctuation of internal temperatures.

Winter boxes specifically designed for hibernation are also being developed, based on the dimensions of natural tree holes used by bats, but these have not yet been widely used (Stebbings and Walsh, 1991). These boxes need to be insulated against extreme cold, so must be constructed with walls 10 cm thick, or possibly from a hollowed out log. Schwegler woodcrete winter boxes are also available.

Location

Boxes may be attached to trees in woodland, usually at least 5 m high, which reduces the risk of vandalism, but will require ladders to put them up and inspect them. Consequently, health and safety must be taken into consideration and a risk assessment carried out before these tasks are undertaken. You should firmly attach bat boxes to a tree in a sheltered position

Schwegler woodcrete bat box with open-bottomed slot.

Woodland owners putting up bat boxes.

with the boxes having good exposure to the sun, for example along the woodland perimeter, or the edge of woodland rides and glades. Boxes in these locations should also be easier to find and inspect on subsequent visits. Avoid obstructions close to the box and remove any leafy branches overhanging the box. Boxes are more likely to be occupied if there is prime feeding habitat nearby, such as a shrubby woodland edge or wetland. It may help to put the boxes up on a sunny day, so that good positions can be found. Bats should also be given the opportunity to choose between boxes facing a variety of aspects, south being the warmest, with others being cooler, depending on shading. Boxes on a single tree may be positioned facing south, south east and south west for example.

Boxes can only be inspected by someone with an appropriate licence; as it is an offence under the Wildlife and Countryside Act 1981 (as amended) to disturb bats. Boxes should not be inspected from the beginning of June to the middle of August as heavily pregnant, or lactating bats with a baby/pup may be present. Frequent inspections, perhaps every six to eight weeks are not usually a problem, but once bats are discovered it is unwise to inspect it again that summer (unless there is a scientific purpose to do so). Boxes that remain unused after several years can be removed and re-positioned elsewhere, but those that have been used should be left in place. Bat droppings are the best indicator that bats have visited a box; these tend to be black or brown and quite variable in size and shape. However, they lack the white areas usually seen in bird droppings and crumble to a fine dust when rubbed between thumb and forefinger.

Finally, it is important to remember that bat boxes are a serious commitment in terms of inspection and cleaning, particularly if they have sealed bottoms. Even if you can persuade local bat groups to help with the initiation of a bat box project, there is no guarantee that volunteers will be able to maintain the boxes over a long period of time, which is essential if they are to remain habitable. One alternative would be to use open-bottomed slot boxes as these do not require cleaning and maintenance.

Dormouse boxes

Boxes have also been designed for small terrestrial mammals such as dormouse, red squirrel and hedgehog. Dormice favour extensive areas of ancient woodland with hazel coppice and a diverse range of shrubs; they also use a range of scrub types, hedgerows and young

Dormouse nestboxes may provide valuable breeding sites when holes are in short supply.

plantations. The dormouse is nocturnal and feeds mainly in the branches of trees and shrubs. It prefers to nest in tree holes, old bird nests and squirrel dreys, but will also construct a nest in tangled scrubby vegetation such as bramble.

Dormouse nestboxes have been widely used for survey and monitoring programmes, but they can provide valuable breeding sites when natural holes are in short supply. Nestboxes are readily occupied by dormice, thus boosting local populations. They are also very useful in young woodland or habitat which has been disturbed, providing opportunities for population growth. Plastic nest tubes are also used to survey dormouse populations, but cannot substitute for nest boxes where conservation is the main aim.

For hibernation, dormouse boxes are not used as the internal temperature within a nestbox is too variable. Dormice require cool temperatures and damp conditions for hibernation, and construct a tightly woven nest on or under the ground, typically in hollow tree stumps and at the base of coppice stools.

If you are considering putting up dormouse nestboxes, first investigate the natural nesting opportunities for dormice in your wood. If the wood is part a larger woodland complex, then consider the woodland as a whole to establish whether there are good nest sites close by. It is also worth establishing if dormice are breeding, or visiting the wood, following the guidelines set out in Section 2.4.

