The Management of Semi-natural Woodlands

1. Lowland Acid Beech and Oak Woods

PRACTICE GUIDE

Forestry Commission

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Enquiries relating to this publication should be addressed to:

Policy & Practice Division
Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT

Tel: 0131 334 0303
Fax: 0131 316 4344

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Publishing update

This guide was first published in 1994. This edition is a reprint with a revised format and further reading section (page 20), otherwise the text has not been altered. The section on further reading has been updated to include relevant advice published since 1994. Please note that all references to *Forestry Authority* should be read as *Forestry Commission*.

Introduction

Ancient semi-natural woodlands are a vital part of our heritage. They provide a range of habitats which support a rich diversity of plants and animals. Many woodland species depend entirely for their survival on the continued existence of these habitats. Ancient semi-natural woodlands form prominent features in many landscapes and collectively constitute a significant economic resource. They are all that remain of the original forests which covered most of Britain and now occupy only 1% of land area. Concern about the continuing loss of area and character of ancient woods contributed to the Government's decision to introduce the Broadleaves Policy in 1985.

The Broadleaves Policy aims to maintain and increase the broadleaved woodland by encouraging good management for a wide range of objectives and giving special attention to ancient semi-natural woodlands to maintain their special features. It has generally been very successful in encouraging the expansion and better management of broadleaved woodland and in preventing further losses of ancient semi-natural broadleaved woodland. However, there is a need for policy guidance to take more account of local and regional factors, especially for semi-natural woodlands which vary greatly in character in response to differences in climate, soils and history.

The management guidelines for the native pinewoods of the Scottish Highlands published by the Forestry Commission in 1989 have proved a successful example of guidance for a specific type of semi-natural woodland. We have now extended this approach into a comprehensive set of advisory guides on the management of ancient semi-natural woods throughout Britain. For this purpose, we recognise eight broad woodland types as described in the Appendix.

The advice is intended to help owners and managers to achieve the best practice which will secure the woodland's future. The guides describe the management most appropriate for each type of woodland. Devised by Forestry Commission staff working closely with foresters and ecologists with special knowledge and experience of managing British semi-natural woodlands, they form a distillation of the best advice available.

Whilst these guides are aimed primarily at ancient semi-natural woodland, much of the advice in them will also be appropriate for other semi-natural woods which are of high conservation value, and for long-established planted woods which have developed some of the characteristics of ancient semi-natural woodland, notably where native trees were planted on ancient woodland sites.

The ecological value and character of ancient semi-natural woodland varies considerably. Some, notably in less accessible upland areas, owe much of their current value to a relatively low intensity of past management, although none have been totally unaffected by human influence. Others, especially in the lowlands, have developed a distinctively rich flora and fauna through a long history of consistent silvicultural management. Some have lost many of their special characteristics through various types of disturbance and many have been reduced in size so much that their survival is at risk. All are part of the nation's heritage, and deserve forms of management which recognise their different values. Some are designated as Sites of Special Scientific Interest. These may have specific management arrangements agreed with the conservation agencies, which are outside the scope of these booklets. The advice given here is aimed at encouraging forms of management which maintain and enhance the special characteristics of all ancient semi-natural woodland.

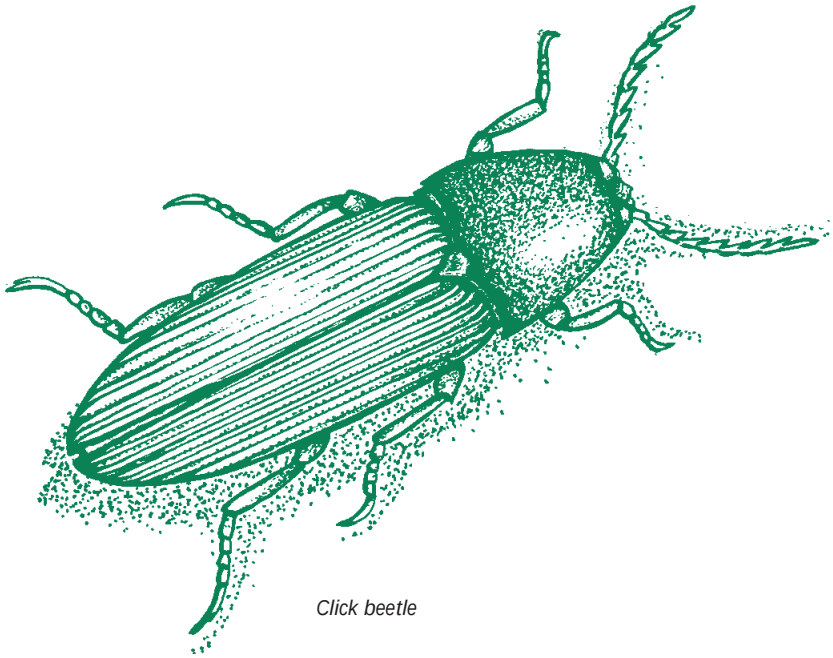
When grant aid is sought the Forestry Authority will compare management proposals with the advice contained in these booklets. Applicants are free to propose other forms of management for these woods, but must satisfy the Forestry Authority that their proposals will be effective in maintaining, and preferably enhancing, the special characteristics of the woodland. The advice given in these booklets is intended to create a flexible framework rather

than a straight-jacket, so that woods and their owners can develop their individuality as much as possible without reducing options for future generations.

Sensitive management which takes account of the individual character and circumstances of woods, and also the particular objectives of owners, is essential if their values are to be successfully maintained.

The appropriate form of management will vary considerably. In some cases, particularly some upland and many wet woodlands the most suitable management will be to reduce grazing and browsing pressures from deer or stock to levels which will allow natural regeneration or expansion of the wood to happen. More intensive forms of management may harm the unique wildlife interest of some of these woods. Elsewhere, especially in lowland woods with a long history of management systems such as coppice with standards, more active forms of silviculture will be appropriate and often necessary to conserve their character and wildlife as well as their value as an economic resource.

One thing which is certain is that positive management will be needed if we are to continue recent progress in halting the decline of our semi-natural woods and to restore them to a healthy condition to hand on to our successors as vital parts of our heritage.



Click beetle

Management principles for semi-natural and native woodlands

Semi-natural woods are composed of locally native trees and shrubs which derive from natural regeneration or coppicing rather than planting. Because of their natural features and appearance, semi-natural woods are valuable for nature conservation and in the landscape, and many are important for recreation and for historical and cultural interest.

Management should aim to maintain and enhance these values in harmony with securing other benefits, including wood products.

Ancient semi-natural woodlands are of special value because of their long, continuous history. They are the nearest we have to our original natural woodland and include remnants of the post-glacial forest which have never been cleared. They are irreplaceable assets which support many rare plants and animals and make a vital contribution to conserving biodiversity. They also contain a wealth of evidence of our past. Many have been greatly modified in structure and composition by centuries of management, whilst retaining many natural features. Some are threatened by neglect in the face of pressures such as fragmentation and overgrazing. The Forestry Authority encourages management which seeks to maintain or restore their special characteristics, including their natural diversity of species and habitats, aesthetic and cultural values and genetic integrity, whilst taking appropriate opportunities for wood production for a range of markets.

Management proposals should be geared to sensitive and low-key methods which are suited to the natural dynamics of these woodlands. Natural regeneration will be preferred to planting wherever practicable. More detailed guidance is given in the guide for each woodland type.

Other semi-natural woodlands, which have developed from natural colonisation of open ground sometime within the last few centuries, are also normally of high environmental value, particularly in the uplands, although they are not usually so valuable as ancient semi-natural woodlands because of their shorter history.

Appropriate management will vary according to the relative importance of these woodlands. For some, for example many long-established upland woods, management should be similar to that for ancient woods, whilst in woods of lower value a greater range of silvicultural options will be acceptable.

Planted woods of native species may often acquire some of the characteristics of semi-natural woodland, especially where they are on **ancient woodland sites**, where plants and animals have survived from the former semi-natural wood. The development of a varied structure and composition, including diverse native tree, shrub and field layer vegetation and the use of locally native species and genotypes for planted trees, can also increase the naturalness of native plantations.

Where planted native woods have developed a high conservation value in these ways management should be similar to that for semi-natural woods, but generally a wider range of silvicultural systems, including a greater emphasis on planting instead of natural regeneration, will be permitted under the grant aid and felling regulations.

New native woodlands, which are designed and managed from the start to develop a natural character, can help to offset some of the past losses of native woodland and will in time acquire a high environmental value, although they should not be seen as substitutes for any remaining semi-natural woodland.

The Forestry Authority will encourage by grant-aid the creation of new native woodlands on open land by natural colonisation or planting, where species composition and site are suitably matched, especially on areas close to existing semi-natural woods. Further guidance can be obtained in Bulletin 112, published by the Forestry Authority.

What are lowland acid beech and oak woods?

