The Management of Semi-natural Woodlands

5. Upland Oakwoods

PRACTICE GUIDE

Forestry Commission

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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 21), 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.

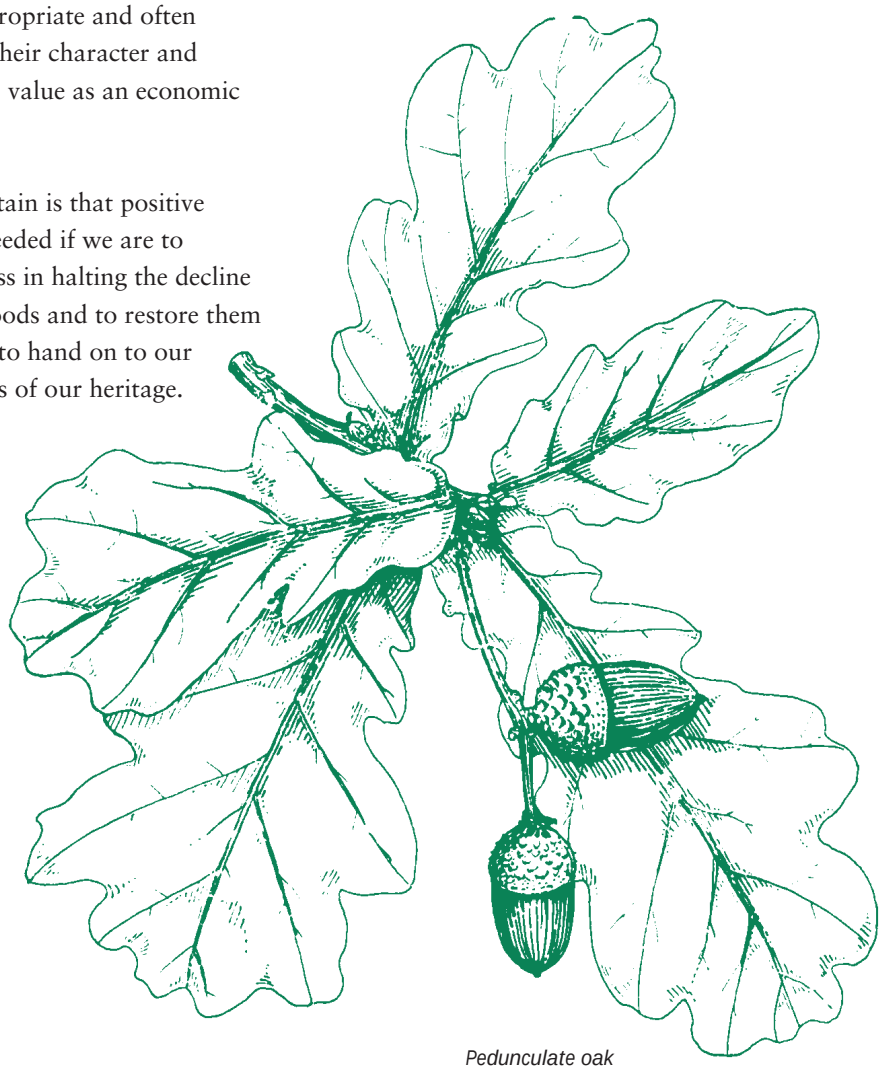
When grant aid is sought the Forestry Authority will compare management proposals with the advice contained in these booklets. Applicants are free to propose other forms of management for these woods, but must satisfy the Forestry Authority that their proposals will be effective in maintaining, and preferably 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.



Pedunculate oak

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 upland oakwoods?

This Guide deals with the management of the semi-natural oakwoods of western and northern Britain, which grow mostly on acid, often shallow, leached brown earth soils in a cool, wet and windy climate, from southernmost Cornwall to north-west Scotland. In parts of Exmoor, Snowdonia, Lake District, Argyll and elsewhere they form important elements of the finest landscapes. There are estimated to be 60 000–70 000 ha of ancient semi-natural woods of this type.

A typical example would be a mature wood dominated by small oaks on a moderate to steep slope, containing an admixture of hazels, birch and rowan, which runs down into ash–wych elm woodland (Guide 4) at the base of the slope. Such woods have usually been heavily grazed by sheep or deer, which have long inhibited regeneration and destroyed the undershrubs. Past regeneration, however, has filled old gaps with birch and allowed groups of birch to grow up around the margins. This Guide deals mainly with the oakwoods, but it applies also to the small inclusions of ash or birch.

These 'western oakwoods', as they are commonly known, comprise mixtures of sessile oak, pedunculate oak, Downy birch, silver birch, hazel, rowan, holly and hawthorn. Occasionally crab apple, aspen and yew will be present, with a few ash, bird cherry or alder intruding from other woodland types. The importance of each species in particular woods is largely a reflection of the history of management (see below), but to a limited extent it is also determined by soil fertility.

Although sessile oak is widely regarded as typical of western oakwoods, there are many examples where pedunculate oak is important. The famous Wistman's Wood (Dartmoor) contains only pedunculate oak and this species is common in parts of Devon and western Scotland. Sessile oak is, nevertheless, the most abundant, and is particularly pure in woods as far apart as Cornwall and Argyll. Likewise, whilst both birch species are usually present in most woods, some woods are, for no obvious reason, predominantly Downy whilst others are mainly silver.

Two types of upland oakwood are recognised by the National Vegetation Classification (Rodwell, 1991[1]).

