



Forestry Commission  
England



Practice Guide

# Managing ancient and native woodland in England





## Practice Guide

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# Introduction

## Why are ancient and native woods important?

Our ancient and native woodlands are one of our oldest land uses and most diverse ecosystems. They have often taken hundreds if not thousands of years to develop, and in the case of ancient woodland are irreplaceable. For millennia they have been an essential source of timber, fuel, coppice products, venison and other sustainable products. They are a vitally important component of the English landscape and every one has its own long and fascinating history. Many are open for public access and are now used for a remarkably wide range of recreational activities, from dog walking and bird-watching to more contemporary activities such as mountain biking and 'forest schools'. Without even being visited they can still enhance the quality of people's everyday lives, providing a 'permanent, natural and peaceful' green element in busy local environments. Finally, the importance of the more subtle but vital environmental services they provide, such as flood alleviation, clean water supplies and carbon sequestration, is now increasingly being recognised and valued.



In terms of the extent of the resource, the original Ancient Woodland Inventory identified approximately 340,000 hectares of woodland in England that is ancient. Nearly 200,000 hectares of this is semi-natural and 140,000 hectares is in plantations on ancient woodland sites. Subsequent estimates suggest that there is around 210,000 hectares of native woodland which is not on ancient woodland sites. So taken together, these three categories of woodland comprise just over half of England's woodlands at c.550 000 hectares.

## Why do they need active management?

Our native woodlands represent a large, growing and remarkably multi-purpose renewable resource. But they are not natural, and have all been subject to management for centuries, if not millennia. The wildlife communities that survive within them have developed in tune with these historic management regimes. We cannot always sustain, or would necessarily want to return to, such historic management, but we do need to develop approaches that sustain the best features of the woodland, and are adapted to our current and future needs.



Due to a decline in the relative value of wood products, many of our woodlands are more neglected now than they have been for centuries. Many owners may not realise that with more active management they could get more rewards from their woods, and also prevent their long-term decline. More active management could also help them make a bigger contribution to the economy, to our quality of life and our carbon balance, whilst *at the same time* protecting and enhancing the environment and our heritage.

Looking specifically at the carbon potential, whilst the volume of timber standing in our native woods, and hence the carbon stored, is increasing every year, only a small proportion of this annual growth is being harvested. However if we leave native woodland unmanaged and unharvested the amount of carbon being stored by English forests will decline because of the over mature age structure that is created. This can be reversed in time by regenerating the woodland and by enhanced woodland creation. The recent report by Professor Read<sup>1</sup>, recognised that our native woodland can make a contribution to emissions reduction if we harvest timber and use it to substitute for energy sources and materials with a higher carbon footprint.

Our native and ancient woodlands are also subject to a wide range of pressures, and many are declining in slow but subtle ways that often goes unnoticed. This is exacerbated by the lack of management due to declining economic viability. From our knowledge of Sites of Special Scientific Interest (SSSIs) we know that the most serious and widespread reasons for unfavourable ecological condition are excessive deer browsing, uniform structure, non-native species and uncontrolled grazing by livestock. A list of the most common challenges and threats is given in Box 1.

### Box 1 Challenges and threats to ancient and native woodland

- Browsing by deer
- Inappropriate grazing levels
- Non-native tree species
- Decline in woodland management
- Increasing levels of shade
- Inappropriate management activity
- Invasive and problem species

- Climate change
- Fragmentation
- Impacts from surrounding land use
- Diffuse pollution
- Loss to development or grazing land
- Pests and disease
- Recreational pressures

<sup>1</sup>Read et al. 2009. Combating climate change - a role for UK forests. An assessment of the potential of the UK's trees and woodlands to mitigate and adapt to climate change. The main report. The Stationery Office, Edinburgh.

When managing to limit the effects of pests and diseases (and other threats) managers should still be able to comply with the vast majority of the Practice Guide. The inherent flexibility within the Practice Guide, and the scope to propose alternative approaches, means most management can be accommodated where there is clear justification for it. Supplementary good practice may be issued in specific instances to clarify the questions that arise.

Addressing the above reasons for decline requires more active management, but in contrast to many other land uses, the operations needed to conserve the wildlife are very often the same as those to increase production. Similarly, many of the actions that will help the owner fulfil their aims, will also provide wider public benefits. Box 2 below illustrates this by listing the six most pressing and important management activities for our ancient and native woodland, and giving examples of the way these actions can simultaneously conserve and enhance the full range of benefits provided by our woodland.

### Why is a Practice Guide needed?

The Government's priorities for England's trees, woods and forests, and its approach to achieving them, flow from "The Coalition: our programme for government" (Cabinet Office 2010). This commits to "introduce measures to protect wildlife and promote green spaces and wildlife corridors in order to halt the loss of habitats and restore biodiversity".

This Practice Guide has been produced to help practitioners translate what these measures mean for practical action on the ground, and it guides implementation of the approaches to management and restoration trialled in woods around the country.

Accommodating and reconciling all the different values and the diverse range of benefits that people derive from such woodland is usually feasible, insensitive or uninformed management can do irreparable damage.



**Box 2 The multiple benefits or ecosystem services arising from the six most common priorities for management activity**

Management activity	Examples of benefits
<p><b>Thinning and cutting under-storey</b></p> 	<p><b>Ecological:</b> Releases understorey, enhances ground flora, diversifies species composition, releases veteran trees</p> <p><b>Recreation and landscape:</b> More open and attractive woodland;</p> <p><b>Production:</b> Generates wood and timber; enhance growth rates</p> <p><b>Carbon and water:</b> enhanced contribution to carbon storage, opening up water courses improving ecological condition and bank stability</p>
<p><b>Felling and coppicing</b></p> 	<p><b>Ecological:</b> Creates canopy gaps for ground flora and sheltered woodland edge and a temporary open phase</p> <p><b>Landscape and heritage:</b> reduces risk of windthrow on an archaeological site, could remove an unsympathetic component from the landscape</p> <p><b>Production:</b> Produces timber and other wood products</p> <p><b>Carbon:</b> Generates woodfuel and substitutes for use of high carbon footprint materials.</p>
<p><b>Restocking and regenerating</b></p> 	<p><b>Ecological:</b> change to a more natural mix of species, creates thicket stage habitat and establishes the next generation.</p> <p><b>Landscape and heritage:</b> restores a cultural or designed landscape, ensures long-term continuity of a landscape feature</p> <p><b>Production:</b> species better suited to the site type, improved quality and timber potential of stand, more resilient mixture of species</p> <p><b>Carbon and soil:</b> enhances carbon sequestration from the vigorous growth of the new stand, establishes new canopy protecting soil</p>
<p><b>Opening up rides</b></p> 	<p><b>Ecological:</b> enhances woodland edge, restores remnant grassland or heathland habitat, creates links between bigger open patches</p> <p><b>Recreation and cultural:</b> improves internal landscape, creates glades and sunny areas, restores historic routes and boundaries.</p> <p><b>Production:</b> improves vehicle access for timber and woodfuel extraction</p> <p><b>Water and soil:</b> facilitates improvement to culverts and avoidance of soil damage and sediment load in water courses.</p>
<p><b>Deer and grazing management</b></p> 	<p><b>Ecological:</b> reduces damage to ground flora, allows shrub layer and understorey structure to develop, prevents loss of palatable tree species</p> <p><b>Recreation and heritage:</b> attractive open internal landscape, restoration of historic wood-pasture, visitors enjoy sightings of wild deer and rare breeds.</p> <p><b>Economic:</b> allows restocking with most appropriate tree species, ensures long-term productivity of woodland, income from stalking or livestock</p> <p><b>Water and soil:</b> reduces soil damage from poaching, erosion beside watercourses and sediment load</p>
<p><b>Conserving deadwood and veteran trees</b></p> 	<p><b>Ecological:</b> conserves micro-habitats used by a large proportion of woodland species, remedies an unnatural characteristic of our managed woodland and ensures continuity through the centuries and into the future</p> <p><b>Landscape and heritage:</b> protects historic trees and boundary features, inspirational aesthetic and spiritual values of very old trees</p> <p><b>Economic:</b> protects the freehold value of the woodland via its amenity value, tree management reduces risk of public liability claims</p> <p><b>Carbon and soil:</b> conserves carbon stores in deadwood and soil.</p>

This Practice Guide outlines the types of management which will protect the diverse values of ancient and native woodland, and enhance the many benefits they provide to owners and to wider society. Owners and managers will adopt differing approaches, in terms of scale and 'intensity', and this guidance aims to encompass the full range. Some more extensive woods are quite robust and mechanised harvesting of large volumes of timber will be needed, and will be an appropriate way to enhance the wildlife and heritage. In other woods owners may want much more limited levels of intervention, and more gradual rates of change. Some owners and managers will want to maximise the benefits, and ask the question: "How can we adapt the wood to suit current and future needs?" Others will take a totally different approach, wanting to keep the woods as natural as possible and asking the question: "What's the least we need to do to conserve our inheritance?" In some situations it may be very desirable to restore historic forms of management, such as coppicing, whereas in others it may be very appropriate to try new and novel approaches. All these approaches are equally valid and we need the full range, and a balanced mix of management intensities. While promoting management we must also ensure a sufficient 'reserve' area is set aside under 'minimum intervention', or simply subject to 'benign neglect'.

The Practice Guide is comprehensive on the topics it covers but not an exhaustive handbook, it has limited coverage of activities where there is a minimal need for government to be involved. Instead it is focused on achieving the following three priorities:

- Safeguarding and enhancing the public benefits provided by ancient and native woodland
- Addressing threats to the resource, and ensuring the rich inheritance we have been given by our forebears is conserved for future generations
- Advising on how competing or sometimes conflicting needs and uses can be reconciled



## Where does it apply?

The Practice Guide applies to all types of ancient or native woodland in England only.

Over the years various characteristics have been used to define the different but overlapping categories of ancient and native woodland. To help practitioners navigate the guidance, simplified but robust explanations of the various categories of ancient and native woodland covered by this Practice Guide are given in Box 3, with fuller definitions of the various terms given in the glossary.

### Box 3 Simplified explanations of the categories of woodland covered by the Practice Guide

#### Ancient

**What it means:** the site appears to have been woodland for several centuries (and thus probably for millennia), and is certainly unlikely to have been converted to farmland in the last couple of centuries.