This guide deals with the management of the ancient semi-natural woods dominated by oak or beech which are found on strongly acid soils mainly in southern England and south-east Wales. It also includes guidance for those woods of this type which have become dominated by birch or sweet chestnut. These woods are concentrated on the acid brown earths and podzols developed in the sands, gravels and very acid loams and clay loams of the Weald, London basin, Hampshire basin, chalkland plateaux and some kinds of superficial deposit. Though they are commonest in south-east England, where beech is native, oakwoods can be found on strongly acid soils in most parts of lowland Britain. There are estimated to be a total of 15 000–25 000 hectares of ancient semi-natural woods of this type.

A typical example grows on gently undulating ground and either has a heathy ground vegetation or is bordered by heathland. Many famous ancient forests fall within this type, including the New Forest, Ashdown Forest, Sherwood Forest, Windsor Forest and Great Park, Wyre Forest, Burnham Beeches and parts of Epping Forest.

Two woodland types within the National Vegetation Classification (Rodwell, 1991[1]) fall within the scope of this Guide.

Beech–wavy hairgrass woodland (W15)

These are the beech–oak woods of very infertile, base-poor, strongly acid soils in southern England. Beech is usually mixed with pedunculate oak or, less often, sessile oak, with birches, and sometimes whitebeam present in gaps and on fringes. Scots pine and sycamore, both introductions, also occur sporadically. The underwood is sometimes dominated by holly, notably in woods which have been heavily grazed. Yew, rowan and alder buckthorn are characteristic, but hazel and hawthorn are absent or rare. Where soils are freely-drained, a podzol profile has commonly developed. The ground vegetation may be sparse and extremely poor, sometimes reduced to little more than tufts of Leucobryum and other mosses scattered amongst persistent drifts of leaves. In other examples, wavy hairgrass, bracken or bilberry is abundant, and in richer examples wood-sorrel, cow-wheat, butcher's broom, hard-fern and buckler ferns are common.

Oak–birch–wavy hairgrass woodland (W16)

These likewise occupy strongly acid soils, most of which are light, freely-drained and podzolic. Pedunculate oak, sessile oak and both birch species can predominate, or grow in mixtures, often with a few beech, sweet chestnut, Scots pine or aspen. Holly, rowan, alder buckthorn and elder commonly occur as an underwood, but hazel, hawthorn and ash are extremely rare. Many woods have been overtaken by Rhododendron. The ground vegetation is extremely poor and generally sparse, characteristically including wavy hair grass, bracken, bilberry, wood sage, tormentil, foxglove, hard-fern and buckler ferns.

The differences between these two types will have little significance for foresters. Indeed, over time, the two types may often be interchangeable, e.g. as beech seeds into a birch–oak wood. More important for management is the dominance of the main trees, for this reflects the history of the wood and its silvicultural prospects. Birch–dominated stands have usually been initiated by disturbance or removal of grazing animals. Oak-dominated stands may be the successors of birchwoods, whereas beech-dominance can develop from oak woodland. Chestnut-dominated ancient woods have usually been planted. Exceptionally holly becomes dominant where it was once cut for browse.

In heathland districts these woods are often intricately intermixed with secondary birch and holly scrub, small mires, strips of alder and wet birchwoods, and enclaves of heath. In south-east England, hornbeam coppices commonly fringe the acid oakwoods. Elsewhere, acid oak woods usually form patches within mixed coppices on the lightest and most acid soils. On the upland fringes, acid oak woods become more extensive, giving way to ash–hazel mixtures on more fertile soils in valleys.

History and traditional management

After the last ice-age, beech was slow to return to Britain. In fact, it had probably not reached its climatic limits before the original woodlands were mostly cleared. Thus, although it is strictly native only in southern England and south Wales, it can spread vigorously after introduction to woodlands further north and west, to which, given time, it might have penetrated naturally. Within its native range beech rose to dominance in woods which were disturbed by woodcutting and pasturage.

Evidence from the New Forest, Epping Forest and elsewhere suggests that many acid beech and oakwoods were mainly dominated by small-leaved lime in prehistoric times. Lime disappeared and beech, oak and hornbeam increased at the time of major disturbances brought about by felling and pasturage.

Most lowland acid beech and oak woods were managed either as coppice-with-standards or as wood-pasture in the medieval period. Under the former regime, beech was an infrequent species within mixed coppice of oak, birch and hazel growing below oak standards. From the 18th century onwards many of these coppices were planted with sweet chestnut, especially in south-east England and locally in the Welsh borderland. Now, some are so dominated by chestnut with little or no beech, that their origins are unrecognisable. Coppices dominated by oak or beech survive locally. The acid oak coppices growing in the lowlands from the English Midlands northwards were rarely planted with chestnut or beech. Now, some are so dominated by chestnut with little or no beech, that their origins are unrecognisable. Coppices dominated by oak or beech survive locally. The acid oak coppices growing in the lowlands from the English Midlands northwards were rarely planted with chestnut or beech.

Within the medieval wood-pastures, beech and oak assumed greater prominence, partly because they were pollarded and thereby outlived other species, but oak was usually far more abundant than beech, until it was selectively felled in the 17th and 18th centuries.

The persistent and extractive character of wood-pasturage probably led to progressive soil degradation and loss of species such as hazel, and reduced many woods to a sparse scatter of ancient trees growing within heathland. Nevertheless, wood pasturage survived far better in this woodland type than any other, and today some of the best wood-pasture relicts in Europe fall within this type.

High forest management appears to have developed early in acid beech and oak woods. By the 17th century oak plantations had been established in some Royal Forests and by the 18th century beech and Scots pine were also being planted. Enclosure of commons during the 18th–20th centuries, both within Forests and beyond, generated many high forest beech and oak woods, many with an admixture of conifers used in the original mixed plantings. These plantations were often intermixed with surviving medieval coppices and wood-pastures.

Sessile oak

Values

Landscape

The larger tracts of lowland acid beech and oak woods form magnificent vistas of mature woodland, heathland and semi-natural grassland. They are key components of some of the wildest landscapes left in lowland England, as in the New Forest and Ashdown Forest. They also form the defining features of some of the most densely wooded parts of the lowlands, where poor soils have not attracted farming and much former heathland has been returned to forestry. Thus, for example, east Dorset, the region around Windsor, and the Greensand Chart woodlands stretching across the south-east form attractive landscapes because of the leavening of mature oak and beech woods.

Historical and cultural

The New Forest, the Forest of Dean and other wood-pastures are themselves historical monuments. The older stands and in particular the ancient pollards in their setting of common pasturage show past forms of land management with a clarity not found in other woodland types. To a large extent, these woods also embody the history of English state forestry, which was latterly focused on large Crown Woods on infertile soils. Woodlands of this type are prominent settings for historical events and have provided the backdrop for numerous novels and paintings.

Occupying generally infertile soils on the margins of farmland, these woods commonly contain the remains of ancient land-uses which have been destroyed elsewhere, in addition to the banks and ditches associated with other types of ancient woodland. Together with artefacts still visible in nearby heathland, these have been important sources for the study of historic land-use.

Wildlife conservation

The apparent poverty of the ground vegetation may encourage the view that these are relatively unimportant woods for wildlife, but in fact the opposite is the case. Most woods contain streams and other wet areas with a rich and distinctive flora. Many include enclaves of heathland or heathy rides which support a rich flora made up of species which are almost wholly absent from farmland. Those in a setting of heathland are often bordered by fluctuating fringes of scrub and birch woodland, which themselves have a distinctive flora. Thus, the New Forest, where most of the wooded ground has a very limited flora, contains nationally rare and local species, such as wild gladiolus, lungwort and bastard balm.

However, the highlights of this woodland type are the ancient wood-pastures, which support extremely rich assemblages of epiphytic lichens, beetles and fungi on and within the older trees. These are the species which were once widespread in primeval forest, which have been progressively reduced until they survive only as relict populations in this scatter of ancient woods. Today, the New Forest, Windsor Forest and Great Park are amongst the richest localities in Europe for original-woodland species, whilst others, such as Savernake Forest and Staverton Park are at least significant within their region. Woodpeckers are frequent and rare raptors are found in the mature stands.

The richness of these woods is not only associated with the old trees, but also with the associated mires, heaths and open spaces, the general warmth of their habitats and the generally large extent of these habitats. The coppiced examples, such as Blean Woods, are notable for butterflies, such as the heath fritillary. The New Forest is outstanding for many features not directly associated with the beech–oak woods.

Recreation

Many acid oak and beech woods and their associated open heathlands are outstanding assets for public recreation, which collectively rival the coastline as favoured destinations for holidays and day trips. Indeed, management in

the New Forest, Windsor Park, Burnham Beeches, Epping Forest increasingly revolves around provision for visitors. Their value and problems are enhanced by their proximity to centres of urban population.

These woods have also tended to be highly favoured for education. They are not only accessible, attractive to visit, extensive and rich habitats, but they also exhibit many features of land-use history, ecology and forestry.

Game and livestock

Many of these woods survived because they were sources of venison. They were also common pastures which supported a distinctive social and economic system of small stockholders. The traditional arrangements have long been modified, but many acid oak and beech woods remain important pastures for deer, ponies (New Forest) and/or sheep (Forest of Dean).