Sessile oak–Downy birch–*Dicranum* moss woodland (W17)

These are the woods of very acid, usually shallow soils in the coolest and most oceanic climates. The canopy is usually low and open. Growth is usually slow, and in extreme sites the wood may be no more than low scrub. Whilst oak is usually the most abundant tree, birch and rowan can be dominant in woods with a history of disturbance. Holly might naturally be abundant, but it is generally restricted to outcrops by grazing. Hazel is usually limited to deeper soil pockets. The ground vegetation is dominated by bilberry (blaeberry), heather or wavy hair and other grasses, and mosses and liverworts. Herbs, such as heath bedstraw, cow-wheat and wood sage may be present. Ferns are often abundant, notably hard fern, male fern, lady fern, oak fern and common polypody. Bracken is only sparse. The profusion and variety of mosses, liverworts and ferns is the most distinctive floristic feature of these woods, especially near the western coast.

Sessile oak–Downy birch–wood sorrel woodland (W11)

These are the woods of acid, freely-drained, leached brown earth soils which are more fertile than in the previous type. Superficially they resemble it, but there are many significant differences. Growth is stronger, so the oaks are usually taller and straighter. Hazel is present and often abundant,and on the most fertile sites it forms a coppice underwood below an oak canopy. Heather and bilberry (blaeberry) are rarely found in the ground vegetation, but bracken is often dominant. Where it is not, the ground vegetation usually comprises a mixture of sweet vernal and other grasses, laced with herbs, such as wood sorrel, violet, tormentil, heath bedstraw, earthnut, hairy woodrush and many others. Mosses and liverworts are more

abundant on north-facing slopes and in sheltered sites.

Both types typically occupy well-drained slope. They generally merge into ashwoods and alderwoods growing on wetter and more fertile soils at the base of the slope. Birchwoods develop around the margins where woodland has been allowed to expand on to moorland and upland grazings. These woodland types are covered by Guides 4, 8 and 6 respectively.

Open habitats form an integral part of many upland oakwoods, where rock outcrops, peatlands, sedgebeds, marshes and rich fens preclude tree growth, or where sheep have prevented regeneration. Most are occupied by grazed grassland, but some have dense bracken stands or swards of purple moor-grass generated by a history of overgrazing and uncontrolled fire.

Sessile oak

History and traditional management

People have long shaped the character of upland oakwoods. Some were certainly mixed woodlands of ash, alder and other species in prehistoric times, which have been degraded into the less-fertile oakwoods by felling, grazing and burning. Most woods have a long history of coppice management. Indeed, some of the purest oakwoods were planted as oak coppice.

Coppicing was prevalent in English examples by the 16th century. Throughout Wales and the Lake District oak was cut to make charcoal for smelting local ores. There is evidence of early iron smelting in hand-worked bloomeries throughout the Scottish Highlands. During the 18th and early 19th centuries many upland oakwoods were intensively managed for charcoal and tanbark, unwanted tree species being ruthlessly cleaned out. The usual coppice rotation was 15–35 years,but most coppices contained a scatter of standard trees grown for much longer. By 1880 the charcoal-fuelled furnaces had closed and coppicing was progressively abandoned. It survived very locally in the Lake District, west Midlands of England and Cornwall.

Following the end of coppicing, the woods were increasingly grazed by sheep and deer. The former coppicing is usually obvious in the multi-stemmed oaks and the scatter of wide-crowned former standards, but the undershrubs have gone and the ground is often a closely cropped sward. The character of many woods has been transformed by the escape and spread of Rhododendron and the introduction and natural regeneration of beech. During recent decades some woods were thinned and underplanted with conifers, which, where they have grown successfully, are reaching into and killing the oak canopy.

The composition and structure of each wood depends largely on its history. The few woods, e.g. in North Wales, which were not coppiced have fewer, larger oaks and a mixture of associated trees and shrubs. Intensively coppiced woods may be oak monocultures. Those with a history of fluctuating grazing intensity may contain several generations of birch, growing in patches. Where dense woods have been freed from grazing, rowan can form a dense underwood.

Hazel

Values

Landscape

The rounded outlines of massed oaks along the sides of upland valleys form an essential part of the semi-wild character of western and Highland scenery. They form a distinctive backdrop to the farmhouses and open, walled fields of the valley bottom, and a base from which the rugged upland moors and crags emerge. Breaks and straight lines in the canopy are particularly obtrusive.

Historical and cultural

Many upland oakwoods have been part of the landscape for centuries and have contributed to the local economy in various ways. Most are now more mature and less disturbed than they have been for centuries. Formerly they were regularly coppiced and in most the sight of drifts of smoke rising from charcoal hearths must have been familiar.

Today, it is still possible to find many charcoal hearths, small quarries,mine entrances and other industrial remains within upland oakwoods. Most woods are bounded and many are sub-divided by walls, which defined part property and grazing limits. Lower margins commonly incorporate the remains of small fields, which have been re-absorbed by the wood. Old pollard and stub trees still mark the boundaries.

Wildlife conservation

The most acid upland oakwoods (W17) are poor in herb species. Pockets of deeper soil may support more variety, but the generality of these woods has cow-wheat, tormentil, heath bedstraw, and perhaps a few wood sage and foxglove. The hazel–oak woods (i.e., W11, more or less) are much richer. Bluebell, wood anemone, wood sorrel, wood stitchwort and other species form colourful spring displays. Mixed with them are characteristic flowers, such as violets, bitter vetch, wintergreen, slender St John's wort, yellow pimpernel, wood speedwell and primrose.