**Determined by:** the history of land use of the site

**Identified by:** the Ancient Woodland Inventory, historic maps, indicator species, woodbanks and other features

**Important because of:** the length of time it has taken to develop, the presence of species not found in more recent woodland and the inheritance of ecological and cultural features from historic and pre-historic times.

#### Semi-natural

**What it means:** The trees forming the canopy appear to have arisen naturally rather than having been planted

**Determined by:** how the trees were established on the site

**Identified by:** lack of evidence of planting (i.e. plantation origin usually obvious from monocultural composition, geometric planting patterns, uniform age and planting rows or known from management records)

**Important because of:** the species composition, woodland structure and distribution of trees are all more diverse and natural, and also reflect the site's history and ecology

#### Native (and honorary-native)

**What it means:** The trees making up the woodland are part of England's natural (or naturalised) flora

**Determined by:** whether the trees colonised Britain without assistance from humans since the last ice age (or in the case of 'honorary natives' were brought here by people but have naturalised in historic times); and whether they would naturally be found in this part of England.

**Identified by:** maps of the historic geographic distribution of tree species and whether they would naturally be found on this soil and site type.

**Important because:** they tend to be better integrated into our woodland communities, and a more stable component of our woodland ecosystems, and (to date) have shown themselves to be resilient and well adapted

#### Wood-pasture and parkland

**What it means:** The site has a long history of being grazed by livestock or deer, and historically was open woodland with rough grazing, or scattered trees with pasture or heath.

**Determined by:** the long-standing combined use as both woodland and pasture, often associated with historic legal rights

**Identified by:** legal rights; historic maps; grazed understorey; patchy structure; veteran, open-grown trees; woodbanks and boundary features

**Important because of:** the abundance of ancient trees, large dimension deadwood and the species associated with them, woodland edge and scrub, plus their historic interest.

It is the combinations of the first two characteristics that give us the familiar Ancient Semi-natural Woodland (‘ASNW’) and Plantations on Ancient Woodland Sites (‘PAWS’), but ‘native woodland’ is the term used in biodiversity action plans and targets. The original Broadleaves Policy of 1985 relied on the term ‘broadleaved’ whereas some of the habitats listed under section 41 of the Natural Environment and Rural Communities Act (2006) use the term ‘deciduous’ (e.g. ‘Lowland Mixed Deciduous Woodland’). So, to avoid further confusion, the term ‘ancient and native woodland’ is used in this publication to cover all these categories, and all combinations of them, and the practice guide will apply to them all. However, in practice there are inevitably intermediate types, grey areas and marginal sites.

So, when using these categories we have to remember it is the features of the woodland itself, not the category it is in, that makes it valuable. The inclusion of a woodland on the Ancient Woodland Inventory is still a very important factor for managers to take into account. But we have to bear in mind that primary reason the ancient woodland inventory was produced was to provide a short-cut way of identifying the woods most likely to be of high ecological value. Time and energy is usually better spent assessing the valuable features of the wood on the ground, rather than cross-examining evidence on which category it belongs in. Discussions about the best way to safeguard the clearly valuable features of the wood are more valuable than debates about whether the trees are planted or whether the species is locally native.

In view of this, Forestry Commission England will be taking an ‘inclusive’ rather than strict interpretation of these categories. If a woodland seems to broadly fit one or more of the above categories it will be considered to qualify and will be covered by the Practice Guide.



However, to balance this, we also recognise that woods vary hugely, and some are much more valuable and sensitive than others. The amount of flexibility in the way the guidance is used and applied needs to reflect this, and we will be taking a risk based approach. We will therefore expect prime ancient, semi-natural woodland to be managed in close compliance with the guidance. A thorough and careful approach is essential, and although occasionally robust action may be required, high risk approaches are not usually appropriate.

At the other end of the scale, more flexibility is likely to be possible for a less historic or diverse wood, such as a homogenous stand of birch, or a recent broadleaved plantation. Many of the features mentioned in the Practice Guide may not be present, and it may take centuries for the desired outcomes to develop. So management will be simpler, much of the guidance may not be relevant and more innovative approaches may be justified. PAWS vary enormously in how much they have been changed by the current stand. When managing them a key first stage is to ascertain which features of ancient woodland have survived. This will determine the level of sensitivity, thoroughness and risk that it is appropriate to take.

Additional common types of woodland that will be covered by the Practice Guide are chestnut and sycamore woods (even where they are not on ancient sites) and most young broadleaved woods planted in the last couple of decades. But plantations of non-native Broadleaves (e.g. poplars, cricket bat willow, red oak and eucalypts) are not covered (unless they are on ancient sites). Similarly, conifer plantations are only covered where they are on ancient sites.

This Practice Guide is focused on the management of existing ancient or native woodland in England. Although it does include guidance on managing young woodland, it does not cover the creation of woodland. Veteran trees are covered where they occur in woodland or wood-pasture, the practice guide does not attempt to give guidance on managing individual trees.

### How does it relate to existing guidance?

This Practice Guide sits within the overall framework of the UK Forestry Standard and associated UK Guidelines. These are the strategic documents that set out how forestry in the UK will meet internationally agreed standards for sustainable forest management. Under this broader framework, this Practice Guide provides more detailed practical guidance for a particular situation: ancient and native woodland in England. It does not attempt to include or repeat more general guidance on 'good forestry', which is covered by these and other Forestry Commission publications. Although some legal requirements are referred to, the vast majority of the guidance is 'good forestry practice' and mandatory elements have not been explicitly separated as in the UK Forestry Standard.

Where a woodland is certified under the UK Woodland Assurance Standard (UKWAS) then managers will still need to ensure they comply with the requirements of UKWAS. To assist in this, in Appendix 6 cross-references have been provided between the chapters in the Practice Guide and the relevant requirements in UKWAS.

The series of eight Practice Guides on The Management of Semi-natural Woodland provide more detailed background and explanation of the history and ecology of each type of woodland (Upland oak woods, Wet woodland, etc). They also give more specific recommendations on the management and silviculture that will be particularly appropriate for each specific type of native woodland. In contrast, this Practice Guide draws out the approaches and practices that should be common to all types of native woodland. However managers should still be aware of the distinctive features of each type of woodland, and take account of both the historical and natural processes that have shaped each type of woodland.

This Practice Guide replace the long-standing policy and practice framework set by the Broadleaves Policy and associated Management Guidelines produced in 1985.

## What is new in the Practice Guide?

This Practice Guide is aimed at foresters and practitioners with experience of managing woodland. It does not include background explanation and rationale, and readers or owners less familiar with the subject are referred to other publications in the Appendix 1. A glossary is also provided to define some critical terms, and explain some less familiar ones.

The guide is focused on those aspects of woodland management that are particularly important in ancient and native woodland, or where specific guidance is needed. It is intended to capture the good practice already being carried out across the country, and should contain few surprises. However, there are many aspects and details that have not previously been included so specifically in Forestry Commission guidance. Box 4 lists the topics which experienced managers may wish to check first in order to be aware of the most significant changes.

One of these topical issues is whether or not to restore PAWS. This crops up throughout the Guide, but the overall approach can be summarised as follows:

- Management is expected to conserve the features that have survived;
- Taking opportunities to enhance this inheritance is always encouraged;
- Restoring conifer PAWS to native species is strongly recommended;
- Converting to a less damaging conifer species or mixture is a useful compromise;
- But continuing with the same species does remain an option.

## How should it be used?

It has been written as pragmatic ‘good practice’ that can be applied everywhere, rather than ‘best’ practice that one might only expect to be achieved in the most valuable sites. It has also been written with inherent flexibility to enable it to accommodate owner’s diverse objectives and be applied to all situations. Like the UK Guidelines, it is intended to be interpreted with a degree of flexibility and professional expertise. The term “should” is used which recognises there may be sound reasons for divergence (the next section gives further explanation on how such flexibility should be used).

The Practice Guide will be followed by Forestry Commission England when managing its own woodland estate. Applications from other owners for support or grant aid from Forestry Commission England, (notably under the English Woodland Grant Scheme) will also be expected to comply with the Practice Guide. In order to demonstrate sustainable forest management applicants should also take it into account when applying for Felling Licences for ancient or native woodland or for individual veteran trees.

It is national guidance, but it may prove useful to develop interpretations to reflect the conditions found in different parts of the country. Although it is national guidance, every wood is individual and every owner’s needs are different. The Practice Guide is definitely not intended to achieve uniformity in our management of ancient and native woodland. It has been written to provide some flexibility to accommodate distinctive local situations and allow for rapid response to pest and disease outbreaks.

It would be surprising if the future did not bring some unexpected developments, events and disasters, such as new markets and uses, storms and droughts, or new pests and diseases. In this case significant divergence or even change in the guidance, may be necessary, either locally or nationally, and possibly at short notice.

We are working to improve our knowledge and understanding of woodland history and ecology all the time. This is especially on new topics such as climate change adaptation, carbon balances and choice of provenance. This guidance is best considered as ‘interim’ on such topics and we expect to produce updates and revisions to reflect advances in our understanding.

#### Box 4 Topics on which there is most significant new guidance

##### Assessment and planning

- Ensuring only the most useful information is collected
- Planning within the wider landscape context
- Reviewing the effectiveness of management

##### Woodland structure

- Protection of the understorey
- The use of clear-felling, felling rates and coupe size
- Deadwood and the treatment of brash and lop-and-top
- Methods of restoring PAWS

##### Species composition

- Proportions of native, honorary native and non-native species
- Moving towards mixed species stands
- Restoration of PAWS to native species
- Reducing the impacts of conifers on PAWS

##### Regeneration and restocking

- Use of natural regeneration and coppice
- When it is appropriate to supplement with planting
- Use of an appropriate mix of provenances
- Planting numbers and stocking densities for different objectives
- Method and rate of restocking on PAWS

##### Open areas

- Justification for creating permanent and temporary open areas
- Presumption against new permanent open areas in ancient woodland
- Appropriate use of open woodland

##### Species management

- The need to manage, control or sometimes eradicate problem species
- Desirability of different forms of protection against mammals
- Responses to outbreaks of pests and diseases

##### Species conservation

- Taking appropriate action for 'priority species'
- When it is advisable to seek expert advice
- Avoiding damage or disturbance to protected species

##### Recreation

- Seeking opportunities to enhance people's experience
- Careful location of recreational infrastructure
- Reducing the risk of disturbance to wildlife from visitors

A major aspect of increasing resilience to climate change is creating woodland, in order to enlarge existing remnants and create landscape scale networks, but this document is focused on existing woodland and does not cover woodland creation.