Some of these woods are managed as cover for pheasants, especially examples outside the Home Counties which form part of smaller, mixed broadleaved woods, and this is often a major source of income from this woodland type.

Wood production

These woods have been important sources of hardwood timber, and there is no reason why they should not continue to yield good quality oak and beech. Growth may be relatively slow and form poor, especially the former coppice growth, but with better silviculture valuable trees of good form can eventually be grown. Many chestnut coppices have been kept in rotation, notably those in Kent, east Sussex and south Essex, and these remain vigorous if markets permit them to be regularly managed.

Oak and chestnut are susceptible to a timber defect called ‘shake’ on poor light soils which reduces their economically useful life on some sites.

Green woodpecker

Policy aims

The aims of policy are to encourage appropriate management of semi-natural lowland acid beech and oak woodlands so as to:

- **Maintain and wherever suitable restore the natural ecological diversity;**

- **Maintain and where appropriate improve their aesthetic value.**

These two aims should be applied in every case. In the great majority of woods they should be compatible with each other but where conflicts do occur the first should tend to take priority over the second because of the national importance of ancient semi-natural woodland for nature conservation. However, each wood should be assessed according to its importance in the landscape and for nature conservation.

- **Maintain the genetic integrity of populations of native species, so far as is practicable.**

This aim is relevant for semi-natural woodlands where the genetic integrity of native tree and shrub populations has not been seriously compromised by past introductions of non-native stock within or close to the woodland.

- **Take appropriate opportunities to produce utilisable wood.**

The production of utilisable wood, including timber, is not an obligatory aim for every woodland. It is possible to achieve all the other policy aims without it, and indeed in a minority of woods where minimal intervention is an appropriate philosophy, wood production may not be desirable. However, for many owners, securing an adequate income from their woodlands is essential in ensuring the continuity of management necessary to achieve these aims. Improving timber values, and hence the financial viability of the woodland, in ways compatible with other aims, is therefore a general strategy which the Forestry Authority encourages.

Most semi-natural lowland oak–beech woodlands are capable of yielding high quality timber products which, with good management as suggested in this booklet, can be harvested in ways which are compatible with achieving the policy aims.

- **Enlarge the woods where possible.**

Expansion of ancient semi-natural woodlands is very often desirable, especially for small woods, to secure their long-term future.

Each wood is unique in its characteristics and its relationship to the surrounding landscape. Many form part of distinctive, even unique landscapes and possess a form which expresses their individual history. Whilst some appear uniform, most encompass significant small-scale variety of site conditions. Within practicable limits, the aim should be to reflect this inherent diversity in future management.

Application of this guide

Beech

This guide should be applied to all ancient semi-natural lowland acid beech and oak and associated woods of this type managed under the Woodland Grant Scheme. They will normally qualify for the special rate of management grant, where work is done to maintain or improve the special environmental value of the wood. It will also apply to Felling Licence applications, to management under other grant schemes and to woodlands in the management of Forest Enterprise.

Semi-natural lowland beech and oak woodlands of recent origin are usually less valuable than ancient ones for nature conservation, so it is usually appropriate for management to place a relatively greater emphasis on timber production in recent woods, but otherwise much of this guide can be applied.

Much of the advice in this guide can also be applied to ancient woodlands which have been converted to broadleaved or mixed plantations. The nature conservation value of these woods is generally less than that of ancient semi-natural woods, so it is usually legitimate to place a greater emphasis on timber production. In ancient woods which have been converted to conifer plantations, but which have retained some nature conservation value, there may be opportunities to restore semi-natural lowland acid beech and oak woodlands to at least part of the wood by including appropriate native trees and shrubs in the next rotation.

Old planted woods of native species on sites which had not previously been wooded sometimes acquire conservation values nearly as high as those of ancient semi-natural woodland. Again, much of this guide can be applied in these cases.

Where the woodland is designated as a Site of Special Scientific Interest (SSSI) guidance must be sought from, English Nature, the Countryside Council for Wales or Scottish Natural Heritage, before carrying out any operation or change of management. Any other legal constraint on management, such as a Tree Preservation Order or a Scheduled Ancient Monument, must of course be respected.

The management plan

For any woodland to receive grant aid from the Forestry Authority, management objectives and a programme of work must be agreed for a five year period.

In the case of semi-natural woods, especially the larger and more complex ones, it will be helpful to prepare a separate management plan, which can be used for reference when the detailed proposals are revised every five years on grant applications. The management plan should contain an assessment of the woodland, including any special characteristics, a statement of objects of management and their priorities and a long-term strategy setting out the desired future condition of the wood and how it is proposed to achieve it. This will be of great value for semi-natural woods where management should be particularly sensitive to the individual values and character of each woodland. The management plan should be brief and succinct; long descriptive essays are not likely to be read.

Here is a checklist of some of the factors to be included where relevant:

Description

- Name, location.
- Areas, with sub-divisions if these clarify management proposals.
- Historical aspects, including past management.
- Tree and shrub species, notably dominant trees and abundant underwood shrubs.
- Age class distribution of trees; stocking; composition and condition of any natural regeneration.
- Ground flora; dominant species and any unusual species.
- Fauna, especially any rare, unusual, attractive or notable species.
- Conspicuousness in the landscape.
- Cultural features.
- Statutory designations.
- Constraints.
- Existing public access and planned future access.

The description should be a brief summary of the main features, ideally based upon survey information.

Local Forestry Authority offices may be able to advise on sources of specialist advice and survey information.

Evaluation

Itemise any special values, e.g. prominent in landscape, rare species, natural features, historical associations, quality timber potential. Careful assessment of the values of the wood will help to generate suitable management objectives.

Objects of management

All the policy aims must be respected, although as explained earlier not all are relevant to every wood. The owner may have additional objects of management for a wood. The owner should express the particular policy aims for the wood, giving details of management objectives and indicating priorities. Owners may find it helpful to discuss their objectives with local Forestry Authority staff.

Management proposals

A long-term strategy should be stated, which specifies any changes in composition envisaged, the overall woodland structure which is sought and any silvicultural systems to be used. It would be helpful to state the reasons for

adopting this strategy. The timescale may be many decades or more than a century. A five year summary work plan should be proposed, itemising the areas to be worked and the main operations to be carried out in the next five years.

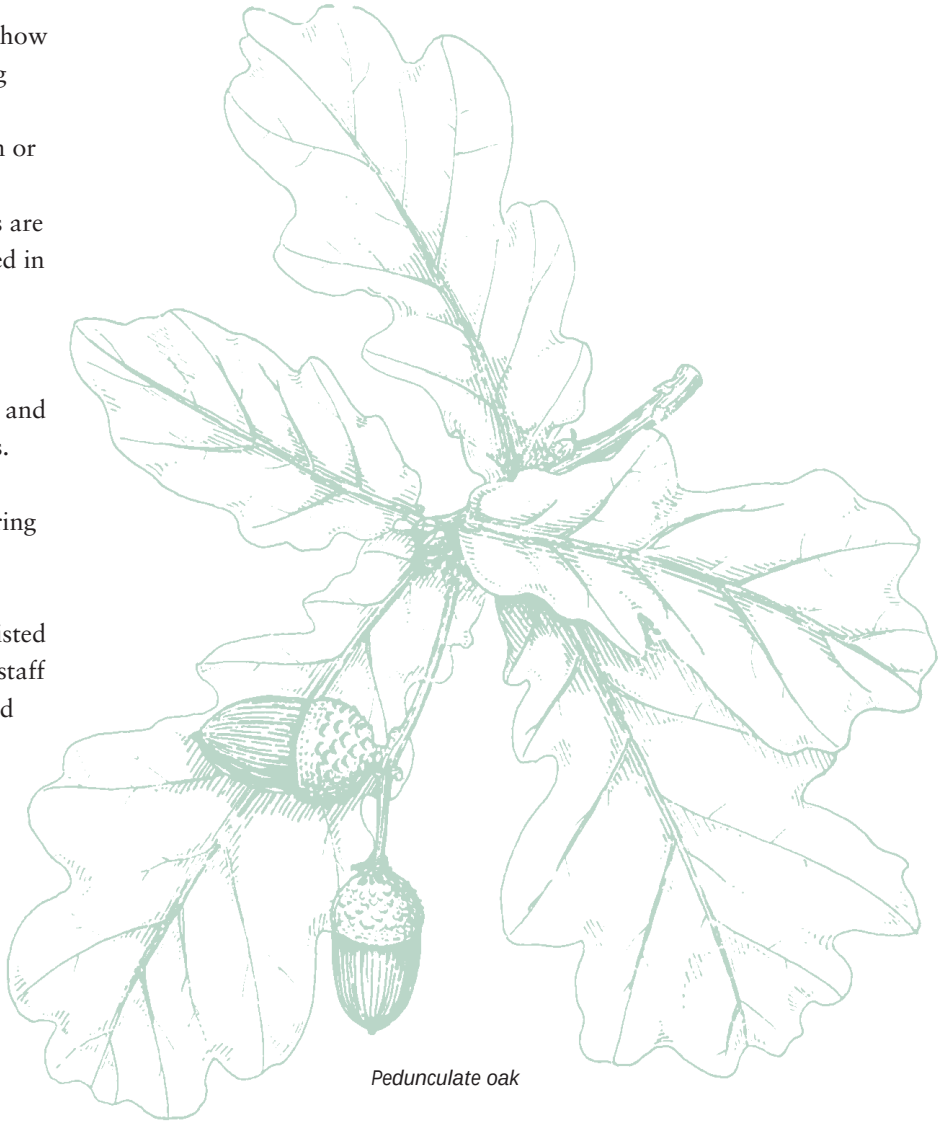
Monitoring

A vital stage, often omitted, is the monitoring and review of management. Has it delivered the desired results? An ideal review point is the revision of a grant scheme or plan of operations every five years. Monitoring requires that some record be made of what the wood was like at the start of the period, the work done and how the wood responded. Experience demonstrates that, even in small and well-known areas, memory seldom provides the level of detail and accuracy required.