The chief significance of western oakwoods is their profusion of lower plants: ferns, mosses, liverworts, epiphytic lichens and fungi. Permanently moist gulleys, seepages and streamsides support mats of mosses and liverworts which are confined to oceanic climates along the western seaboard of Europe. The assemblages of epiphytic lichens, which clothe the trunks of oak and even the smaller twigs of bushes, are amongst the richest in Europe. The abundance and variety of ferns is equally characteristic,and includes rarities, such as hay-scented buckler fern.

Four summer migrant birds, pied flycatcher, wood warbler, tree pipit and redstart, favour the open, grazed oakwoods. Buzzards and (in Wales) red kites use them as nest sites. Greater spotted woodpeckers occur throughout these woods. Jays and long tailed fieldmice play an important part in oakwood regeneration by redistributing and storing acorns. A wide range of native mammals use these woods including badgers, polecats and pine martens. Red squirrels remain in some northern woods but are being displaced elsewhere by grey squirrels.

Oakwoods and their associated glades provide habitats for a very wide range of insects. The succession of canopy-feeding moths produces large numbers of caterpillars that totally defoliate oaks in some seasons. The oakwoods are home to a number of rare woodland butterflies, such as the chequered skipper in Argyll. Wood ants are often uncomfortably abundant, living in huge mounds of litter and preying on insects in the trees.

The significance of oakwoods for wildlife is far from confined to the tree-covered ground. The open areas, particularly those containing mires, support many species which are not found under the trees. In any particular wood, the greatest contribution to the species list often comes from the open ground amongst the trees.

Chequered skipper butterfly

Recreation

Upland oakwoods occur in districts which the majority of the population associates with holidays and countryside recreation. They are prominent in the National Parks of Dartmoor, Exmoor, Snowdonia and the Lake District. Many are permeated by trails which are well used by hill walkers. Indeed, the view down a steep slope through groves of mature oaks to a stream tumbling over rocks is one of the chief delights on an upland ramble. Another is the view from upland moors down over a mature, unbroken sea of oaks.

Game and livestock

Upland oakwoods are rarely used as pheasant preserves, but they harbour foxes and deer which are hunted. Their principal value is as shelter for sheep and deer, which move down from the moors into the woods. Although there may be some seasonal variation in grazing and browsing pressure, many woods appear to be permanently grazed by sheep.

Wood production

Oak timber is seldom of high quality at present on these upland sites. Growth is slow and the timber is often shaken, knotty or twisted. Extraction is often difficult from remote woods on steep ground. Extracted timber may be a long way from timber mills. Nevertheless there is potential for some good quality logs on the better soils and there is a growing interest in small-scale working supplying niche markets and local uses such as firewood and fencing.

As old stored coppice is converted to high forest the quality of oak stems produced should improve in future given suitable silviculture.

Wood warbler

Policy Aims

The aims of policy are to encourage appropriate management of semi-natural upland oakwoods 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 those 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.

Many upland oakwoods are capable of yielding significant quantities of utilisable wood products a proportion of which can be of relatively high quality. With good management as described in this guide these products can usually 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. Although many upland oakwoods have become fairly uniform, due to part encouragement of oak monocultures, 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

This guide should be applied to all ancient semi-natural 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 upland oakwoods of recent origin can be almost as valuable as ancient semi-natural woods for nature conservation and scenic value, especially where they are growing next to an ancient semi-natural wood. Most semi-natural upland oakwoods, at least partially, should therefore be treated in a similar way to ancient semi-natural woods.

Much of the advice in this guide can also be applied to ancient woodlands of this type 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 upland oakwoods, at least partially, 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 a high conservation value. Again much of the advice in 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 Scottish Natural Heritage, English Nature or the Countryside Council for Wales 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 officers 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.

Operational guidelines

General principles

The policy aims for upland oakwoods 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.

- **Improve the diversity of structure.**

A range of age classes within each site is preferred to the single age class which is frequently encountered.

- **Increase diversity of species, where appropriate.**

Many upland oakwoods are dominated by oak, due to past treatments.

- **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. mires).

- **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 layout 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

The type of management which is appropriate for individual woods needs to be carefully considered at the outset before any system is chosen.

A few woods, usually in nature reserves, may be managed on a 'minimal intervention' basis to allow their natural development to be scientifically recorded. Elsewhere some active intervention will generally be needed to safeguard and restore upland oakwoods whether or not wood production is an objective.

The basic requirement is to secure the long-term survival of the wood. In upland woods, the most important single measure to achieve this will often be the control of browsing and grazing by sheep and deer so that the wood can periodically regenerate or expand. Further intervention may often be unnecessary except, for example, where dense or even-aged woods fail to regenerate and cutting gaps and perhaps planting may be needed.

In upland oakwoods there is rarely an immediate need to carry out felling for nature conservation objectives. Oaks are very long-lived trees and most are under no immediate threat. Regeneration of oaks can be expected to proceed slowly as the canopy opens during intervals of release from browsing.

A low-intervention approach is particularly suitable for the more remote and inaccessible woods which do not have a long history of silvicultural management (although some trees may have been felled from time to time) and where the potential for substantial wood production without damage to the site may be low.

In these woods on more accessible sites and better soils where wood production would be more worthwhile and also in other woods which have been strongly influenced by silvicultural management in the past, a greater degree of intervention is usually appropriate using some type of silvicultural system as described below.