Dormice nestboxes are similar in appearance to bird boxes, the main difference being the positioning of the entrance hole at the back, facing the tree. Boxes should be placed about 2.5 m above the ground, ideally near a routeway which dormice might be using. Dormice are easily disturbed by approaching people, so public areas should be avoided. Nestboxes are relatively easily to construct, or they may be purchased from specialist suppliers. Like bats, dormice are a protected species, so should not be disturbed, unless a special licence has been obtained from Natural England.

Red squirrel nestboxes

In some parts of Britain where you are lucky enough to have red squirrels present in your wood, or in woodland close by, you may have considered putting up nestboxes for them. Most woodland is likely to have sufficient nest sites for red squirrels, so the animals may only use a box occasionally, usually in summer and autumn. Nestboxes can provide refuges in bad weather, if dreys are dislodged by high winds for example, and dispersing youngsters may seek refuge in boxes. For these reasons, woodland owners should not be disappointed if nestboxes remain unused.

Nestboxes are normally placed about 4 m above the ground, although squirrel dreys may be found much higher in the canopy. They are available commercially, and designs for their construction can be found on the 'Save our Squirrels' website. Once in place, nestboxes should not be disturbed if they are being used. The red squirrel is listed on Appendix III of the Bern Convention and is protected by Schedules 5 and 6 of the Wildlife and Countryside Act; a special licence is required to disturb these animals. In any case, if you have red squirrels in your wood, it is now an offence to intentionally or recklessly:

- kill, injure or take (capture) a red squirrel
- damage, destroy or obstruct access to any structure or place which a red squirrel uses for shelter or protection
- disturb a red squirrel while it is occupying a structure or place which it uses for that purpose.

Detailed guidance on surveys and management operations to minimise disturbance to red squirrels may be found in '*Forest operations and red squirrels*' (Forestry Commission Scotland, 2006a) and '*Practical techniques for surveying and monitoring squirrels*' (Gurnell *et al*, 2001).

One important consideration when contemplating nestboxes for red squirrels is the presence of grey squirrels in your wood. In areas where both species are present, such as the

Borders, parts of Northern England and mainland Wales, nestboxes put up for red squirrels may be used by both species, which may not be desirable. Grey squirrels carry Squirrelpox virus, which they appear to be immune to, but is normally fatal for red squirrels. Although it is not known how the virus is passed from grey squirrels to red squirrels, it is possible that this could occur if red squirrels use a box previously inhabited by grey squirrels. Where both species occur, boxes can be used as part of a control programme for grey squirrel; for further details on squirrel control, refer to '*Controlling grey squirrel damage to woodlands*' (Mayle *et al.*, 2007) and '*Red squirrel conservation*' (Pepper and Patterson, 1998).

5.4 **Woodland ponds**

Ponds frequently provide excellent wildlife habitat and collectively support a significant proportion of British wetland flora and fauna. Some insects, amphibians and plants are only found in ponds, highlighting their importance in the conservation of freshwater biodiversity in Britain. Ponds are common in woodlands in many parts of Britain, and include old hammer ponds and mill ponds, natural shallow flashes and shallow pools along trackways. Natural ponds often occur in close proximity to other wetland habitat such as streams, seepages in wet woods and other ponds. Woodland ponds are usually shaded, often heavily. They may support rare and specialised communities. They are particularly good for dragonflies, and may contain important assemblages of species of conservation concern such as Nationally Scarce water beetles and great crested newt (a European Protected Species).

Although ponds are widespread in Britain, examples supporting healthy populations of wildlife are becoming increasingly rare. Consequently, ponds are now included on the list of UK BAP priority habitats, and may be classified as a priority pond if they meet one or more criteria:

- they are habitats of international importance
- they contain species of high conservation importance
- they support exceptional populations or numbers of key species
- they are of high ecological quality.