The Practice Guide has been written to provide guidance on harvesting wood for all purposes, from high quality logs to firewood and woodfuel. When harvesting specifically for woodfuel the same considerations as for harvesting any other timber product should be taken into account.

## How is it organised?

The Practice Guide is divided into chapters, each dealing with one of the major aspects of woodland management, and each chapter follows a standard structure:

**Introduction:** this section explains what is covered in that chapter (and what is covered elsewhere), and defines any critical terms and concepts. It also summarises why this aspect is important, and lists how it can be influenced.

**Outcomes:** the outcomes summarise the conditions managers should be seeking to achieve. They are the 'essential' elements of the practice guide and taken together define what is required of managers to fully demonstrate sustainable woodland management. However, in some management situations not every outcome may be relevant. The outcomes are a realistic future ideal, and many should be achievable within a 5 – 10 year management plan. However, others will inevitably take longer and managers will be expected to be making good progress towards achieving such longer term outcomes.

**Guidelines for achieving outcomes:** these are the recommended means of achieving the outcomes. They have been selected as being the most proven and reliable means, but they are not compulsory and are not the only way to achieve the stated outcomes. Managers are free to propose alternative approaches which they have good reason to believe will achieve the outcomes, however, such alternative approaches should be compatible with the overall principles and objectives of the guide. The Forestry Commission will determine whether such alternatives are appropriate, and the list of questions in Box 5 will be used, amongst other factors, to help make such decisions.

Within each chapter the first set of guidance relates to all types of woodland, but where there is guidance specific to PAWS or wood-pasture it is given in subsequent sections.

### Box 5 Considering alternative management proposals

**The following questions will help determine whether or not proposed alternative approaches that diverge from the guidance are likely to be considered appropriate:**

1. Will the proposed management conserve and enhance the environmental and cultural features and values of this particular wood, especially those that are irreplaceable?
2. Will existing public benefits from the wood, particularly landscape, public access and contribution to the local economy, be sustained?
3. Have all reasonable steps been taken to minimise any short-term adverse impacts?
4. Is there good evidence, experience or rationale to suggest that the alternative approaches are likely to work, and if they are radical, will their impact be appropriately monitored?
5. Is the management proposed for this wood appropriate when considered at the scale of the whole landscape?
6. Will the potential of the wood to meet the needs of future generations be improved?

Practice Guide

# Chapters

# Chapter 1: Woodland assessment and monitoring

## Introduction

Assessment and monitoring are critically important as they underpin initial decisions on management, and then enable us to see whether we are achieving our aims. The purpose of the assessment is to identify what's important, distinctive and vulnerable in the wood and what potential opportunities there are for enhancing the benefits that the woodland provides.

We cannot always be sure that management will achieve the desired outcomes, so we should record and observe enough to ensure the important features are being conserved, that the objectives for management are being met, and the wood is improving as a result of management. This applies equally to areas being treated under 'minimum intervention' where natural changes still need to be monitored.

However we have to be very careful not to waste time and effort recording more information than is necessary.



## Outcomes

- A. Characteristic features:** The woodland has been assessed to ensure that all important and obvious features, characteristics and components, silvicultural, ecological and cultural, have been considered and included in the management planning process.
- B. Detail of information:** The range of information collected during assessments, and the level of detail, is appropriate to the size and scale of the wood, its value and rarity and the intensity of the operations proposed.
- C. Landscape context:** The landscape context of the woodland has been assessed, including the visual, cultural and ecological aspects.
- D. Evaluation:** The assessment includes an evaluation of current trends (including climate change), the opportunities to enhance the wood and the seriousness of any threats.
- E. Monitoring:** Basic, repeatable monitoring information is being gathered at appropriate intervals, and is being assessed to ensure management is delivering the desired outcomes.

## Guidance for achieving outcomes

- 1. Basic information to collect:** Assessments should generally provide core information on:
- woodland status e.g. continuity, age, origin, nativeness
  - trends: is the wood improving in condition and quality, or are there some causes for concern?
  - the potential for production of high quality timber, other wood and timber or woodfuel (i.e. growth rates, stocking levels, and stem quality).
  - native woodland habitat types, using a classification system such as National Vegetation Classification ( See Glossary) or similar
  - any rare, threatened, protected and Biodiversity Action Plan (BAP) priority species known to be present
  - key cultural and historic features, including archaeological features, woodbanks, pollards and coppice, woodland industry features and former field systems
  - non-woodland habitats and communities including rides, glades, wet flushes, ponds and watercourses
  - accessibility for maintenance, recreational useage and timber extraction, and the condition of fences, paths and other infrastructure.
  - the landscape context of the woodland; i.e. surrounding land uses, the nature of nearby woodland, interactions with other nearby habitats and the wider landscape setting
- 2. More detailed assessments:** Only information that will actually help management decisions needs to be recorded. For example, comprehensive species lists are 'nice to have' but it is probably more important to know of any exceptional habitat requirements of any rare species that are present. In many situations an annotated map may be all that is needed. It is assumed that in most situations nearly all the required information will already be readily available, or can be collected by the woodland manager. Specialist advice will only occasionally be necessary, and more detailed assessments are usually only required where:
- preliminary site inspections or basic surveys have identified nationally important features which are vulnerable;
  - the situation is particularly complex or unusual and not well covered by published guidance;
  - high impact operations (e.g. forest road construction) are planned which may have a significant impact.
- 3. Long term change:** Managers should ensure long term changes in woodland condition are monitored and recorded to assess the relative success of management operations (see Appendix 3 for further detail on condition monitoring). As a minimum such monitoring should involve qualitative observations on the effects of management (e.g. observations on site condition in relation to stated outcomes, photography from known points). Where a decision

has been taken not to undertake any active management, it is still important to record and monitor changes, to ensure 'benign neglect' does not become 'decline through neglect'.

**4. Climate change:** Managers should consider whether specific measures are required to address observed changes or to increase resilience to future climate change.

**5. Pests and Diseases:** Tree pests and diseases represent an increasing threat and should be included in woodland assessment and monitoring. It is important that managers are aware of current threats and associated symptoms.

**6. Maps:** Assessment information is best expressed through annotated maps accompanied by simple descriptions.

**7. PAWS assessment:** Assessment of PAWS needs to be sufficiently detailed to identify those components which are characteristic of ancient woodland or are of particular value, and whether these are concentrated in particular areas. These features might include ground flora typical of ancient woodland, unusual understorey species, large coppice stools, woodbanks, and veteran trees.

## Chapter 2: Management planning



### Introduction

When managing a woodland it is important to have clear objectives stating what you are trying to achieve

Planning should bring together the information collected during assessment, clarify the aims, objectives and long term outcomes for the woodland and reconcile any conflicting priorities. It should bring out, and ideally also summarise, the reasoning behind the management adopted, as this will help evaluation and review in the future.

Having decided what needs to be done the operations to achieve it can be planned along with the rate and timing of any change, as this is critical to both wildlife and people. Good planning will explain:

- what we are trying to achieve,
- why we are taking this approach,
- how we are going to avoid problems,
- what is going to happen,
- where and when it will happen.

### Outcomes

**A. Planning:** Appropriate management planning has been undertaken which is based on adequate information, considers all key components of value, threats, constraints and opportunities. Planning has been done within the context of the landscape.

**B. Setting objectives:** Managers have stated objectives, identified desired outcomes which management operations intend to achieve, and have considered risks.

**C. Approval:** Managers have complied with relevant legislation, where necessary have had plans approved by the relevant authorities and where appropriate have taken into account the views of stakeholders.

**D. Evaluate and review:** Plans are reviewed and amended if necessary depending on the pace and scale of change, the results of monitoring and by changing objectives.

## Guidance for achieving outcomes

**1. Options and priorities:** The assessments should have identified irreplaceable features and high value characteristics. Various options for management should be compared in terms of how well they will conserve and enhance such features. The management planning process should be used to resolve any conflicting objectives, and agree any mitigation measures to reduce adverse impacts. The priorities for active intervention can often be clarified by asking: "What will the wood look like in 20 years time if left to itself?"

**2. Use of assessments:** Assessments of the woodland, and evaluation of success of past management, should be an integral part of the preparation and revision of management plans.

**3. Risk:** When deciding between options, the reliability of the approach, and the risk to irreplaceable features, should be borne in mind. Evidence and experience from other nearby woods should be applied, alongside general principles and received wisdom. The risk of intervention are usually obvious, but these should be weighed up alongside the risks of non-intervention, which are often subtle and gradual decline.

**4. Landscape context:** Management plans should consider the interactions between the woodland, its adjacent habitats, surrounding land uses and the wider landscape. Operations should be planned and designed to conserve and enhance the visual and cultural aspects of surrounding landscape, i.e. its landscape character. Managers are encouraged to explore ways in which the woodland can enhance 'habitat networks' at the landscape scale.

**5. Legal compliance:** Managers should be aware of any legislation that might relate to their particular woodland. Examples that are commonly relevant to ancient and native woodland include: Felling licences, SSSI designation, scheduled ancient monuments, protected species and game laws. Managers must ensure that they comply with all such legislation, and are advised to consult with appropriate statutory bodies.

**6. Productivity:** Managers should consider the potential for the production of timber and other woodland products such as woodfuel, and for enhancing the productive potential for future generations.

**7. Plan structure:** Management plans are generally more usable if they follow a simple structure (for an example structure see Appendix 4) and use annotated maps to present as much key information as possible. The detail and length of any management plan should be related to the size and scale of the wood, its value and rarity and intensity of the operations proposed.

**8. Consultation and approval:** In most cases, particularly where they are linked to grant-aid or felling licences, management should be agreed through a consultative process which provides the opportunity for input from all relevant stakeholders.