Some management techniques can sometimes have adverse effects on the site or the wildlife of a wood, so careful thought needs to be given to operations such as cultivation to achieve benefits without adverse effects. Ways of achieving the right balance are suggested below.

Silvicultural systems

High forest

Most upland oakwoods were coppiced until the late 19th-mid 20th centuries and therefore comprise even-aged stands, 50–150 years old, with little or no younger growth, diversified only by a scatter of older trees, which had formerly been retained as standards. Such woodlands may have a high density of stems and many multi-stemmed trees.

If access is reasonable and markets are available, an option is to single coppice, followed by further thinning on a 5–10 year cycle. This has the following advantages:

- producing the best quality timber of which the site is capable
- producing larger trees of higher conservation value for lichens, nestholes and specialist invertebrates and fungi
- producing trees which yield more seed than small-crowned unthinned coppice stems
- allowing more light to reach the woodland floor, which (in the absence of grazing) allows coppice sprouts from cut stumps and also undershrubs to develop. On more fertile sites, however thinning may encourage growth of bramble or bracken at the expense of mosses which may be detrimental to conservation value.

When regeneration fellings are eventually necessary, groups of at least three mature oak trees should be cut. Rowan, holly, hazel and yew will regenerate in shade, but oak and birch require more open conditions. A wood which is already poorly stocked, with abundant open space on suitable (i.e. well-drained) soils will not require regeneration fellings. Large areas should not be clear felled.

Every few years oak has a mast year and the next spring large numbers of seedlings are produced. Regeneration may be successful if a small number of trees are felled after a heavy mast and the wood is fenced against sheep and deer. Alternatively small amounts of advance regeneration may be established by this means, and these groups should then be opened out by felling some adjacent trees. Coppice shoots may be acceptable as part of the regeneration within a group system, but seedling trees are preferred, because maiden oak generally live longer, form better stem and crown shapes and are more stable.

Heavy seeding fellings over larger areas may be acceptable where the impact on the landscape is small. A small number of mature oaks should normally be retained as a seed source and shelter for regeneration. This treatment is most likely to maximise oak and birch regeneration in the next generation.

Upland oakwoods rarely yield much high quality timber, so expensive silvicultural techniques are not recommended. Oakwoods can be perpetuated with a slow rate of oak regeneration. In most woods it will be better to regenerate the wood in several episodes spaced over many decades. Aim to have not more that 20% of the wood, and preferably about 10–15%, in regeneration at any one time and allow about 20 years for the regeneration phase in any one patch.

Coppice

Although most upland oakwoods were coppiced, restoration of coppicing is not generally recommended. Oak stumps sprout weakly as they age and young shoots are readily removed by sheep and deer. The assemblages of bryophytes, lichens and other species for which these woods are famous develop poorly in coppiced woods.

In the few places where markets for upland oak coppice products have not disappeared, where coppicing has continued until recently, coppicing can be satisfactorily resumed. It is essential that browsing of coppice is prevented. Birch may regenerate copiously, which can weaken oak regrowth. Self-sown oak saplings should be encouraged in coppice

systems to provide eventual replacements for old coppice stools.

Woodland pasturage

A few upland oakwoods are traditional wood-pastures, consisting of a scatter of large trees within permanent pasture. They have a historical interest and may be important habitats for specialised species depending on large timber. They should be maintained as wooded pasture by retaining existing trees and planting a few successors of the same species in open spaces.

Harvesting

Thinning and felling in oakwoods is normally straightforward, but extraction may present problems due to poor access, steep or rough terrain and the need to avoid damage to sensitive sites. The construction of major roadlines is not acceptable in oakwoods of high landscape value. Sensitive small-scale extraction techniques will often be desirable, including reviving traditional horse extraction or using pedestrian skidders. On-site utilisation with mobile sawbenches may be cost-effective and add value for the small woodland especially where niche markets such as hardwood flooring, wall-panelling and craft uses can be developed.

Upland oakwoods yield few sawlogs of sufficient diameter and quality to meet planking grade standards. Most go for fencing, beams and rough construction. Sawlogs can generally be sold if reasonable parcels (20 tonnes minimum) can be assembled at an accessible roadside. Small roundwood outlets are limited: certain chipboard mills take straight small diameter hardwoods, and some sizes can be converted on site to fencing for local use. Firewood is another use for low quality material.

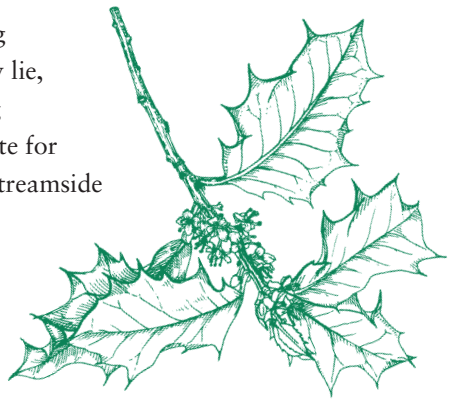
Retained old trees and deadwood

Many woodland wildlife species depend on large, old trees, standing dead wood and large fallen trunks and limbs. Upland oakwoods often contain a few large, ancient specimens, but rarely possess large accumulations of dead wood. Where they exist, the trunks of large trees form rich habitats for epiphytic lichens, and large fallen trunks or limbs provide habitats for fungi, insects and other woodland fauna.