Monitoring should be targeted to assessing how well the objectives of management are being achieved. This may mean, for example, assessing the success of natural regeneration or changes in woodland structure and species composition. Where rare habitats or species are present their progress may also be monitored in response to woodland management.

Simple techniques such as fixed-point photography can be used by non-specialists and provide valuable information over the years. Amateur naturalists as well as professional ecologists may be able to help with monitoring the wildlife of woods.

Some sources of advice on monitoring are listed in Further Reading and Forestry Authority staff may also be able to advise on what is needed for individual woods.



Pedunculate oak

Operational guidelines

General principles

The policy aims for ancient semi-natural oak–beech woods lead to general principles for management.

- **Maintain semi-natural woodland types.**

Management should be based on growing species native to the site and appropriate to the pattern of soils within the site. Existing abundant species should remain a significant component.

- **Maintain or restore diversity of structure.**

A range of age classes within each site is preferred to the limited spread of ages usually encountered.

- **Maintain diversity of species, and increase where appropriate.**

Some woods have been simplified almost to monocultures of beech, oak or chestnut by past planting.

- **Maintain diversity of habitat.**

A diverse structure and mixture of species improves habitat diversity, but open areas are also extremely important. They can be temporary (recently cut areas) or permanent (e.g. rides).

- **Maintain a mature habitat.**

This can be achieved by retaining old, dead or dying trees either standing or fallen, and by increasing rotation lengths.

- **Minimise rates of change.**

Wildlife takes time to adjust, so change should not be too drastic. This applies both to the scale and sequence of felling, and the lay out of the wood.

- **Use low-key establishment techniques.**

Aggressive working methods should be avoided. The general rule should be to do the minimum necessary to ensure adequate establishment and growth.

The need for management

Although a few acid oak and beech woods within nature reserves may legitimately be left unmanaged indefinitely for scientific purposes, most examples of this type will necessarily be managed to some extent and those which have had a coppice history will be much richer managed than neglected. Many of the wood-pasture woods, however, will only retain their importance if they are left to respond naturally to changes in grazing, i.e. they would be unmanaged silviculturally whilst still being used as pasture.

Woods with a recent coppice history depend for their richness on the maintenance of open spaces and the varied structures created by sustained management.

Silvicultural systems

The values of acid beech and oak woods are most likely to be maintained if the silvicultural system used in the future incorporates the main features of the system used in that wood in the past. This does not mean that a former wood-pasture or coppice should be treated exactly as it was in the middle ages. Rather, it indicates, for example, that, respectively, large, old trees and open areas with young growth should perpetually be supplied by the future system.

High forest

Stands containing a substantial amount of beech are particularly well suited to high forest systems worked by small-scale fellings. Beech bears shade and grows best as a maiden tree.

Most beech-dominated woods should ideally be managed as uneven-aged high forest with a pattern of small groups. Groups should

normally vary in size between 0.2–0.5 ha with a width of about 1.5–2 times the top height of the stand, but smaller groups not larger than the space occupied by one or two mature trees are quite practicable. This produces a structure similar to that of natural beech woodlands, which regenerate mainly in small gaps. It creates structural diversity and a range of size classes, even in small woodlands.

Where oak is dominant and where oak is intended to be the main species in the new growth larger openings over 0.5 ha are required. A simple system of small-scale clear-felling and regeneration can be acceptable, but a large group felling or shelterwood system is preferable for structural diversity, maintaining landscape values and genetic continuity of the tree stock.

The treatments should be adapted to local circumstances. In woods of less than 5 ha, especially if access is difficult, 'little and often' may be less practicable than longer intervals between fellings, with somewhat larger regeneration groups.

Coppice

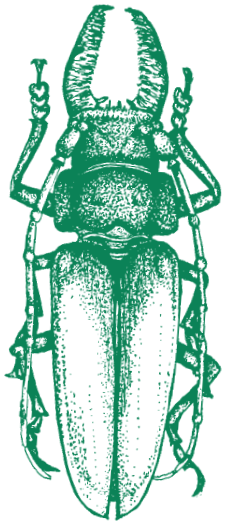
Coppicing is recommended as a component of smaller woods and in those woods which are still coppiced or have been coppiced within the last 50 years or so, provided browsing can be controlled. Coppicing maintains the short cycle of light and shade to which the wildlife of most lowland ancient woods is adapted. It creates great habitat diversity and numerous edge habitats. It enables ride grassland to be maintained and preserves mixtures of trees and shrubs that have often remained stable for centuries. Narrow strips of coppice maintained beside rides in woods managed as high forest will also add to diversity.

Coppice is particularly appropriate for stands rich in chestnut, oak or birch. Coppice-with-standards will produce the greatest habitat diversity and creates an opportunity to grow large oaks quickly. Groups of timber trees produce an intermediate condition between coppice and high forest which combines the benefits of both. Some of these woods produce the richest displays of bluebells in Europe after coppicing.

Woodland pasturage

Many of the surviving and former wood-pastures have such high value for nature conservation, landscape and public recreation that their management must be the subject of consultation with specialists and conservation organisations. Most are SSSIs, and thus subject to consultation with English Nature or the Countryside Council for Wales.

Individual prescriptions are required for each site, but in general some continued pasturage is desirable. The intensity of grazing and browsing must periodically be reduced to levels which allow a new generation of trees to become established. Regeneration should be natural. On the other hand, grazing intensity must not fall so low for so long that all open spaces fill with trees and old trees are choked to death by vigorous young trees growing close by. Where ancient trees are now isolated within enclosed high forest woods, it is desirable to give them enough space to continue vigorous growth and eventually to allow a few of the younger trees to form successors. Some of these should be pollarded to provide a continuous supply of pollard trees in future.



Longhorn beetle

Harvesting

If machinery with high ground pressure is used during felling and extraction it can compact soils, disrupt streams, accelerate erosion, tear up ride vegetation and damage archaeological features. On the other hand, limited site disturbance can usually enhance the success of natural regeneration by providing a seed-bed. Operators should avoid crossing watercourses, other wet areas, banks, ditches and other archaeological features, and should avoid working when the soils are waterlogged.

Felling and extraction can also damage advance regeneration of saplings or those already growing in earlier felled patches. Accuracy of felling direction is particularly important in woods managed by small-group or selection systems.

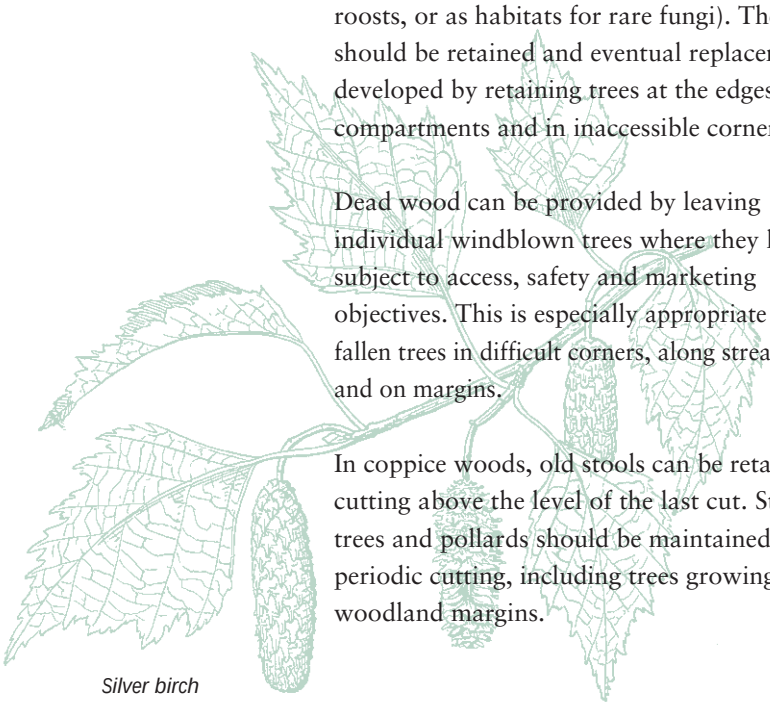
Retained old trees and deadwood

Many woodland wildlife species depend on large, old trees, standing dead wood and large fallen trunks and limbs. Such trees are a special feature of wood-pasture forms of acid beech and oak woods, which support rich assemblages of epiphyte lichens, fungi and wood-utilising beetles. Large fallen logs in moist, shaded sites are also important for these species.