**9. Incomplete plans:** If management planning is incomplete then operations should be limited to those which are low impact, 'safe' or very limited in scale.

**10. Climate change:** Managers should be aware of up to date climate projections and guidance of their likely impacts. Any implications for achieving management objectives should be evaluated.

## Chapter 3: Woodland structure



### Introduction

The term 'structure' covers three closely related aspects or characteristics of a woodland:

- **The woodland 'mosaic':** the variety of different habitats and stages of growth within the wood (e.g. 30% *thicket*, 60% *maturing plantations* and 10% *'old growth'* woodland).
- **The vertical structure:** the different layers and components that make up the woodland canopy (e.g. densely stocked *coppice with widely spaced standards*)
- **The age structure:** the approximate age of the canopy trees and the number of different categories (e.g. 120 year old *standards* with some groups of 10-year old trees *underplanted in gaps*)

Woodland structure is a product of both past management and natural processes. It can be very revealing about the historic uses of the woodland, and the ancient or veteran trees within woods are an irreplaceable part of our heritage.

The structure is also very important in determining the suitability of the habitat for different wildlife communities. Most species are remarkably particular about the structure, as this determines availability of nesting sites, food supply, protection from predators and micro-climate (especially light levels, temperature and humidity). The youngest stages (open and thicket stage) and the oldest (over mature woodland, veteran trees and deadwood) are particularly valuable. They generally have the highest number of species associated with them and the majority of rare and priority species are found in these particular structural stages.

A diverse structure within a wood is generally valuable as the variety of ages and stages provides habitats for the widest range of species. It also gives greater resilience to climate change and extreme events (e.g. storms and droughts). A range of ages is also a buffer against economic changes, such as fluctuations in timber markets and uncertain futures (e.g. changes in society's needs). However, in smaller woods opportunities for diversity may be limited, and the way in which the wood complements others nearby – i.e. the landscape context – will often be more important.

Many of our native woods have an unnaturally uniform structure, species composition and age distribution; felling, coppicing, and ensuing regeneration, is a priority in order to diversify such woods and increase their resilience. Ancient woods have for centuries been subject to the rapid and dramatic change arising from thinning, felling and coppicing, to supply wood and timber, not to mention more occasional storm damage. Sustaining this 'disturbance regime' can thus be critical to conserving the biodiversity that has developed and survived under such regimes. But we do need to be aware that on many sites there has been a long interruption of such cycles, and PAWS in particular are not usually in as a robust condition, having been subjected to unprecedented levels of shade.

In terms of the production from woods, the 20th century was unusual as we have primarily been concerned with harvesting the main stem of trees. Recent interest in renewable energy is prompting a return to the historic practice of harvesting woodfuel from the whole tree, including branchwood or lop and top, and the under-storey. While harvesting provides opportunities for wood production, it will have an impact on carbon sequestration. However, any reduction in carbon stores does need to be considered alongside the emissions reductions from substituting the wood harvested for other materials and non-renewable fuels.

## Outcomes

- A. Carbon implications:** The role of the woodland in helping to reduce rising carbon dioxide levels, through producing wood, or accumulating carbon on site, has been taken into account, and where appropriate enhanced.
- B. Range of habitats:** The woodland comprises a range of woodland habitats, and harvesting plans ensure that this will be conserved or enhanced.
- C. Continuity of habitats:** Any work planned will help to ensure there is continuity of different habitats in the woodland and across the landscape, and that this continuity can be sustained over time.
- D. Rate of structural change:** The rate of change caused by management is at a pace and scale which maintains or enhances the environmental value of the woodland.
- E. Historic structure:** Management proposals take account of and respect the physical, biological and historical factors that have created the existing structure; where appropriate the aspects of this inherited pattern that have historical significance will be sustained in the developing structure.
- F. Vertical structure:** Where appropriate and feasible, the vertical structure is becoming more diverse, developing into a 'multi-layered' canopy, with a well developed understorey and shrub layer.
- G. Woodland edge:** The external margins and the internal edges of woodland against rides, glades and felled areas are recognised for their historical significance, and are being conserved and enhanced as particularly valuable areas of habitat.
- H. Age range:** The age structure is becoming more diverse with a widening range of ages and stages present. In some situations this may be possible within each stand, but otherwise the age diversity is being achieved across the woodland or landscape.
- I. Veteran trees and deadwood:** Existing veteran trees have been identified and are being protected, and future replacement veterans are being conserved. The amount of standing and fallen deadwood is increasing.

## Guidance for achieving outcomes

**1. Carbon:** The carbon stored within the soils, understorey and canopy trees of native woodland is significant, and when developing harvesting plans managers should consider ways to conserve and enhance such stores. However, it is inevitable that the amount of carbon stored within the woodland may temporarily decrease when mature trees are harvested.

**2. Wood production:** Managers are encouraged to take opportunities to grow or produce high quality timber, wood and woodfuel, for this or future generations. However, it is recognised that this may not be appropriate where it is uneconomic to do so, or where it will jeopardise other objectives.

**3. Silvicultural systems:** The method of stand management used should be appropriate and sufficient to meet the objectives for the site. As a general principle, systems that either mimic natural processes or continue historical practices are likely to be most appropriate. These are commonly described as *low impact*, *close to nature*, *continuous cover* or *uneven-aged systems*. They include: small coupe felling, group selection, shelterwood, small scale coppice, coppice with standards, or single tree selection systems. Larger-scale coupe felling can be appropriate (see para 8 below) but the dramatic impacts need to be carefully considered.

**4. Felling plans:** Felling plans should take opportunities to diversify the structure of uniform woods, and ensure continuity of different stages and habitats into the future. Such plans should take account of the variation in the topography, soils and drainage across the woodland. The variation in structure across a woodland is also an expression of its long management history and felling plans should reflect these differences. The intensity and scale of felling and harvesting should be kept to a level from which wildlife can readily recover, and reasonable steps should be taken to ensure continuity of habitat over time.

**5. Landscape change:** Any changes in the external appearance of the woodland are in keeping with the character of the landscape. The scale and rate of change is generally acceptable to local people and other users of the woodland.

**6. Reinstatement of coppicing:** Where coppicing and pollarding are the traditional practices and have been sustained into recent times, then it can be very valuable to sustain the cycles. Coppicing is particularly important where the species present depend on such practices.

**7. Conserving the understorey:** Often the best way to enhance the structure, and rejuvenate the understorey, is to thin the overstorey and cut the understorey. Damage to stools should be minimised during any harvesting. If the overstorey is being felled, opportunities to retain some patches of understorey and sub-storey trees should be sought, in order to provide some continuity of habitat. But leaving a scattering of straggling or damaged stems standing is not recommended. Wherever the understorey is cut during thinning or felling operations, the risk of browsing by deer or livestock should be considered and addressed. If palatable understorey species are likely to suffer serious browsing from deer then it may be necessary to intensify deer control or restrict grazing by livestock.

**8. Felling coupes:** In some woods clear felling, including coppicing, was the historic management regime, and natural windblow can be extensive and dramatic. But whilst such changes can be ecologically consistent, the wider impacts on amenity and landscape may require reductions in scale. The fundamental question is: 'will the felling conserve, and in the long term, enhance the wildlife and heritage of the wood?' Where clear felling is used, the size and scale of coupes that are appropriate will depend in individual circumstances, but the following general guidance should be heeded:

- Clear felling will be more appropriate where there is a long history of such treatments
- Where woodland wildlife communities are in a depleted rather than robust state then large scale felling should be avoided as it risks leading to further loss of biodiversity.

- In small, isolated woods clear felling should generally be avoided as it prevents any continuity of wooded habitat.
- Retaining isolated trees within clear fells is seldom successful, and where there are features such as veteran trees or wet flushes, it is much better to protect them with retained thinned patches or to avoid clear felling altogether.
- In larger woods (over 10ha) or in clusters of woods, larger coupes may be more acceptable. However, in these situations only a small proportion of the total area (no more than 10%) should generally be felled in any 5 year period.
- Where there are important species dependent on woodland canopy, or unsuited to full light and open conditions, then continuous cover systems are likely to be the best solution.

**9. 'Early stage' habitats:** Opportunities to create 'early stage' habitats (open clearings and ensuring thicket stage) should be taken. This may need to be balanced against the need to avoid too much rapid change, and to conserve 'old growth' habitats (i.e. over-mature woodland). In stands that are, and are likely to remain, essentially even-aged, opportunities should still be taken to diversify the age and habitat structure in particular locations e.g. along ridesides and edges, around veteran trees or historic features.

**10. Key features:** Distinctive wildlife and cultural features should be identified and afforded protection in felling plans and during harvesting operations. These might include deadwood hulks, patches of ancient woodland ground flora, archaeological remains, watercourses and riparian zones, wetland areas, rocky outcrops etc.

**11. Woodland margins:** Opportunities should be taken to enhance the value of internal and external woodland edges as 'marginal habitat'. They are valuable for the depth of canopy and high light conditions that encourage flowering and fruiting of understorey and shrubs. In general, wide, diffuse margins and gradual transitions are better than abrupt or 'hard' edges. Where woodland adjoins intensively farmed arable land retaining a dense belt at the margin could reduce spray and fertiliser drift into a felled area; however, this may not be windfirm, and may not be appropriate landscape design. If possible, where land adjoining woodland is farmed intensively, buffer the woodland by leaving a headland within the field adjoining the wood as fallow, rough grass or scrub.

**12. Veteran trees:** Existing veteran trees should be retained and protected. Each veteran tree may need to be treated as an individual case. In general, felling of the tree should only be done on safety grounds, and only then as a last resort if other techniques such as crown reduction and pollarding are not feasible or appropriate. When reducing canopy competition around veteran trees in dense stands, the sudden exposure to wind and sun can stress the tree, damage lichens and mosses living on it and increase the risk of windblow. Consequently thinning around veteran trees should be selective with progressive, gradual reduction of the surrounding canopy; that is, successive halo thinning rather than felling concentric rings (halo felling).

**13. Old growth and natural reserves:** In large native woodlands, a small proportion of the area (approx. 5%) should be subject to minimal disturbance and retained well beyond conventional 'maturity' as 'natural reserves'. Even in smaller woods some individual trees, and ideally clumps, should be retained into old age to provide 'old growth' habitat. In a well wooded area, or on a large estate, it may be appropriate to meet this measure across that landscape unit rather than within the individual woodland.