Management should aim to maintain and increase the number of large, old trees and the quantity of dead wood. Large trees can be achieved by allowing some groups of trees to grow longer than might be commercially desirable, selecting oaks which occupy windfirm sites. Marginal trees, and trees growing in difficult corners and along streamsides may already be important (e.g. as lichen trees) or associated with rich habitats, and these should be retained indefinitely. Eventual replacements of existing large trees should be developed by retaining and thinning around well-grown trees at the wood edge and within the body of the wood.

Large old coppice stools can be retained by cutting above the level of the last cut. Stub trees and pollards, which usually grow on marginal and internal banks, can be maintained by periodic maintained cutting, but only if the nearby woodland is opened up at the same time.

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 streamside and on margins.



Holly

Methods of regeneration

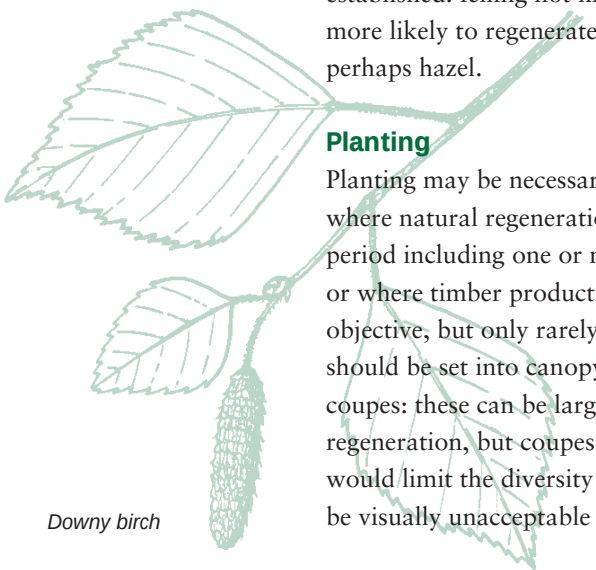
Natural regeneration

Natural regeneration is preferred. It favours 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. Birch and rowan usually regenerate well, but oak and hazel are less reliable. On moist, base-rich pockets within the oakwoods, alder, ash, wych elm, hazel and shrub species usually regenerate.

The change from oak dominance toward a more mixed composition, perhaps with a few oak saplings scattered amongst thickets of birch and rowan, is a natural phase in the woodland; oaks may increase in dominance again as they gradually overtop the birch. Oak dominance in the past was artificially maintained by silviculture, especially in coppiced woods.

Although both oak species fruit prolifically over a lifetime, acorn production varies greatly from year to year, with mast years occurring irregularly every 2–7 years. Good seed years are less frequent at high elevations and in wetter climates. Acorns are taken in large numbers by wood pigeons, corvids and small mammals, but losses may be reduced by scarifying the ground immediately after acorn fall as described earlier.

Germination and initial growth takes place readily within moss, grass, blaeberry and light bracken cover, even under mature oaks. Seedlings generally die within 2–3 years unless they escape repeated browsing by deer and farm animals and grow within a gap or clearing. Gaps should be created by heavy thinning or felling groups of 0.3–1 ha. Such felling is best left until the seedlings are established: felling not linked to a mast year is more likely to regenerate birch, rowan and perhaps hazel.



Downy birch

Planting

Planting may be necessary to establish oak where natural regeneration has failed over a period including one or more good seed years, or where timber production is an important objective, but only rarely otherwise. Plants should be set into canopy gaps and felling coupes: these can be larger than for natural regeneration, but coupes of several hectares would limit the diversity of the wood and may be visually unacceptable in some landscapes.

The density of plants will depend on objectives. Where timber production is intended on a good timber site, groups of oak at 2 m spacing may be merited in parts of the wood, whilst aiming for an irregular density over the wood as a whole. Where wood production is not an objective restocking may be adequate if enough transplants and natural saplings survive to produce 50 mature trees/ha. Natural regeneration will increase the density and diversity of any plantings. Small transplants can be protected by tree shelters. Larger transplants (25–50 cm) may require weeding for several years: stakes could be used to make them more conspicuous.

In all ancient semi-natural upland oakwoods, efforts should be made to keep the natural gene pool intact. Imported stock was often planted into oakwoods formerly managed for charcoal, but unless this can be demonstrated, any planting should be restricted to local stock.

Ideally, seed should be collected locally and raised in nurseries for replanting in the same region, and in order to maintain natural diversity seed should be collected from as wide a selection of parent trees as possible. However, oak is covered by the Forest Reproductive Materials regulations, so that planting stock should originate from a registered seed source although 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.

Where ‘nurse’ species are considered to improve the early growth and form of oak, notably, for example, on exposed, frosty or infertile sites, the nurses should themselves be broadleaved, notably birch and rowan, and could take the form of coppice oak regrowth or natural seedlings.

Conifer nurses are not appropriate in ancient semi-natural woodlands of this type; they tend to deplete the diversity of naturally regenerating native trees and shrubs and the ground vegetation and associated animals, due to their shade and litter.

Site preparation

Upland oakwoods are usually well-drained, but damp areas and small mires develop in depressions. Drainage of these patches is undesirable: they are essential elements of habitat diversity on which many woodland species depend.

Some form of patch scarification may hasten regeneration of birch and rowan, but its value for oak is uncertain. Each site is different and,

since cultivation may also have undesirable ecological effects, an informed judgment is required. Cultivation should not normally be undertaken until the effect of grazing control alone has been adequately tested, over an adequate period (at least 5 years and probably over 10 years).