Management should aim to maintain and increase the number of large, old trees and the quantity of dead wood, even in woods managed as coppice or high forest. Large trees can be achieved by allowing some groups of trees to grow longer than might be commercially desirable, selecting examples of long-lived species (oak, beech) which occupy windfirm sites. Particular mature trees may already be known to be important (e.g. as bat roosts, or as habitats for rare fungi). These should be retained and eventual replacements developed by retaining trees at the edges of compartments and in inaccessible corners.

Dead wood can be provided by leaving individual windblown trees where they lie, subject to access, safety and marketing objectives. This is especially appropriate for fallen trees in difficult corners, along streamsides and on margins.

In coppice woods, old stools can be retained by cutting above the level of the last cut. Stub trees and pollards should be maintained by periodic cutting, including trees growing on woodland margins.



Silver birch

Methods of regeneration

Natural regeneration

Natural regeneration is preferred. It maintains the natural distributions of tree species in relation to site conditions, allows a shrub component to grow with the trees, maintains local genotypes; and usually gives mixed stands of diverse structure. Beech, birch and oak regenerate well on the drier sites. Beech produces good or very heavy mast crops irregularly with a long-term average of one year in three. On more fertile sites sycamore may also regenerate strongly which may pose a problem locally. Advance regeneration of beech is frequently established below small gaps and light-canopied trees in beech–oakwoods. Within its native range it should be accepted whenever possible. Felling and regeneration groups should ideally be created by enlarging the openings around patches of advance regeneration.

Where beech–oak stands contain little advance regeneration, felling should be timed and designed carefully to give the best chance of obtaining the desired amount and composition of subsequent natural regeneration. Larger openings provide greater opportunities for light-demanding species, such as birch and oak. Smaller openings mainly generate groups of beech regeneration with some rowan and holly.

Acid lowland oakwoods rarely contain useful advance regeneration, but natural regeneration is often prolific after a heavy felling. Birch is usually the most abundant species and the proportion of oak is variable and unpredictable. If felling is timed to follow a heavy crop of acorns high oak densities are possible. However, it may be better to accept a rapidly developing grove of birch, which may be sold for pulpwood or turnery at about 30 years.

Planting

Planting may be necessary to enrich natural regeneration or to fill blanks, but on freely-drained, drought-prone sites there is a high risk of failure. Enrichment with locally native species which are likely to be absent or inadequately represented in natural regeneration increases diversity and adds to the silvicultural options at a later stage. Any enrichment planting should normally be done within 3 years of felling. Planting will often be necessary to achieve high stem densities where owners wish to grow straight clean stems for timber, especially for oak and less often for beech or birch. On sites where timber production is less important a longer period may be allowed for natural regeneration to fill gaps, perhaps up to 20 years (see section on Thinning.)

Enrichment planting can be done with individual plants or by groups, distributed in an irregular manner across the site. Individual planted groups should be at least large enough to generate one final crop tree. If tree shelters are to be used, the cost should be weighed against future benefit. Single trees planted in accessible spots may be the simplest way of establishing a broadleaved crop. Shelters help to protect individual transplants and make saplings more easy to locate for weeding and tending.

Oak and beech are both covered by the Forest Reproductive Materials regulations so that planting stock should originate from a registered seed source, but small amounts of seed can be sold from unregistered sources (sufficient for a thousand plants or less) if it is to be used for conservation rather than forestry purposes.

Local sources are generally preferable and are particularly important in stands where there is little evidence of past planting such as old coppice woods.

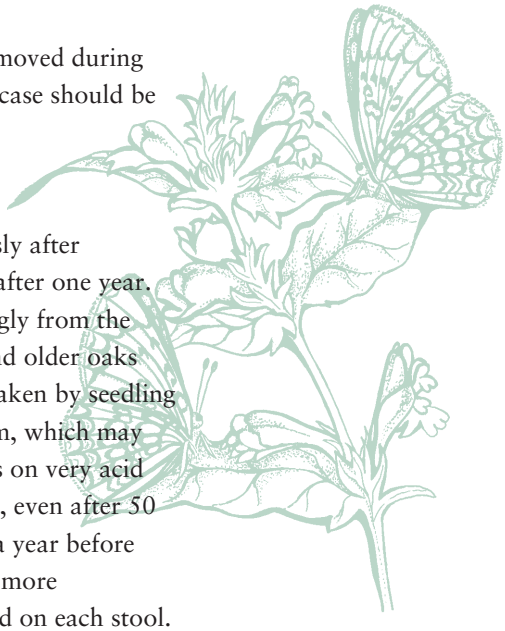
Pedunculate oak was planted into many acid beech and oak woods in the past, but its vigour and form has often been disappointing. In some woods there is evidence that sessile oak was originally more abundant and that it is better suited to the site. Under these conditions, replanting with sessile oak in the mixture is acceptable.

Where 'nurse' species are required to improve the early growth and form of broadleaved timber-species they should themselves be broadleaved, e.g. birch, and could take the form of coppice regrowth. Conifer 'nurses' will rarely be appropriate in ancient semi-natural woodlands generally, because they tend to deplete the diversity of naturally regenerating native trees, shrubs and ground vegetation and associated animals, with their shade and litter.

The dry acid sites of this woodland type are probably less affected by conifers in these ways than other types, because of their naturally low botanical diversity. Limited use of conifer nurses, mainly on sites where they have been used successfully in the past may therefore be acceptable, provided they are removed during early thinnings. However, each case should be judged on its merits.

Coppicing

Sweet chestnut sprouts vigorously after coppicing and can reach 1.5 m after one year. Birch and oak also sprout strongly from the stumps of young trees. Beech and older oaks sprout weakly and can be overtaken by seedling regeneration of birch. Hornbeam, which may also be a component of coppices on very acid soils, usually sprouts vigorously, even after 50 years of neglect, but can 'wait' a year before doing so. Beech stumps sprouts more vigorously if one stem is retained on each stool.



Heath fritillary butterfly on cow-wheat

Standards add to the maturity and structural diversity of coppice woods. They are best developed from oak or birch, which do not shade out the underwood. Ideally, saplings of seedling origin should be retained when the rest of the underwood is coppiced, but adequate standards can be developed from stump sprouts and from stock planted in tree shelters immediately after coppicing. The total cover of standards of all ages should not exceed 30–40%.

Site preparation

Limited disturbance of the mineral soil is often beneficial on flat ground and gentle slopes. It is a substitute for the natural soil turnover which occurs when large trees are blown over. It breaks up thick mats of slowly-decomposing humus, stimulates regeneration by burying fruits (such as acorns) which might otherwise be eaten, re-activates dormant seed and releases nutrients. Light screefing after a heavy seed fall is especially effective.

Although much of the ground in these woods is likely to be freely-drained, pockets of wet ground persist in depressions, beside streams and in association with old banks and ditches. These should normally be left undisturbed as an important component of habitat diversity.

Wood-pasture and pollarding

Regeneration in the surviving wood-pastures should be natural, its rate and pattern controlled by regulating the numbers and access of stock. Fencing destroys the open, accessible character of wood-pastures, but may be necessary in

substantial plots for up to two decades. Care should be taken to maintain an adequate amount and distribution of open spaces.

Reintroduction of pollarding may be desirable to maintain the old trees. Recent experimental re-pollarding of old pollards has had mixed results: the trees sometimes die, and those on which some branches are retained look unsightly. Caution is therefore recommended, cutting only a selection of trees growing in well-lit places. In the long-term, it is desirable to start new pollards near the old trees by lopping saplings.

Weeding

Ground vegetation consists of native plants and provides a substrate for woodland fauna, so weeding should be minimised. Certain stand treatments on heavier soils give rise to growths of bracken or coarse grasses with inhibit regeneration and growth. Herbicides, for grasses, should be limited to spot applications of one metre diameter around the tree. For bracken, hand-cutting is preferred except in dense stands where selective herbicide may be used.

Tending and thinning

Thinning of high forest stands is necessary to grow good timber, but it can significantly influence the conservation value of a wood. All the species in a natural mixture should be retained as late into the rotation as possible, and preferably into the final crop. Final thinnings can be designed to achieve advance regeneration. Heavy and early thinning may help a shrub layer to persist or develop and retain a vigorous ground vegetation. Patches with different intensities of thinning will allow some structural diversity into a wood which might otherwise be uniform. Thinning also provides an opportunity to bring in some early income.

In naturally-regenerated stands respacing should be done about year 15, though beech can be left somewhat longer without detriment. Beech will continue to regenerate into birch groups for up to 15 years after initial establishment, slowly outgrowing the surrounding birch. The overwood must be removed while the regeneration is still supple enough to withstand extraction damage.