**14. Deadwood:** One of the most unnatural features of our woods is the small amount of deadwood. Bringing more woodland into management, the increasing value of woodfuel, and the possible use of 'whole tree harvesting' in native woodland, all bring the risk of reducing the amount of deadwood habitat. Setting specific targets, or maximum levels is not necessary because it is quite simple: the amount of fallen deadwood in every wood should be steadily increased at every opportunity. If you stop and look around you in any wood and cannot see a sizeable piece of deadwood, then increasing the amount should be a high priority. In most situations naturally fallen deadwood should be left, but with two exceptions: where there is

extensive windblow and where valuable sections of the stem can still be recovered. Large dimension hardwood is particularly valuable, but the deadwood retained should include a variety of species and sizes. It should be naturally scattered through the wood, but a few low piles or concentrations of deadwood can be particularly valuable habitat (e.g. off-cuts and part loads left near timber stacking areas are ideal). Deadwood should be left in large sections and not cut up, and generally is best left roughly where it falls. Deadwood within the soil is equally valuable and stump removal should not be undertaken on ancient woodland sites.

**15. Harvesting operations:** Harvesting methods, machines and routes should be chosen to minimise disturbance of the most sensitive areas. The lowest impact methods may involve the use of the largest of machines rather than traditional equipment. A balance may need to be struck between short-term disturbance and long term habitat improvement for the species. Permanent, serious and irrevocable damage must be avoided, but some superficial disturbance and rutting which disappears within a couple of years may be inevitable, and it can also create valuable ephemeral habitats for wildlife. Biosecurity issues should be addressed and latest guidance can be found on Forest Research website.

**16. Timing of operations:** Harvesting will always cause some disturbance, but should be carried out at a time of year that keeps this to a minimum, whilst respecting other practical constraints. Felling usually causes more disturbance to the woody habitat, whereas extraction can result in more soil damage. On the most vulnerable sites, difficult choices may have to be taken, weighing up the risk of damage against predictable decline from lack of intervention. Recommendations on the timing of harvesting operations include:

- On most sites harvesting in late summer and autumn is the ideal, but it will not be possible everywhere.
- On more freely draining sites, grazed sites or where the ground flora is less vulnerable, winter harvesting is often the next best alternative.
- On heavier soils and wetter sites summer working may be the only way to avoid significant site damage.
- Having the flexibility to suspend timber extraction if the soils become waterlogged is often more important than the time of year chosen.
- Separating the two operations can reduce overall damage, felling in wetter times of year and delaying extraction until a dry spell, but this is not always possible.
- In native woodland with a dense understorey and/or good ground flora, harvesting in April to May should be avoided if at all possible.
- If the woodland is likely to contain protected species particular care should be taken with timing – see Chapter 8 and Appendix 5.

**17. Broadleaved lop and top:** The treatment of broadleaved lop and top should take into account its importance as a habitat, the carbon stored in it and its role in returning nutrients to the soil:

- Where broadleaved lop and top are being harvested as woodfuel a significant amount should still be left on site as habitat.
- Any whole tree harvesting of broadleaved trees, or harvesting of their lop and top, should ideally be done when they are not in leaf in order to reduce removal of nutrients and leaf litter.
- Lop and top should be left scattered or be in small heaps.
- Burning of broadleaved lop and top on site should only be done in exceptional circumstances or to avoid adverse impacts on wildlife.
- Stump harvesting should not be carried out in ancient woodland and only in exceptional circumstances in native woodland.

**18. Windthrow:** Small numbers of windthrown trees are best left in situ unless they are of particularly high quality and commercial value. More extensive windthrow can be good from a pure ecological perspective, but clearance is likely to be desirable to harvest useable wood, enable rapid restocking, make the site safe and facilitate recreational uses. Uprturned root plates are valuable habitat, but again may need to be made safe. Care is needed that the process of clearing up windthrow does not create more damage than the original event.

**19. Protected species:** Sites that are particularly important for protected species should be given special treatment. Where protected species are likely to be present (e.g. dormice, bats, great crested newts or otters) the relevant guidance on harvesting operations should be followed.

**20. Soils:** Soil profiles in ancient woodland are often relatively undisturbed and are vitally important for their fauna, flora and particularly fungal communities. They also generally have relatively high levels of carbon stored within them. Care should therefore be taken to avoid causing any permanent damage to their structure or to the drainage of the site. This should be achieved by careful choice of machinery, planning of extraction routes, avoidance of vulnerable site or weather conditions and use of brush mats.

## Plantations on ancient woodland sites

**21. Restoration and conservation:** Restoration of plantations on ancient woodland sites is encouraged, but managers should not be in a rush to restore native canopy, through clear felling followed by restocking. Such rapid restoration can seriously damage the very features that are irreplaceable and that make ancient woodland so valuable. Many PAWS are in a fragile condition, with characteristic species only just hanging on after several decades of dark shade. Well intentioned, but heavy-handed restoration of PAWS can easily do more damage than good for these species.

**22. Thinning:** Thinning is the safest first step, and usually the first priority in a neglected stand, in order to reduce dense shade and secure surviving components of the ancient woodland. Even in densely shaded conditions, where there is very little ground flora apparently surviving, a light thinning will usually result in some recovery. When thinning, it can be beneficial to vary the density of the canopy, opening it up around areas that already have a good ground flora. However, on some soil types heavy thinning of PAWS often leads to vigorous growth of vegetation (typically bracken or bramble) that can smother either regeneration or the ancient woodland flora. Heavy thinning of neglected stands on unstable soils also brings a high risk of windblow, which will be disastrous from almost all points of view.

**23. Restoration via gradual felling:** There is no universal or definitive prescription for the best way to restore PAWS, but there are several significant problems associated with the use of larger-scale clear felling:

- Many species characteristic of ancient woodland are best adapted to stable and relatively shaded woodland conditions, albeit in some cases regular cycles of light and shade.
- Such species are readily out-competed by more vigorous and invasive species that thrive in the open conditions created by clear felling
- Clear felling produces large quantities of brush at once, and this can smother the ground flora, lead to nutrient flushes and change soil conditions.
- The vigorous growth of tall vegetation (most commonly bracken, bramble, nettles and coarse grasses) usually increases the need for mechanical or chemical weed control during restocking.
- The sudden loss of canopy changes the hydrology, and can result in temporarily waterlogged soils, hampering restocking and exacerbating extraction damage.

**24. Time scale:** Whilst there is an urgency to begin restoration, there is usually no hurry to finish the process. In general, restoration is best done via several cycles of thinning, group fellings and/or selective fellings, rather than a single felling operation, with the whole process taking a decade or even much longer. Although it is desirable for sites to be restored as soon as possible, waiting until economic maturity of the present stand is usually acceptable, provided the stand is regularly thinned to prevent further loss of valuable features due to intense shade.

**25. Clear-felling:** However, there are some situations where the risks are lower and clear felling, with modest sized coupes, may be appropriate:

- where there is no survival of ancient woodland features or species under the stand, for

example under rhododendron or unthinned western hemlock (although it is often difficult to confirm this until the response to an initial 'exploratory' thinning has been assessed);

- where the features and communities associated with ancient woodland are in a robust state and will rapidly recover from any felling;
- where site factors and ecology of the woodland mean there is a high likelihood of a native canopy rapidly being re-established through natural regeneration;
- where the coupes are elongated, and not south facing, so that humid and shaded conditions are still maintained across much of the felled area.

**26. Felling exceptions:** There are some other situations where more rapid felling is acceptable due to the need to avoid other adverse consequences. These include:

- where there is an urgent need to remove the seed trees of invasive species, such as western hemlock (although bear in mind these do not always freely regenerate);
- where there is a specific and urgent need to create temporary open ground, or thicket habitat in order to conserve important species found on that site which depend on such conditions;
- where the risk of windthrow is so high that thinning or group felling is almost bound to lead to windthrow;
- where clear felling is the only viable option, and the only alternative is neglect;
- where felling is required to help control the spread of a pest or disease.

**27. Non-productive thinnings:** On PAWS where extraction of timber is not practicable, restoration can still be achieved through thinning to waste. Ring-barking or chemical thinning is relatively straightforward to do, and produces an appropriately gradual opening up of the canopy, but the results are unpredictable and can be chaotic. Again, care should be taken not to generate large volumes of brash in a short space of time which might smother the woodland floor. The risks to the public or forest workers associated with creating such an unstable and unsafe stand should also be carefully assessed and managed, along with the unsightly appearance.

**28. Brash:** Conifer brash should be concentrated along extraction routes to minimise site damage, with the remainder well spread across the site. However, where there are patches of surviving ancient woodland flora, interspersed with totally bare areas, where practical the brash should be concentrated within the barer areas. Whole tree harvesting will often be the best way to avoid damage from large quantities of conifer brash, but even then sufficient brash should be kept along extraction routes. However, stump harvesting is too disruptive to ancient woodland soils. Chipping of conifer brash often creates deep mats which smother ground flora and it is not recommended. Burning of brash should be a last resort option, bearing in mind this action will release stored carbon.

**29. Deadwood:** Some PAWS still contain deadwood, standing or felled, dating from the previous native stand. These are invaluable relics, of historic and ecological value, and should not be removed

## Wood-pasture and parkland

**30. Wood-pasture structure:** It is important to conserve the distinctive structural features of wood-pasture, including valuable elements of designed landscape. Conserving the existing veteran trees should almost always be the highest priority along with maintaining or reintroducing an appropriate grazing regime.

**31. Pollarding:** Traditional pollarding to develop or regenerate the crowns may be desirable, but both costly and risky, so it is not practicable everywhere. It is particularly appropriate where there has been a long history of this practice, it has only relatively recently been discontinued and there are strong heritage or aesthetic reasons for continuing and for the creation of successors to existing veteran trees. Where a lot of pollarding is required, phasing the work is recommended to reduce the risk, the visual impact and the rate of change for dependent wildlife.