Limited disturbance of the mineral soil is most likely to be beneficial on gentler slopes, if it is carried out after the acorn fall in October and November in order to hide acorns from predators and provide a seed bed. Scarification, hand mounding or screefing should not be done in areas where there are already many young trees and shrubs. It should be limited to ground where the peat depth is less than 10 cm.

Coppicing

Coppice sprouts can reach 1 m in their second season in the absence of deer and sheep. Browsing can permanently check new growth and eventually kill the stool. Natural regeneration of birch often overtops oak coppice, and may have to cut back, taking care to retain any oak saplings.

Weeding

Ground vegetation consists of native plants and provides a substrate for woodland fauna, so weeding should be restricted to the essential minimum. In upland oakwoods bracken, bramble and grasses often grow strongly in open patches. Brambles either smother or protect saplings from browsing, according to their relative vigour. If treatment is necessary, hand cutting does least damage to wildlife, particularly when cutting can be delayed until late June.

Naturally regenerated oak seedlings can withstand considerable grass competition and gradually come through. Herbicides are usually cheaper and more effective than cutting at reducing root competition from grasses. If needed they should be applied to spots of 1 m diameter around planted trees each year for about 3–4 years. Regular mechanical cutting often results in a loss of coppice and the impoverishment of the ground vegetation to a uniform grassy mat. At a later stage it may be necessary to release individual stems by hand cutting. The best oak, whether planted, seedling or coppice shoots, should be favoured in weeding and cleaning where an objective is to grow quality oak timber.

Dense bracken can prevent any regeneration and may require herbicide treatment. Asulam is recommended to control the thickest bracken growth. It should not be used in moist areas and near streams, where other ferns will be affected.

Tending and thinning

Thinning is necessary to grow good timber and provides an opportunity to bring in some early income from about 40 years of age, 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. Heavy and early thinning will allow 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 and cleaning will release good quality oaks. Where timber production is an objective, a 5–10 year cycle of thinning is recommended, the frequency and intensity of thinnings declining with age. However, poor markets for small oak and other species may preclude full early thinning. If this is the case, minimal clearance to favour selected ‘final crop’ trees (about 100 trees/ha) is recommended. Later thinnings should be utilisable. Thinning encourages the growth of epicormic branches, but this will only be a significant loss on the very best oaks.

Coppice oak does not require thinning, though this was once a common practice in northern districts. Decisions must be taken when cutting about which poles to retain as standards. Oak is preferred, both for timber value and as habitat, but a few birches should also be retained for diversity.

Exotic species

Any underplanted conifers should be removed before they do damage to the ground flora: their removal may bring in a small surplus. The disturbance associated with removal often generates prolific natural regeneration.

Several non-native trees commonly colonise upland oakwoods. In the case of Sitka spruce, western hemlock and other conifers, complete removal of trees and saplings is recommended, followed by periodic removal of later saplings. Conifers may have been planted on land beside upland oakwoods, and these will form persistent seed sources: a buffer zone of at least 50 m where conifers are removed should be considered. Scots pine often seeds within upland oakwoods, but this can generally be tolerated, and may be welcomed in some circumstances within the native range of pine in the Highlands of Scotland.

Beech and sycamore are often well established and cast heavier shade than most of the native trees. If they occupy a small proportion (under about 10%) of the canopy they should normally be eradicated, but otherwise it is more practicable to accept them as part of the mixture and control them during thinning and cleaning operations. The aim should be to ensure that they form no more than a small proportion of the canopy trees, and never dominate the understorey.

Rhododendron and cherry laurel can be a serious problem, inhibiting regeneration and extinguishing ground vegetation. They are very expensive to remove, especially on rocky terrain, but their 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 a dense understorey. The most severely infested woodlands may be uneconomic to reclaim and a strategy of containment may be necessary. Rhododendron clearance may be eligible for special management grants under the Woodland Grant Scheme in ancient semi-natural oakwoods.

Nutrition

Fertilising with a handful of mineral phosphate around each tree may assist early growth of oak and other species on the more infertile soils but it may add to grass competition on more fertile soils. In established stands the use of fertilisers is likely to be a waste of money and could alter the ground vegetation.

Grazing and browsing

Low intensity grazing and browsing is a natural feature of woodlands which helps to maintain diversity in composition and structure. It helps to maintain the important moss and liverwort communities in the western woods, for example, by preventing them from being shaded out by grasses and herbs. However, in the small, isolated and unmanaged woodlands we have now, even very low numbers of deer and sheep will selectively browse young growth. Fencing is thus normally necessary, of the whole wood, or of that part which is currently being regenerated.

When whole woods and large parts are fenced against deer, further control may be necessary. Fences must be well designed and maintained. Sheep often penetrate poor fences or enter over snow in winter, devastating young broadleaves. Shelters may be cheaper, depending on the amount and distribution of young growth, and they will also allow some grazing to continue.

Grey squirrel control

Grey squirrels can cause serious bark-stripping damage to oak and other trees between about 10 and 40 years of age.

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 of England and Wales where red squirrels are

present. In these areas cage-trapping and spring-trapping are the only suitable methods.

Fire

Fire is lethal to young regeneration, though mature oaks normally survive a singeing. Spring burning on adjoining moorland must be done carefully to avoid fire spreading into the oakwoods.