Beech-dominated groups should normally be thinned first after 30–40 years and last about 80–90 years, or some 20 years before final crop trees are felled. Stems should be selected for vigour, good form and potential timber value, but the aim should be to maintain a mixture of species in the stand throughout the rotation. Most birches, however, should be removed from groups before the last thinning because they mature at about 60 years. Good oaks should be retained as part of the mixture. Some birch can be kept to provide dead wood habitats.

Neglected beech stands can be improved by thinning at all ages. This provides an alternative to clear felling when rehabilitating a wood.

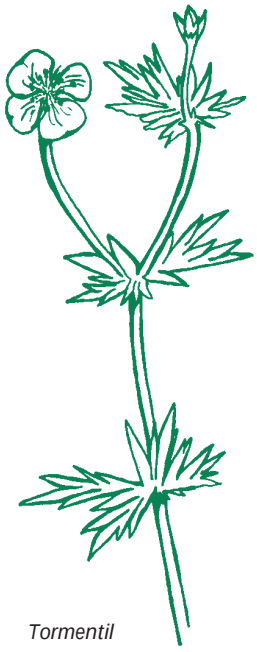
Neglected oaks should be thinned gradually to avoid epicormic growth.

Coppice does not require thinning but decisions must be taken when cutting about which poles to retain as standards. Beech is not recommended because its heavy shade damages the underwood. Oak is preferred, both for timber value and as habitat. Ideally, a few individuals of other species should also be retained as standards.

Exotic species

Scots pine and other introduced conifers grow well on light, freely-drained soils and will often invade to form a part of mixed regeneration. Where they are already established, regeneration of scattered individuals can be accepted, but closed canopy stands should be prevented.

Sycamore sometimes colonises beech–oak woods, especially on deeper soils, and has sometimes been planted. Where it is well-established, sycamore may be retained, but as a small part of the mixture, not as a monoculture. If it is only starting to invade a wood it should be removed. Excessive sycamores should be removed in stages, choosing the moment which will maximise returns. It can be used as a nurse in woods



Tormentil

where it is already present, provided no native species is available and suitable. It should not be planted in ancient semi-natural woods where it is not already present.

Rhododendron can be a serious problem, inhibiting regeneration and extinguishing ground vegetation. It is very expensive to remove, but removal is a priority. Prevention is better than cure: young saplings should be removed immediately and scattered bushes should be killed before they coalesce into dense understorey. The most severely infested woodlands may be uneconomic to reclaim and a strategy of containment may be necessary. Special Management Grant may be available to help pay for rhododendron clearance.

Nutrition

Spot application of fertiliser may be necessary on the most degraded soils. Widespread application may damage the naturally impoverished wildlife habitats of these woods.

Grazing and browsing

Grazing and browsing is an integral part of wood-pastures and should be perpetuated, provided regeneration is intermittently possible. Deer populations in some areas may make this impossible, however, without temporary fencing.

In other woodland types grazing and browsing by rabbits, hares and deer should ideally be controlled at low population levels. Protection for seedlings and saplings should be afforded if and when damage becomes significant. The most effective form of protection is by fencing, tree guards or shelters. Shelters are usually cheaper than fencing for irregular areas and small groups. They also help during weeding by making protected trees – both planted and naturally regenerated – more visible.

Grey squirrel control

Grey squirrels can cause serious bark-stripping damage to many trees between 10 and 40 years of age, particularly to beech, sycamore and to a lesser extent oak.

Control methods are described in FC Research Information Notes 180[2], 191[3] and 232[4]. The most effective method is the use of Warfarin bait in hoppers which are designed to prevent non-target animals from entering and being poisoned.

Poison cannot legally be used for grey squirrel control in Scotland or in some counties in England and Wales where red squirrels are present. In these areas cage-trapping and spring-trapping are the only suitable methods.

Open ground

Open areas in semi-natural woodlands provide exceptionally important habitats. In high forest and coppice beech–oak woods rides often support many of the herbs which are characteristic of heathland. On their margins they have concentrations of shrubs and small trees, such as sallow, rose and rowan. Together with the adjacent wood edge, they form a mixture of habitats which generate concentrations of wildlife. Maintaining these open and edge habitats is an important reason why woodland nature conservation generally requires management, not neglect. Cutting will usually be necessary. Rides and roadside can be improved by judicious widening or scalloping, and by creating large open areas at junctions.

Wood-pasture forms of beech–oak woods were a mosaic of glades and tree-covered ground, and the aim should be to perpetuate this condition.

Minimum intervention areas

Whilst wildlife generally benefits from management in accordance with this code of practice, it is not necessary for environmental gains for every part of all woodlands to be actively managed. Awkward or remote corners, steep-sided streamsides, rock outcrops and sites on steep slopes with very shallow and drought-prone soils can be left completely unmanaged to grow large trees and build up accumulations of dead wood, which would provide habitats for specialised and now often rare species.

Where such non-intervention patches are explicitly maintained within the management plan the need for retained old trees elsewhere in the wood may be correspondingly reduced.

Holly woodland

Dense groves of holly are characteristic of this woodland type. Holly can form a dense underwood which is almost as effective as Rhododendron in eliminating ground vegetation, but it also forms dense patches of woodland on open heaths. This is an unusual formation which appears to be better developed in Britain than elsewhere.

Clearance of patches of holly below mature beech and oak may be necessary to obtain regeneration of deciduous trees. Holly scrubs are often cut for decoration, and this may be enough to release oaks growing with the holly to grow into substantial trees.

Holly

Expanding lowland acid beech and oak woods

Expansion should be encouraged where adjacent ground is suitable, but not onto valuable lowland heath or acid grassland habitats which should be conserved as such.

Where expansion is desirable it should preferably be by natural colonisation with planting perhaps used to increase the stocking of oak or beech for timber production objectives.

Further advice can be obtained in Forestry Commission Bulletin 112[5].

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28 Domestic stock grazing to enhance woodland biodiversity (1999).
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Appendix

Definitions and classification of ancient and semi-natural woodlands

Definitions

Ancient woods

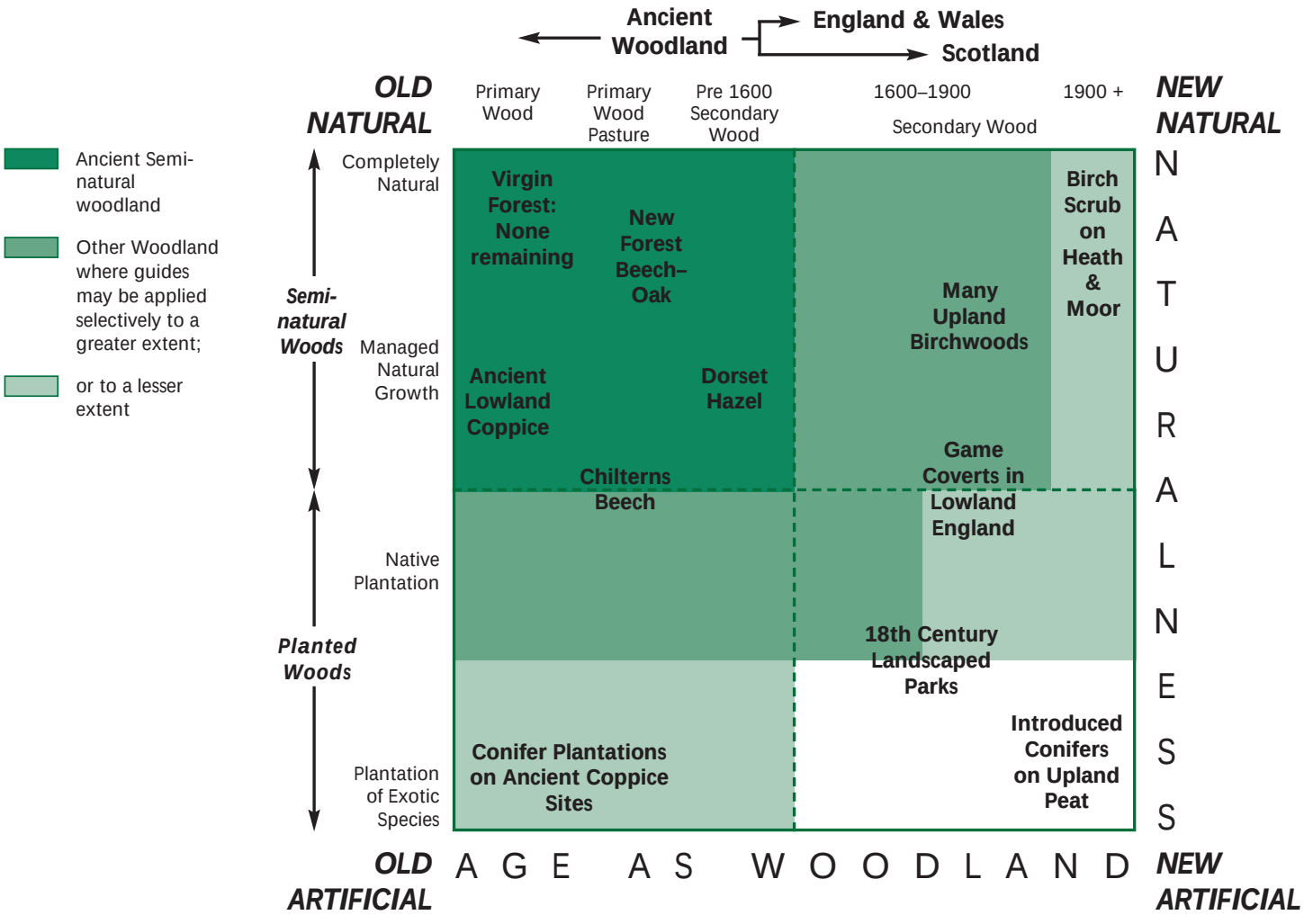
Ancient woods are those occupying sites which have been wooded continuously for several hundred years at least since the time when the first reliable maps were made. In England and Wales ancient woods are those known to have been present by around 1600 AD. In Scotland ancient woods are those which were present before 1750 when the first national survey was made by General Roy.