**32. Tree safety and surgery:** Tree surgery may be required to ensure trees are safe, but should be matched to the level of risk. Wherever possible such trees should not simply be felled. Tree surgery may also be highly desirable to increase the stability and longevity of vulnerable veteran trees, particularly where successors are not abundant. Work should be phased to avoid treating all the trees at one time.

**33. Successors:** Trees with potential to become the veteran trees of the future should be identified, and conserved. Some tree surgery or even pollarding can be desirable to help develop appropriate crowns. This allows associated flora and fauna to move between trees, and also reduces the risks of drought or storm affecting all the trees. Regeneration is covered in Chapter 5.

**34. Deadwood:** The most important principle is not to fell any dead or dying trees unless absolutely necessary. Once wood has fallen, or been felled, it should generally be left lying somewhere convenient under the tree canopy. However, there are situations where priority species need deadwood located in rather precise situations to ensure the right micro-climate, and in these cases specialist advice should be taken.

**35. Grassland/heath:** The historic and ecological value of wood-pastures and parkland is also dependent on the management of the grassland or heath between the trees, and this is briefly covered in chapter 6 on open space.

# Chapter 4: Tree species composition



## Introduction

In most native woods in England the species composition of the woodland canopy is an expression of natural factors, modified by centuries of past management. The species composition of the understorey may also have been changed or simplified through enrichment and selection, to increase species such as hazel. However in many ancient woods in particular the composition of the understorey remains very diverse and still closely reflects subtle changes in soil and drainage. The species composition of canopy and understorey is thus an important indicator of site conditions, ecological communities and historic ancient management practices.

We have defined native woodland in simple terms as sites where at least 80% of the canopy comprises native species. However the definition of a 'native species' has always been a subject of debate, and these discussions have been complicated by the probable effects of climate change. Terms used to describe nativeness and the meanings we ascribe to them are listed in the glossary.

When considering tree species we need to strike a balance between conserving the composition we have inherited, which has developed over centuries, with preparing for an uncertain future and unprecedented rates of change in climate. As a result of past management many woods have become more mono-cultural than they would naturally be, thereby increasing their vulnerability. The potential ranges of native tree species are changing rapidly, and their suitability to different sites could also be altered. Some changes in guidance are introduced here – for example, in the way in which we manage 'near native' or 'frontier' species – but it is acknowledged that further changes may be required as our understanding increases.

The need to increase 'adaptability' and widen the 'genetic base' has also merited new guidance on the use of local provenances when replanting, but this is covered in chapter 5 on restocking. Guidance on the management of invasive shrubs and other species is covered in Chapter 7.

Changes in species composition can be achieved through a range of operations: selective thinning or felling, choice of areas to fell, regeneration and cleaning. There are also many *indirect* ways in which species composition can be altered including:

- removal or opening up of mature trees which are acting as seed sources;
- lack of thinning can favour shade tolerant species and existing dominant trees;
- uncontrolled deer browsing can effectively remove palatable species;
- grey squirrels may affect the proportion of the canopy occupied by susceptible species such as sycamore, beech and oak.

## Outcomes

- A. Species composition of native woodland:** The presumption is that the proportion of the canopy occupied by native species is being maintained or increased. In most native woodland at least 80% of the canopy is comprised of native species.
- B. Special sites:** In native woodland within SSSIs and other sites where nature conservation is a principal objective, the tree species composition is moving towards almost pure native species (i.e. over 95% of the canopy being native species).
- C. Species composition of PAWS:** In all PAWS the existing native component of the canopy is being safeguarded. In most PAWS the proportion of the canopy occupied by native species is being significantly increased. In PAWS that are being restored the canopy composition is gradually moving to at least 80% of the canopy being native species.
- D. Species mixtures:** Opportunities are being taken to increase resilience by diversifying the mix of tree species, particularly in stands currently dominated by a single species.
- E. Understorey species:** The species composition and distribution of the understorey is being conserved or enhanced, and important species are not being reduced through shading or browsing.
- F. Invasive non-native tree species:** Invasive non-native tree species are not being introduced, and where they are present, and it is practicable, they are being controlled or eradicated.
- G. Historic species:** Species which have historical significance or are recognised cultural features are being conserved, including non-natives, providing this does not prejudice other objectives.

## Guidance for achieving outcomes

- 1. Native component:** In most native woodland at least 80% of the canopy should comprise native tree species, and management should be moving the site towards this composition. The majority of this native component should be species that are historically native to that site (i.e. species that would have naturally been found on that site for most of the last 5000 years). However, a small proportion of the 'native component' can be broadleaves that are:
- Either: 'advancing native species' which in the past were not naturally present on this site, but are native elsewhere in Britain, and given climate change can be expected to be suited to this woodland in the near future (e.g. beech in the North West)
  - Or: 'honorary natives' which are broadleaves native to North West Europe and expected to be adapted to conditions on this site in the near future (e.g. chestnut).

**2. Non-native component:** Up to 20% of the canopy can comprise other species, including exotics. This is on condition that they are well suited to the site, are not invasive and are not causing environmental damage. It is usually best if they are in intimate mixture with native species, rather than in pure 'non-native' stands.

**3. 'Honorary native woods':** In woods dominated by honorary species, such as chestnut coppice, or woods dominated by sycamore, it may take several decades to increase the proportion of historically native species. And in these situations it may be appropriate for a higher proportion of honorary species to remain into the future.

**4. Introducing honorary and non-natives:** The above proportions apply where honorary and non-native species are already present on the site. Introducing such species to woods in which they are not present is not generally recommended. The key factor is to consider whether the non-natives will adversely affect the particular environmental value of the site. Non-natives that are likely to be invasive should not be introduced to any ancient or native woodland.

**5. Invasive non-native trees:** Action should be taken to limit or reduce the natural spread of existing invasive non native trees where they are likely to be seriously damaging. Where possible, invasive tree species which still only occupy a small part of the site should generally be removed before they become widely established ('sanitation felling'). Where such species are already more widely established, eradication may still be desirable but may not be practical or represent value for money. A judgement will need to be made on the impact of the species, the cost of removal and the subsequent development of the stand.

**6. Mixed stands:** In most situations a native wood should be moving towards a canopy that has at least two dominant species, with no one species occupying more than two thirds of the canopy. In stands that are currently almost mono-cultures opportunities should be taken to favour any minor components during thinning, and to create canopy gaps to bring on trees growing under the main canopy. Premature felling of some areas could be considered to accelerate such diversification.

**7. Resilience and adaptation:** Species that are chosen or favoured, whether native or not, should be suited to the soil, and be well matched to the climate expected on that site in the next few decades. Their ability to tolerate the extremes that might occur on such sites, such as frost, drought and storms should be borne in mind. The distribution of species across the site through planting should reflect any substantial variation in site conditions, particularly soils, exposure and drainage.

**8. Respecting past composition and distribution:** It is also important that the choice and mix of species reflects the history of the site. The distribution of the species should also take account of the history, for example by respecting ancient boundaries and not masking intriguing differences in composition across the wood.

**9. Rare native trees:** Some species of tree or shrub (e.g. Midland hawthorn, wild service tree, small-leaved lime) have a distribution that is historically very revealing. Introducing such species into woods where they are not present is therefore not generally recommended. However, if introductions are made they should be recognisable as having been planted (e.g. in rows or patterns), properly documented, and ideally using seed or cuttings derived from trees on the site.

**10. Understorey:** Thinning and other harvesting should try to ensure that the more light-demanding components of the understorey are not shaded out. If the understorey is cut, including during thinning, then steps should be taken to ensure it regrows and that palatable species are not being lost through browsing. In such situations the benefit of opening up the canopy needs to be weighed against the risk of reducing the species diversity of the understorey.

## Plantations on ancient woodland sites

**11. Restoration is preferred:** The preferred long-term outcome for almost all PAWS is gradual restoration, eventually resulting in a stand with over 80% of the canopy comprising native species. However this may take many decades to realise. The species that can be included as part of the native and non-native components are as explained above for native woodland.

**12. No reduction in natives:** As a general principle, the establishment of trees and management of PAWS should not result in any reduction in the proportion of the canopy occupied by native species.

**13. Native species favoured:** Thinning and cleaning should generally favour and release native trees that are surviving within the canopy, so that the proportion occupied by native species is increasing. Some stems and crowns may not be very stable and will need gradual rather than sudden opening up. For individual trees that are not sufficiently stable then it may be preferable to coppice them, but in this case ensure the regrowth is protected and given sufficient light.

**14. Exotic broadleaves:** if exotic broadleaves are being removed the ideal is to replace at least some of them with native species (including advancing and honorary natives). Replacing them with other more suitable exotic broadleaves is another possibility, but replacement with conifers is rarely appropriate.

**15. Conifer regeneration:** On PAWS, dense regeneration of freely regenerating conifers such as western hemlock should be prevented or controlled to avoid further losses of ancient woodland components.

**16. Conifer crops:** If managers do continue growing conifers on PAWS then crops that cast a lighter shade are strongly encouraged. This can be achieved in the following ways:

- Replacing densely shading species with deciduous species or ones that cast a lighter shade.
- Adopting a regime of early and regular thinning, preferably using crown thinning to create a more variable canopy structure.
- Including a proportion of native species in any replanting, particularly in clumps around pockets of surviving ancient woodland flora.
- Where some of the native species that do not normally regenerate freely (e.g. oak, beech and lime) have established themselves, then these are safeguarded and incorporated into the stand.
- Where there is abundant regeneration or regrowth of other native species (such as birch and willow) at least some of this is kept during cleanings and incorporated into the stand.

**17. Mixtures:** A preferable alternative is to restock conifers with a mixture of native and non-native species. This will require careful design, early cleaning and regular thinning to ensure the species mix is sustained and that slower growing native species are not shaded out. In most situations an intimate mix or group pattern is much better than replanting part of the site with conifers and part with native species. But if such segregation is followed, the conifers should be planted in the areas with the lowest survival of ancient woodland components

# Chapter 5: Restocking



## Introduction

Establishing the next generation of trees is critical to sustaining the woodland, and the benefits it provides, for future generations. This applies equally whether the objective is sustaining timber production; ensuring continuity of habitats or securing sequestered carbon. It is a moment when difficult management choices can arise, between sustaining traditional practices and conserving our inheritance, or adapting the wood to our predictions of future needs and future environment.