To identify whether a woodland pond represents a priority habitat will require a survey to examine factors such as vegetation types or specific species groups.

Pond restoration and management

If you have a pond in your woodland, advice may be sought from the Pond Conservation organisation, or your local wildlife trust to help you determine its quality and whether there are priority species which would benefit from any kind of restoration. An overgrown pond may appear to be in need of management, but many woodland ponds have a lot of plants in them, with relatively little open water; they may contain fallen branches and other deadwood which is excellent habitat for aquatic wildlife and should not be removed unless it constitutes a risk to health and safety. Insects also benefit from decaying leaf litter on the pond floor, submerged tree roots and the muddy edges of shady ponds. Consequently, a pond survey should be undertaken before any management is carried out. Invasive habitat management involving the removal of plants or dredging should only be considered if the wildlife in the pond will not be put at risk.

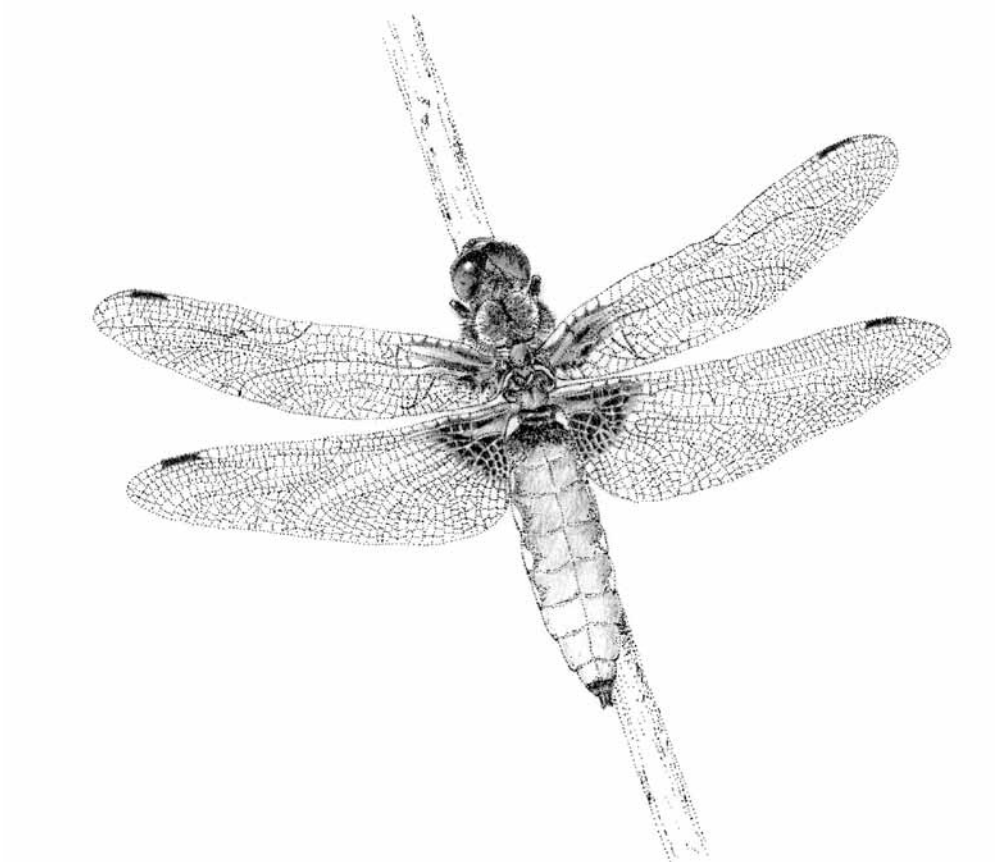
Trees also contribute significantly to the biodiversity of a woodland pond, and in some circumstances are best left alone. This includes mature woodland with long-established ponds, and wet woodland where alders and willows grow close to, or within a pond. However, there are circumstances where woodland ponds might benefit from some management. Trees are often cut back or removed to allow more light to reach a pond, but it can be difficult to predict whether this will be beneficial or harmful to the aquatic ecosystem.