Open ground

Open areas in semi-natural woodlands provide exceptionally important habitats. Upland oakwoods frequently contain glades with bracken, grassland or mires, which diversify the wood by creating warm, sheltered openings. Oakwood margins are often irregular, forming a complex transition of habitats, with exposed peninsulas of woodland and sheltered coves.

Oakwoods would be impoverished if all openings filled with trees, either naturally or by planting. Enough open spaces will remain open if grazing is continued in most of a wood while part is fenced for regeneration. Discrete fellings will renew the open spaces at intervals.

Minimum intervention areas

Awkward or remote corners, steep-sided streamsides, rock outcrops and sites on steep slopes with very shallow and drought-prone soils may be particularly important for wildlife diversity as well as being difficult to access and should 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.

Wood anemone

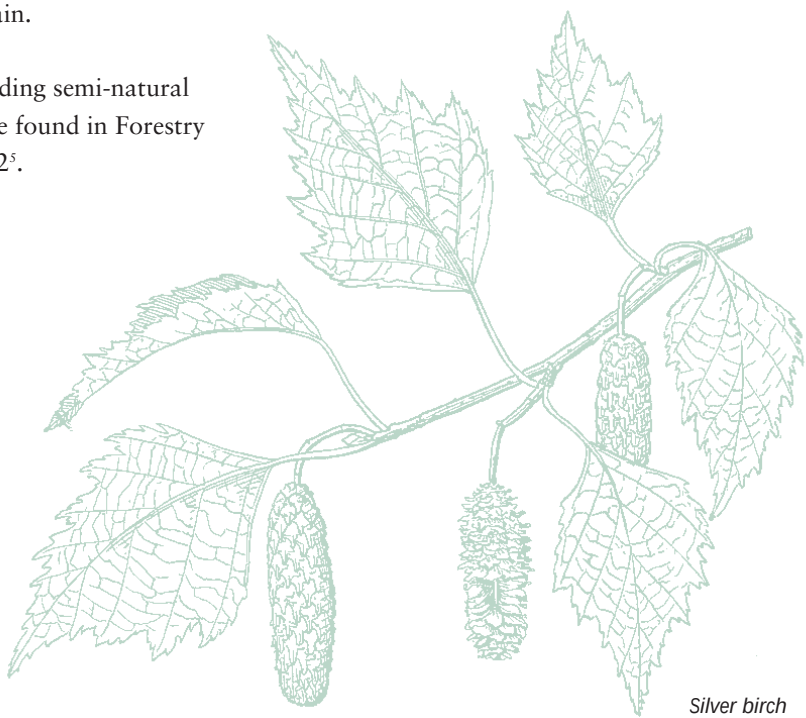
Expanding upland oakwoods

Upland oakwood margins have often shifted to and fro over the centuries, especially along their moorland borders. Sometimes, whole woods have 'moved' as expansions in one place are matched by degeneration in another. New oakwoods are generally not as rich as long-established oakwoods, but those developing on suitable soils around the margins of existing oakwoods quickly acquire species from the adjacent woodland.

Instead of felling and restocking, younger age classes can be introduced to a mature oakwood by allowing the wood to expand onto adjacent 'bare' ground, or into other woodland, such as birchwoods and even into parts of adjacent felled conifer plantations. This is particularly appropriate if floristic, place-name or documentary evidence indicates that oakwoods once occupied the ground. Expansion of oak onto adjacent ground which is already of high conservation value as grassland, moorland etc, should be avoided.

Oak woodland can be expanded by natural seeding, but this is usually slow and unsure beyond 2–3 tree-lengths from the wood edge. Planting oaks of local origin and other locally native trees is more certain.

Further advice on expanding semi-natural woods in this way can be found in Forestry Commission Bulletin 112[5].



Silver birch

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For further information and details of new Forestry Commission publications visit:
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Appendix