Under a classic even-aged and clear felling system the moment of restocking is the once-in-a-generation opportunity to change or diversify species composition (see previous chapter) and more subtly, alter the genetic composition. Under continuous covers systems such opportunities are more regular and enable gradual and even continuous evolution of the species composition. Creating areas for restocking also fundamentally changes the structure, typically creating temporary open space and then young stages of growth and thicket habitat (see chapter 6). The methods used, and the time taken, to restock areas can fundamentally affect the value of the habitat produced, for wildlife or game. The length of time the area is 'open' is also very important to users of the woodland, and the intensity of intervention (natural versus more artificial methods of regeneration) can have a significant impact on the appearance and feel of a wood.

Restocking is also an exercise in risk management. Managers need to try to predict, and respond to, changes in many different natural factors, whether this is the natural seed supply, the growth rates of trees and weeds, or the numbers and behaviour of deer and rabbits.

This section should be read in conjunction with the chapters on species composition, structure and species management.

## Outcomes

**A. Method of regeneration:** Natural regeneration, coppice re-growth and suckering predominate as the methods of restocking, supplemented by planting or direct seeding where this is necessary to achieve management objectives.

**B. Time periods:** Areas being regenerated are successfully restocked within an appropriate and agreed time period. This period is matched to the rate and scale of felling to ensure all the values and attributes of the wood are being sustained in the long term.

**C. Protection from herbivores:** Grazing and browsing animals are either at levels where they are not threatening the potential for natural regeneration, or, where this is proving impracticable, other management measures are in place, such as fencing, which will protect regeneration from browsing.

**D. Numbers of trees:** The stocking densities of the various tree species are such that they will achieve the desired outcomes for the site, including where appropriate providing for the production of wood and timber for future generations.

**E. Provenance:** When replanting, the choice of stock ensures trees are well adapted to the site, have good resilience to climate change, and where appropriate, have improved potential for timber production.

## Guidance for achieving outcomes

**1. Natural regeneration:** A combination of establishment methods will usually be appropriate, (e.g. natural regeneration for some species supplemented by planting of others). Natural regeneration, suckering and coppice regeneration are the preferred means of restocking native species. They should always be encouraged and protected, and only controlled where they are over-abundant, suppressing trees planted for specific purposes or there is a need to retain open space. The chances of good natural regeneration can in some cases be improved by ensuring the felling occurs following good mast years.

**2. Planting:** Although natural regeneration is the ideal, planting may be appropriate for one or more components of a woodland where:

- past experience, evidence or specific site factors suggest a low chance of successful regeneration despite all necessary measures being taken (e.g. due to a lack of seed sources or vigorous bramble or bracken);
- the species mix needs to be diversified or enriched to meet wood production, biodiversity or resilience to climate change objectives;
- natural regeneration is likely to be of mainly non-native species;
- there are important landscape or heritage reasons (e.g. replacing critical components of a designed landscape);
- genetic diversity or quality needs to be increased or improved by introducing new provenances.

**3. Direct seeding:** sowing seeds of one or more species may be worth considering as an alternative to supplementary planting. It offers the opportunity to change the composition and genetics, whilst still creating a relatively natural structure and appearance. However, it requires skill and care, and is not easy to predict, and should be considered a somewhat risky approach; it is certainly not a 'low input' option.

**4. Provenance:** The genetic origin of the trees used in restocking, particularly when replanting, is important, but is a much debated topic. It is often argued that local stock may show some adaptation to the site, but emerging evidence suggests this is more likely to be broad adaptation at the regional rather than local scale. However a wide genetic base is recommended to build in adaptability to an unpredictable future climate. With both an uncertain climate and our limited knowledge of tree genetics, a mix of provenances is advised. With this in mind the following recommendations are given on provenance <sup>2</sup>:

- **Seed collection:** whatever source or provenance ensure the seed has not been collected from just a small number of seed trees, as this can give a narrow genetic base.
- **Regional (or local) sources:** it is safest to use stock from seed stands in the same 'region of provenance', and it is recommended that this makes up at least a third of the stock on any

site. Using seed from the 'local seed zone' is perfectly acceptable, but this may not bring significant advantages compared with sources from elsewhere in the wider 'region of provenance'.

- **Elevation:** upland sources (over 600m approx) should be used for upland sites and corresponding elevations below 600m for lowland sites.
- **Existing stock:** where existing trees on the site have grown well, incorporating stock derived from them into the next generation is recommended, not least because it follows the precautionary principle. Protecting and promoting natural regeneration and coppice regrowth is the best way of ensuring this, but collecting and growing seed may be feasible in some situations, ensuring seed is collected from an adequate number of trees.
- **'Selected' sources:** Where timber production is an objective of management a significant proportion of the restocking should be with 'improved' planting stock (i.e. from seed sources selected for their growth rates and timber quality and which have been certified as 'qualified' or 'tested' under the forest reproductive materials regulations.) If improved material is not available, planting stock should generally come from registered seed stands (see Hubert and Cundall for further guidance).
- **Clonal material:** if cuttings or other clonal material is used it is vital that a mix and broad range of clones is used.
- **More southern sources:** At this stage it is not possible to predict future climate with a high degree of certainty, but including at least one source likely to thrive in slightly warmer climates is recommended. Sources from 2-5 degrees of latitude further south than the site is a useful rule of thumb. Eastern European sources should generally be avoided as they have proved unsuited to England.

**5. Herbivores:** The ideal is to control populations of grazing and browsing animals including deer and rabbits in order to keep them to levels where natural regeneration of most species can be successful. But this requires control across the landscape, and this is not always feasible. Fencing is expensive, but is generally the second best alternative to controlling populations. If populations are such that only particularly palatable species are being damaged then individual tree shelters or protection may be very appropriate. However, it is not desirable to use tree shelters alone to protect planted trees where there are high herbivore populations. This can result in low stocking, lack of natural regeneration, and damage to the understorey, shrub layer and ground flora.

**6. Stocking density:** The density or numbers of trees that it is appropriate to establish per hectare will depend on site conditions and history, but should also be carefully matched to the objectives for the woodland. In most cases sufficient trees should be established to give future generations the option of harvesting some timber and wood.

**7. Examples of appropriate densities:** Minimum stocking densities should be agreed at the time of application for a felling licence or grant. Stocking densities that might be appropriate for different objectives are given below. These are expressed as established stems per hectare i.e. the area actually felled and being restocked. These numbers are the total of natural seedlings, coppice and planted stems, and include both canopy trees and shrubs:

- 2500 or more trees/ha where the aim is to produce high quality hardwood timber
- 1000 - 2500 trees/ha for stands where timber would be useful, but stem quality is not so important
- 500-1000 trees/ha where the main aim is simply to regenerate a native tree canopy
- 200-1200 stools per ha for productive coppice stands
- 30-100 standard trees/ha in coppice-with-standards
- 20 - 80 trees/ha in wood-pasture and parkland

**8. Tree spacing:** Irrespective of total numbers the actual spacing can be varied across the site in order to create some variation in woodland structure (i.e. some degree of 'clumping'). Clumping may also be used in low density planting to improve the form of the central trees in the clump. A 'naturalistic' planting pattern is visually the most pleasing, but the practicality of subsequent maintenance should be borne in mind. However, a rigid geometric grid pattern, especially if shelters are used, should be avoided on sites which are visually prominent.

<sup>2</sup> See the following publications for further guidance:

Hubert J and Cundall E (2006) Choosing provenance in broadleaved trees.

FC Information Note 082.

Ray D, Morison J and Broadmeadow

M (2010) Climate change: impacts and adaptation in England's woodlands.

FC Research Note 201.

Forestry Commission (2007).

Forest reproductive material: regulations controlling seed, cuttings and planting stock for forestry in Great Britain. Forestry Commission, Edinburgh, i-iv + 1-32 pp.

Boshier D (2007). 'Tree improvement and genetic diversity of British and

Irish broadleaved trees: dispelling misconceptions'. British and Irish Hardwoods Trust ([www.bihp.org](http://www.bihp.org)).

**9. Timing:** The general recommendation is to achieve re-establishment within 5 – 10 years of the over-storey being removed (i.e. trees taller than the competing vegetation and at the required stocking density). Many species typical of ancient woodland are essentially shade tolerant, and although they benefit from a period of full light, if exposed to such conditions for many years will tend to be out-competed by more vigorous, opportunistic and commonplace species (e.g. bramble or bracken). On the other hand, the open phase is a very valuable wildlife habitat, as it allows a much greater diversity of species to thrive. Coppice cycles provided an ideal combination of both. A patient long-term approach to regeneration minimises expenditure, but involves sacrificing a decade or more of wood production. Having to reclaim and replant a site where regeneration has failed is difficult, expensive and unattractive. Insurance planting is therefore recommended where regeneration is unreliable.

**10. Cultivation:** Scarification or ripping can be a useful technique for encouraging regeneration on some recent native woodlands. However, cultivation should be avoided on ancient woodland due to the importance of undisturbed soil profiles and the damage that can be done to cultural and archaeological features. Cultivation also tends to increase losses of soil carbon.

**11. Chemicals:** Fertilisers and manure should not be used. The use of pesticides, and herbicides should be minimised in native woodland, and in ancient woodland they should ideally be avoided. However, there may be situations where there are no other practical means of controlling vigorous weed growth, or other means are more damaging. In these situations spot applications around slower growing planted trees may be appropriate. Spots should be kept as small as practical, and preferably under 1.0m diameter. Stem applications to woody weeds are generally acceptable, as is the use of herbicides to control weeds in very limited areas. But the only situations where wider-scale applications might be appropriate will be to control non-native and invasive species which have formed a dense canopy.

## Plantations on ancient woodland sites

**12. Rapid restocking:** On sites which have been very heavily thinned or clear felled it is usually a priority to achieve rapid re-establishment of woodland cover. If signs of natural regeneration being able to succeed are limited, then at least some planting is recommended within a year or two of felling to ensure the next generation is re-established within a few years of felling.

**13. Supplementary planting:** On PAWS with few seed sources natural regeneration of some species particularly oak and beech can be very slow and thinly spread. Where this is the case, planting of such species is recommended.