In both cases the dates correspond roughly with the time when new woodland planting first became commonplace so that ancient woods are unlikely to have been planted originally. Some may be remnants of our prehistoric woodland (primary woods) whilst others arose as secondary woodland on ground cleared at some time in the past.

An ancient woodland may be over 400 years old but this does not mean that the present trees are as old as that, although in some woods this is the case; rather that woodland has been present on the site continuously without intervening periods under other land-uses.

In fact many ancient woods have been cut down and regrown (or been replanted) several times in recent centuries, and during this century many have been converted from native species to plantations of introduced trees.

Figure 1 **Classification of woodlands according to age and naturalness**



Semi-natural woods

Semi-natural woods are stands which are composed predominantly of native trees and shrub species which have not been planted. By 'native' we mean locally native, e.g. beech is not native in Scotland and Scots pine is not native in England. Many woods are semi-natural even though they contain a few planted trees, for the latter do not change the character of the wood. The problem lies with woods dominated by native trees which were planted long ago on sites where they grew naturally, such as the many beech woods on the southern chalklands. Another ambiguous type is the chestnut coppice, dominated by an introduced species, often planted about 1800, but containing an admixture of native broadleaves and managed by the traditional coppice system. Both these 'intermediate' types are usually classified as 'semi-natural' by ecologists.

'Ancient' and 'semi-natural' have sometimes been used as synonyms, but this is quite wrong. Ancientness refers to the site as woodland, whereas naturalness refers to what is growing on that site.

Combining ancient with semi-natural

The age of the site as woodland and the naturalness of the stand on a site are independent of each other. This is illustrated in Figure 1. The vertical axis of the diagram shows a range of naturalness from completely natural at the top (i.e. people have had no influence on its composition) to completely artificial at the bottom. The horizontal axis shows a range of age-as-woodland, from primary woods on the left (i.e. surviving remnants of prehistoric woodland which have never been completely cleared) to woods of very recent origin on the right.

Ancient woods are simply those in the left-hand half of the diagram: those in the right-hand half are recent woods (except in Scotland where ancient woods extend further to the right). Recent woods are often called secondary woods, but this is slightly inaccurate, for there are secondary woods originating in the Middle Ages or earlier, which are included with the ancient woods. Semi-natural woods are those in the upper half of the diagram. Those in the lower half are planted woods. Ancient, semi-natural woods are those in the top-left quarter.

Within the diagram various examples of woodland types are placed according to their degrees of ancientness and naturalness. Top left would be virgin forest, if it still existed in Britain. At the other extreme, bottom right, is the most artificial form of recent woodland, a conifer plantation on drained peat in the uplands. Such forest comprises an introduced species, planted in regular formation on sites modified by management, where trees may not have grown naturally for several millennia. In the other corners are two kinds of intermediate condition. In the top right corner, newly and naturally-regenerated birch scrub on heaths or moors exemplifies woods which are relatively natural, but which are extremely recent in origin. In the bottom left corner is a conifer plantation, often for Norway spruce or Corsican pine, growing in a wood which had been treated as coppice continuously for several centuries. This is a common condition in lowland England: the site has been woodland continuously for a millennium or more, but the stand is almost wholly artificial. The diagram also shows roughly where several other woodland types fit.

Ancient semi-natural woods

Figure 1 makes clear that ASNW as a class contains many types of woodland. Some are very ancient, but others originated in historic times. Some are much more natural than others. Borderline types exist, and for different reasons.

Ancient semi-natural woods, because of their combination of naturalness and a long continuous history, are generally richer for wildlife and support more rare habitats and species than more recent or less natural woods.

However, all these divisions are somewhat arbitrary points on a spectrum and mature 'recent' semi-natural woods and old plantations of native species can also develop a high ecological value and of course landscape value, which may justify similar management to that of ancient semi-natural woods as Figure 1 indicates. This is particularly the case in the uplands where in general the ecological differences between ancient and younger woods are less marked than in lowland areas.

Inventories of ancient and semi-natural woodland were prepared by the former Nature

Conservancy Council (NCC) from map and historical records and some survey information.

Owners can refer to these to check the status of their woods either by consulting the NCC's successor bodies (English Nature, Scottish Natural Heritage and Countryside Council for Wales) or local Forestry Authority offices each of which holds copies of the inventory.

Classification of ancient semi-natural woodlands

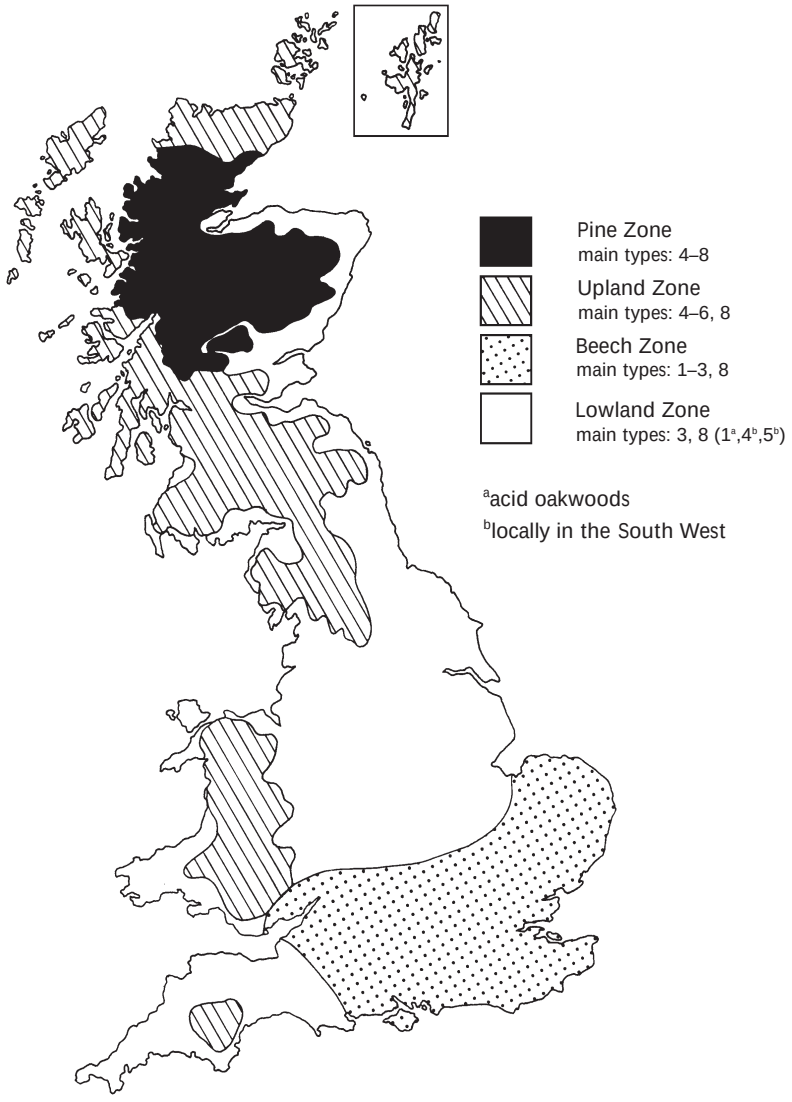
Outline

For the purposes of these management guides, Britain's ancient semi-natural woodlands have been divided into 8 types. This gives the best balance between straight-forward, practical guidance and the specific needs of the various types of native woodland. Many more types are recognisable, but fine distinctions would over-complicate the advice. With fewer types important ecological and silvicultural distinctions would be lost.

The 8 woodland types are based on 4 major regional divisions of Britain shown approximately in Figure 2:

- **The uplands of the north and west (Upland zone);**
- **The 'boreal' region of the Scottish Highlands within the Upland zone, in which pine is native (Pine zone);**
- **The lowlands of the south and east (Lowland zone);**
- **The southern districts of the lowlands within the natural range of beech (Beech zone).**

Figure 2 **The main semi-natural woodland zones**



These geographical divisions are further divided to recognise the ecological differences between acid and base-poor soils on the one hand and alkaline and base-rich soils on the other. Wetland woods constitute an additional type found in all regions.