Definitions and classification of ancient and semi-natural woodlands

Definitions

Ancient woods

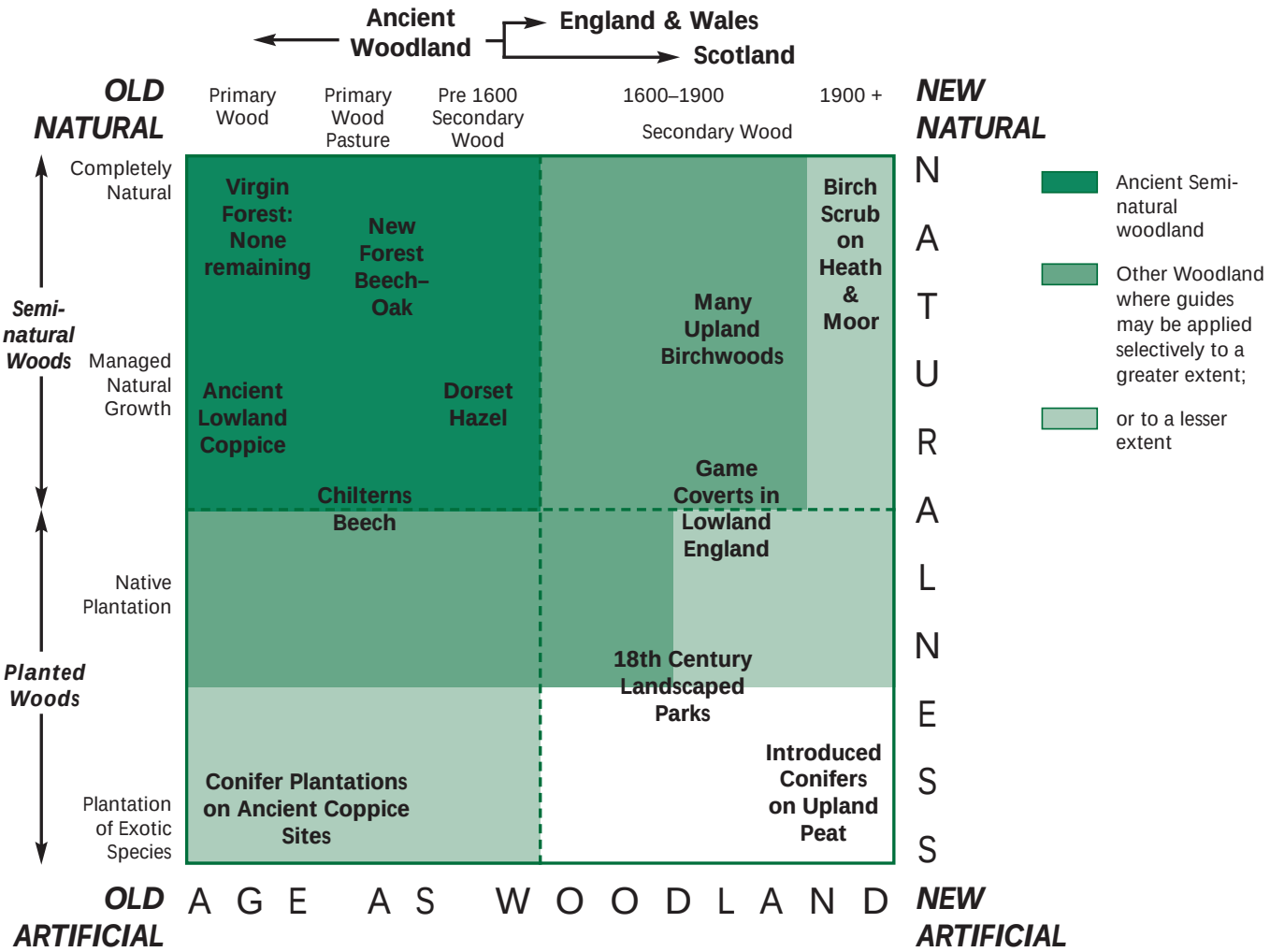
Ancient woods are those occupying sites which have been wooded continuously for several hundred years at least since the time when the first reliable maps were made. In England and Wales ancient woods are those known to have been present by around 1600 AD. In Scotland ancient woods are those which were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

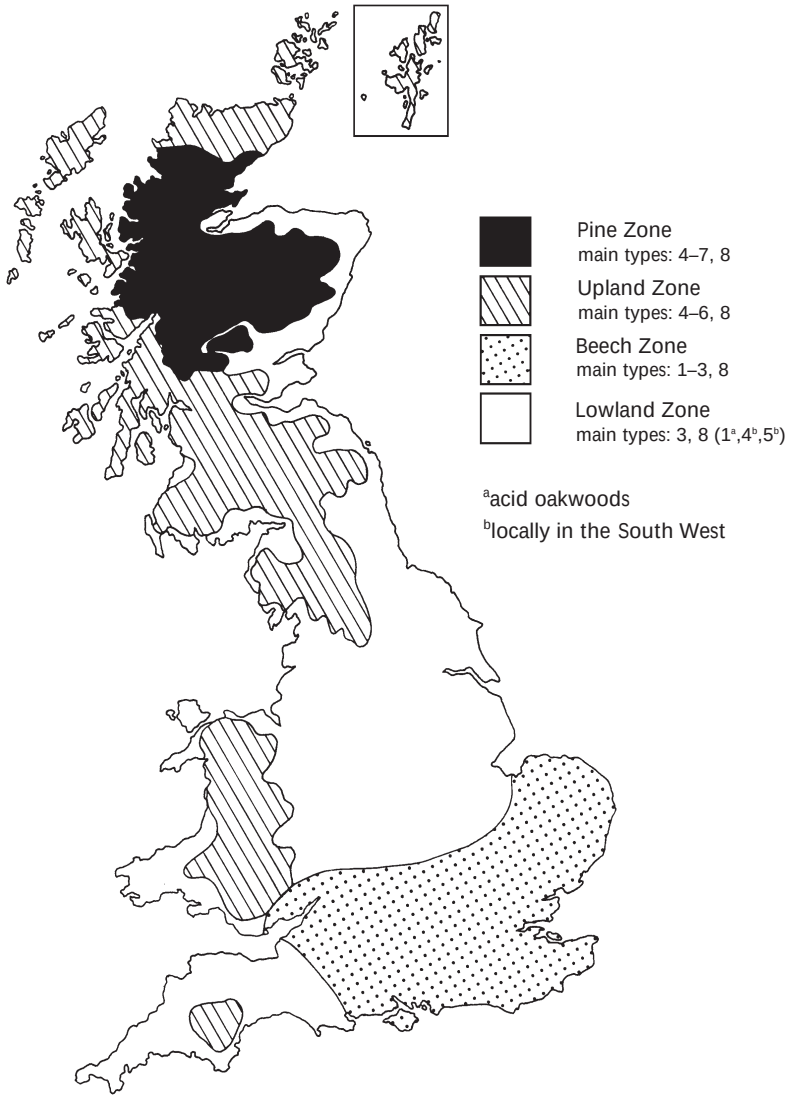
Outline

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).

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