Reducing shading can encourage a greater diversity of plants and animals, but too much light may favour unwanted plant species such as duckweed and bulrush, which could dominate the pond and ultimately cause serious damage to the aquatic community. To avoid such an outcome, it would be wise to reduce the shade by no more than 25%, gradually over a five year period, monitoring the effects on the pond community very carefully. A very useful guide to pond management, including those found in woodlands is Pond Conservation's '*The Pond Book: a guide to the management and creation of ponds*' (Williams *et al*., 1999).

Creation of new ponds

Pond creation in woodland can be particularly valuable in today's intensively managed landscapes, as there are few opportunities for ponds to form naturally. In some cases it may be better to create a new pond than risk a negative outcome from managing or 'restoring' an existing pond. New ponds with clean water can make an important contribution to the conservation of freshwater wildlife by acting as stepping stones to improve ecological connectivity, increasing the diversity of ponds in an area, and strengthening local populations of UK BAP priority species such as the common toad and the three-lobed water-crowfoot. For this reason it is useful to have some knowledge of wetland habitat in the area, and how a new pond might add value.

Ponds are probably best created in recent woodlands where there is no risk of damaging ancient woodland habitat. In any case, it is important to ensure that the site for pond



The broad-bodied chaser is likely to be one of the first dragonflies to colonise a new woodland pond.

creation is not selected because it is already 'damp', as such an area might be a natural spring or a seasonal flush which constitutes important habitat in its own right, which should be protected. Locate a pond near to wet areas, but not in them. If your subsoil includes clay there is a good chance that the pond will hold water; sandy and chalky soils do not support ponds unless they have plastic pond liners. It is also important that a new pond does not alter local hydrology, risking damage to nearby protected habitat; or adversely impact on drainage or water courses. It should not be at risk from pollution, or require planning permission. Pre-site checks in a woodland setting might include:

- potential impact on protected species or designated sites
- potential impact on archaeology
- need for trees to be felled or coppiced
- impact on hydrology
- health and safety.

There are many different designs and features which you may consider at the planning stage for a woodland pond (Pond Conservation, in prep.), including:

- Hydrology – ensure the pond will hold water for at least some of the year.
- Size – a pond with a diameter of about 30 m should allow light to reach the water surface on the northern side of the pond, whilst the southern edge will remain shaded if the pond is surrounded by trees.
- Location and leaf litter – leaves of alder and willows degrade better in water than those of trees such as oak and ash, so consider the surrounding tree species and their likely contribution to pond sediments.
- Depth – shallow edges will favour marginal plants, and disturbance from animals coming to drink will also be beneficial.
- Islands – if the pond is large enough, small islands will add to the biodiversity value but must be low to avoid tree regeneration.
- Base – as wooded ponds tend to fill in more quickly from leaf litter, an undulating base can extend the life of the pond, and provide bare areas on top of submerged bars.

Designs and drawings are essential for those involved in pond creation, including contractors and if required, planning officers. Project costs should also be carefully worked out before work commences. The construction phase will require careful planning, including timing for dry conditions, and access for machinery to deal with topsoil and spoil. You may wish to undertake this with the help of family and friends, or with a contractor. Excellent guidance on all the practical aspects of pond creation can be found in the '*Pond Creation Toolkit*' (www.pondconservation.org.uk), a series of factsheets dealing with all aspects of pond location, design, planning, construction and management.

Finally, if you create a new pond, you may be tempted to visit nearby ponds to collect plants, and possibly beetles and other aquatic animals to give nature a 'helping hand'. This is unnecessary, and should not be undertaken. In contrast to many terrestrial communities, such as plants of the woodland floor, ponds are colonised very quickly, by a wide range of plants and insects. Some of these will be specialists of ponds with bare surfaces, so it is important to allow these plants and animals an opportunity to use the new pond in the early years, before it takes on the character of a more mature pond.