The result is 8 types whose main characteristics are summarised below and in Table 1. They can be related to existing classifications, particularly the National Vegetation Classification (Rodwell 1991[1]) and the stand types described by Peterken (1981[6]). Insofar as the complexities of native woodlands can be reflected in a simple scheme, each type has a distinctive ecological and regional character, different history of management and exploitation, and different management requirements in the future. The guides have been drawn up for typical examples of each type.

The classification helps to relate British woodlands to those of continental Europe. The boreal pine and birch woods form an outlier of the sub-arctic coniferous forests. The beechwoods are the extremity of the central European broadleaved woods. Upland broadleaved woods have their counterpart in the oceanic woods of Ireland, Brittany and Galicia. The lowland mixed broadleaved woods form an outlier of a zone of mixed woodland lacking beech which extends throughout central Europe and deep into Asia.

Descriptions of each type

Lowland acid beech and oak woods

NVC types W15, W16
Stand types 6C, 6D, 8A, 8B

Beech and oak woods on acid, generally light soils. South-eastern, mainly in Weald, London and Hampshire basins. Mostly treated as high forest or wood-pasture in the immediate past. Many had a more distant history of coppicing, and in the Chilterns and the south-east some still have this character. Many were planted with chestnut around 1800 and are still worked as coppice. Includes a scatter of strongly acid

Table 1 **Summary of the main ecological and silvicultural characteristics of the eight semi-natural woodland types**

Semi-natural woodland type	Ecological characteristics		Silvicultural characteristics	
	NVC communities	Peterken stand types	Main historic management	Emphasis in future management
South and East Britain				
1. Lowland acid beech and oak woods*	W15, W16	6C, 6D, 8A, 8B	C or WP	HF
2. Lowland beech–ash woods*	W12, W13, W14	[1A], [3C], 8C, 8D, 8E	C or HF	HF
3. Lowland mixed broadleaved woods	W8 (A–D), W10	1B, 2A, 2B, 2C, 3A, 3B, 4A, 4B, 4C, 5A, 5B, 7C, 9A, 9B, 10A, 10B	C	C or HF
North and West Britain				
4. Upland mixed ashwoods	W8 (E–G), W9	1A, 1C, 1D, 3C, 3D, 7D, [8A–E]	C or HF	HF(C)
5. Upland oakwoods	W11, W17 (Oak dominant)	6A, 6B, [8A–B]	C or HF grazed	HF(grazed)
6. Upland birchwoods	W11, W17 (Birch dominant)	12A–B	HF grazed	HF(grazed)
7. Native pinewoods**	W18, W19	11A–C	HF grazed	HF(grazed)
All regions				
8. Wet woodlands	W1, W2, W3, W4, W5, W6, W7	7A–B, 7E	C neglect	Minimum intervention

NVC: National Vegetation Classification C: Coppice WP: Wood Pasture HF: High Forest
*Restricted to zone where beech is native (SE Wales and S England) **Restricted to zone of native pine (Scottish Highlands)

oak-dominated coppices found throughout the English lowlands. Also includes associated birch woods, self-sown Scots pine woods, holly scrub. Enclaves of hornbeam on acid soils best regarded as part of this type.

Lowland beech–ash woods

NVC types W12, W13, W14
Stand types 8C, 8D, 8E and parts of 1C, 3C

Beech woods on heavy and/or alkaline soils and associated ash woods. Southern distribution, grouped in South Downs, North Downs, Chilterns, Cotswold scarp, Lower Wye Valley and south Wales limestones, but sparingly elsewhere. Most had a medieval history of coppicing with limited wood-pasture, but most have long since been converted to high forest, often with extreme dominance of beech. Coppice survives in western districts. Woods often on steep slopes, but they extend on to Chiltern and Downland plateaux. Associated ash woods usually mark sites of past disturbance or formerly unwooded ground. Yew common in the driest beech woods and as distinct yew woods on open downland.

Lowland mixed broadleaved woods

NVC types W8(a–d), W10
Stand types 1B, 2A, 2B, 2C, 3A, 3B, 4A, 4B, 4C, 5A, 7C, 9A, 10A and 10B

Often known as 'oak–ash woods' by past ecologists, these are largely dominated by mixtures of oak, ash and hazel, but other trees may be dominant, notably lime (4A, 4B, 5A and 5B), hornbeam (9A and 9B), suckering elms (10A), wych elm (1B), field maple (2A, 2B and 2C) and alder (7C). Occur throughout the lowlands and upland margins, with enclaves on fertile soils in SW Wales, NE Wales and E Scotland. Most treated as coppice until 20th century, some still worked. Many still have a stock of oak standards growing with a mixture of other species grown from coppice and seedling regeneration. The various stand types occur as intricate mosaics which present silvicultural problems. Many have been invaded by sycamore or chestnut. Disturbed ground often marked by abundant ash, hawthorn or birch.

Upland mixed ashwoods

NVC types W8(e–g), W9
Stand types 1A, 1C, 1D, 3C, 3D, 7D with 8A–E where beech has been introduced.

Dominated by ash, wych elm and/or oak, usually with hazel underwood, sometimes with scattered gean. Found throughout the uplands on limestone and other base-rich sites. Also characteristic of lower slopes and flushed sites within upland oak woods. In the very oceanic climate of the north and west, increasingly take the form of ash–hazel woods with birch and rowan containing lower slopes dominated by alder. Lime is regular and sometimes common north to the Lake District. Like other upland woods, many have a history of coppicing which was displaced by grazing. Sycamore is a common colonist and in many woods is a naturalised part of the mixture.

Upland oakwoods

NVC types W11, W17 (oak-dominated woods)
Stand types 6A, 6B with 8A, 8B where beech has been introduced.

Woods dominated by sessile oak and, less often, pedunculate oak, growing on base-poor, often thin soils in upland districts from Sutherland to Cornwall. Sometimes absolutely dominated by oak, but more often oak forms mixtures with birch and rowan on very acid soils and hazel on the more fertile sites. Oak was planted in many woods, even those which now seem remote. Coppicing was characteristic, but not prevalent in N Wales and NW Scotland. Most now neglected and heavily grazed by sheep and deer. Includes small enclaves of birch, ash, holly, hawthorn and rowan-dominated woodland.

Upland birchwoods

NVC types W11, W17(birch-dominated woods)
Stand types 12A, 12B

Woods dominated by birch, but sometimes containing many hazel, sallow, rowan and holly. Birchwoods occur throughout Britain. Some are secondary woods which can sometimes develop naturally into native pinewoods or upland oakwoods. This type covers 'Highland Birchwoods' together with the extensive birchwoods of upland England and

Wales. Most are now heavily grazed by sheep and deer. Lowland birch stands are usually temporary phases or small enclaves and are included in Types 1 and 3.

Native pinewoods

NVC types W18, W19
Stand types 11A, 11B, 11C

Scots pine-dominated woods and the associated enclaves of birch and other broadleaves in the Highlands. Tend to be composed mainly of older trees, with natural regeneration often scarce. Most subjected to exploitive fellings during the last 400 years and heavy deer grazing during the last century.

Wet woodlands

NVC types W1, W2, W3, W4, W5, W6 and W7
Stand types 7A, 7B and 7E

Woodland and scrub on wet soils and flood plains. Usually dominated by alder, willow or birch. Generally take the form of scrub or coppice. Fragments of the prehistoric flood plain woods of black poplar, pedunculate oak, ash, elm, alder tree willows, and occasional black poplar survive in some southern districts.

Problems in using the classification

Semi-natural woodlands are complex systems which throw up many problems in the construction and use of classifications. These may seem unwelcome to managers used to managing plantations of one or two species, with clearly defined stand boundaries, but management of complexity is unavoidable if the small-scale diversity of semi-natural woodlands is to be successfully conserved. The commonest problems and their solutions are:

Intermediates

Stands falling between two or more types. Examples include;

- **a sessile oakwood on the Welsh borderland (between types 1 and 5);**
- **a mixed woodland with a limited amount of beech (between types 1 or 2 and 3–5);**
- **a birch-rich pinewood (between types 6–7);**
- **Managers should use the Guides appropriate to both types.**

Mosaics

Woodlands may include more than one of the 8 types within their border. Example: lowland acid beech woods and upland oak woods commonly include patches of birch-wood.

Ideally, each patch should be treated separately, though this is impractical with small inclusions of less than 0.5 ha.

Outliers

Good examples of each type can occur outwith their region. Examples: good lowland mixed broadleaved woods occasionally occur in N Wales and SW Wales; birchwoods occur throughout the lowlands.

Management of outlying examples should be based on the guidance for their core regions, but some adaptation may be required for local circumstances.

Introductions

Semi-natural woods often contain trees growing beyond their native range. Common examples are beech in northern England, north Wales and Scotland, and Scots pine south of the Highlands.

Unless the introduced species is dominant, such woods should be treated in the same way as the original type, using the guidance given on introduced species within that type. Thus, for example, a beech wood on acid soils in the Lake District should be treated as an acid beech wood (type 1) if beech is dominant, but otherwise should be treated as an upland oakwood (type 5).

Notes

Forestry Commission

231 Corstorphine Road
Edinburgh
EH12 7AT

www.forestry.gov.uk

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