**14. Planting pattern for mixtures:** Where a PAWS is being restocked with both conifers and natives, it is generally best to distribute the native species in mixture across the site. Increasing the proportions of native species in the areas with the best survival of ancient woodland is recommended.

## Wood-pasture

**15. Successors:** Establishing a range of potential successors close to existing veteran trees can be very important, to ensure species that are dependent on the old trees can move to a new host.

**16. Designed landscapes:** Any planting or regeneration should be sympathetic to historic landscapes, and not destroy the integrity of the original design. The choice of species and even provenance should also be influenced by the history of the site, and there may be good heritage reasons for using non-native species.

**17. Grazing:** The use of tree cages and fencing to protect trees from grazing animals must be robust and matched to the type livestock expected. The aesthetics of the design and nature of the protection may also be significant and needs careful consideration to ensure it is in keeping with a designed landscape.

## Chapter 6: Open areas within woodland



Open areas within woodland are often some of the most interesting and valuable in terms of both their history and wildlife. They are also very appealing focal points for people using the woodland, as viewing points and recreational areas. They can also be important for the management of game and livestock.

Their ecological value is a combination of the open habitat itself, the micro-climate within the woodland and also the internal woodland edge that surrounds them. Some open areas are not accidental but are in locations determined by distinctive topography, soil or drainage. Many have been in that location for many centuries, as a result of past management or associated with historic features. In contrast, other types of open habitat are temporary, lasting a few years, or a few decades, before the area once again reverts to woodland. When considering creating new open areas it is particularly important to take account of the woodland habitat that is being lost.

The common types of open space within woodland include:

- forest roads, verges, rides and tracks, especially those that are long-established;
- surviving glades and patches of open semi-natural habitats (e.g. chalk grassland and heathland), which are often associated with ancient grazing rights;
- open areas associated with historic features and sites, such as old buildings, boundaries, earthworks and archaeological remains;
- permanent open habitats around ponds, wetlands, watercourses and rocky outcrops where trees are slow to establish naturally;
- partially open areas, including wood-pasture and land being colonised by scrub;
- temporary open areas created by management activity (i.e. felled areas and coppice coupes) or by natural disturbance (i.e. windthrow)
- Most open areas require active management, and without this they will revert to woodland and lose much of their ecological and heritage value.

Improvements to tracks and roads which involve construction or excavation will require notification of the planning authority and in some situations or new roads will require planning permission. Only broad guidance is given on these aspects in this Practice Guide. Any substantial clearance of woodland will need to comply with the policy on restoration of open habitats, and may require an Environmental Impact Assessment; advice should be sought from the Forestry Commission.

## Outcomes

- A. Permanent open areas:** Long established rides, glades and open areas within woodland which have developed a high value for wildlife, heritage or recreation are being managed as permanent open areas.
- B. Protecting heritage:** The management of permanent open areas is ensuring their historic interest and any heritage features are being conserved.
- C. Conserving open habitats:** The management and use of both permanent and temporary open areas is conserving their wildlife value, and particularly any priority habitats and species.
- D. Avoiding the creation of clearings in ancient woodland:** In general ancient woodland is kept as woodland, rather than being cleared to create permanent new open areas. However, the creation of some small areas of open habitat may be desirable in larger ancient woods.
- E. Creating open areas:** in non-ancient woodland, where open space is limited or lacking, small open areas, both temporary and permanent, are being created.
- F. Wood-pasture:** Areas that have a long history as wood-pasture or parkland are being managed to sustain their distinctive value and identity. This will often involve gradually creating gaps, thinning the canopy and where appropriate re-introduction of grazing animals.

## Guidance for achieving outcomes

- 1. Historic open areas:** Long established open areas are often of historical significance, and they should not be allowed to revert to woodland if this will compromise the heritage value of the woodland. The management of the open land around any historic feature should conserve and enhance its significance. This will often involve removal of scrub and trees that have colonised the site. Where unstable veteran trees are a threat to historic features then tree surgery is likely to be more appropriate than felling.
- 2. Surviving open habitats:** Long established glades, rides and verges often comprise valuable priority habitats, such as calcareous grassland, heathland and bog, which have survived within the woodland. These 'permanent' open habitats should be protected and rather than being converted to woodland should be used for a purpose compatible with their wildlife.
- 3. Open canopy woodland:** In many situations it may not be necessary or desirable to completely remove woodland cover. Even if the eventual aim is a fully open area, gradual reduction in canopy via intermediate 'open woodland', will help ensure the edges and retentions are stable. It will also ease the transition for both people and wildlife.
- 4. Management regimes:** Permanent open areas will usually require periodic cutting, mowing or grazing to prevent them being colonised with trees and scrub. The regime applied should be matched to the particular habitat and the use made of the area. Some may need mowing several times a year, whereas others may only need scrub cutting every few years. In most circumstances the ideal is to remove the cut material, but this can be prohibitively expensive where there is no market for it (e.g. as woodfuel or bedding). Thinly scattering the arisings across the site or heaping up may be acceptable alternatives. Care should be taken with any machinery to avoid soil compaction.
- 5. Priority species in open areas:** Some open areas will be important to priority species, particularly those which rely on a warm micro-climate and on woodland edge. Management should take into account the habitat needs of species that are legally protected or for which this woodland is particularly important (see Chapter 8).

**6. Disturbed ground:** The value of disturbed ground, temporarily bare soil and even wheel ruts, for wildlife should not be overlooked. Upturned root plates are one of the natural features that tend to be lacking in managed woodland. What may look like ride damage may actually provide the exposed soil and pockets of impeded drainage that suit some species. However, such disturbance is usually only desirable on rides that have historically been heavily used and disturbed, and it should ideally be 'periodic and patchy'.

**7. Creating temporary open areas:** The temporary open phases of the woodland cycle, and the ensuing thicket habitat, can be some of the richest areas in terms of number of species and their abundance. The ideal in larger woodlands is a continuous supply of newly opened areas to replace those that are restocked, which form an interconnected mosaic of such areas. Where there are similar open habitats adjoining the woodland it is advantageous to connect to them.

**8. Clearings in ancient woodland:** Creating new glades, tracks and roads in ancient woodland can involve losing woodland communities that have taken hundreds of years to develop. Such clearance should therefore be the exception. However, it may be justified for the following reasons:

- a road, track or loading area is necessary to facilitate management work which will ensure conservation of biodiversity or heritage (especially PAWS restoration);
- a clearing is vital to facilitate public enjoyment of the woodland environment;
- small patches of other habitats are highly desirable to complement the ancient woodland;
- small open areas are essential to secure the long term conservation of a significant heritage feature.

**9. Criteria for clearings:** However, for such clearance to be acceptable the following criteria should also be satisfied:

- the area cleared is a very small proportion of the total area of ancient woodland (no more than 1-2%);
- there is no practicable alternative to locating the clearing within the ancient woodland
- the area cleared has been located to avoid the most sensitive or valuable woodland areas;
- high quality open habitat and woodland edge will be created and maintained as a result of the operation.

**10. Creating new permanent open areas in non-ancient woodland:** Where open space is absent or limited, clearance of woodland to create rides and glades is desirable. In particular where previous semi-natural habitat has survived in rides and glades opportunities should be taken to enlarge and connect such patches. The total area of open space within the wood should still generally be only a small proportion of the total area, typically 5 – 20%. This scale and pattern of clearance will enable the following to be accommodated: rides, glades, canopy gaps, ponds, viewing points, picnic sites, car parks and woodland roads. Care should be taken to avoid clearing areas containing particularly valuable woodland features such as veteran trees or rich woodland flora.

**11. Improving access tracks:** Care should be taken when improving the surface, alignment or drainage of an access track or forest road. Alteration in ditches and culverts can significantly change the soils in areas where they discharge, and care should be taken to avoid jeopardising veteran trees in such areas. The choice of stone for any surfacing can adversely affect some sites, and generally speaking managers should try to avoid using limestone on acidic sites if it is going to adversely affect a distinctive flora.

**12. Larger scale clearance of woodland:** Where the non-ancient woodland has colonised semi-natural habitats, but these have survived under the canopy, then larger scale restoration may be appropriate. This will need to be guided by and comply with the policy on when to convert woodland to open habitat, see [www.forestry.gov.uk/england-openhabitats](http://www.forestry.gov.uk/england-openhabitats). Conversion of ancient woodland to open habitat whether planted or semi-natural will not be permitted.

## Wood-pasture and parkland

This guidance focuses primarily on management of the woodland element of wood-pasture; managers should refer to other more detailed sources of advice on topics such as tree surgery for veteran trees, pasture management and heathland restoration.

**13. Grazing:** An appropriate grazing or foraging regime should be used that achieves the delicate balance between controlling colonisation and avoiding damage to existing trees. Veteran trees and their successors which are particularly vulnerable may need fencing or other protection. To prevent damage supplementary feeding areas, shelter and water supplies should be carefully located to avoid ground compaction, concentrations of dung and poaching of ground by livestock. The seasonality of grazing and the stocking numbers needs to be carefully managed to balance such factors as understorey regrowth, tree regeneration, ground flora and poaching of the soil.

**14. Pasture management:** Cultivation, fertiliser application and pesticides should be avoided near retained trees.

# Chapter 7: Species management

Some species can pose a threat to native woodland, and jeopardise some of its important values. In most cases these are invasive, and usually non-native species, and The most common species are listed below; most are invasive, and most, but by no means all, are non-native. The plants are a threat as they shade out other species, whereas the majority of the animals are a problem because of the damage they cause to the natural regeneration and stems of established native trees. Tree species, some of which are both invasive and non-native, are covered in the chapter on ‘Species composition’ and livestock are covered in the chapter on ‘Open areas’. Management of vegetation which is competing with trees is covered under ‘Regeneration’.

Animals	Plants
Grey squirrels Non-native deer: fallow, muntjac and sika Native species of deer: roe and red Rabbits Edible dormice ( <i>Glis glis</i> ) Wild boar	Rhododendron spp Laurel Japanese knotweed Himalayan balsam

Rackham makes clear in the second edition of his book ‘Ancient Woodland’<sup>3</sup> that high deer populations, which are at a historical all time high, are the greatest threat to our woodland. There have been several occasions in the last few decades when invertebrate pests and diseases have posed a threat to native trees. Recent examples include knopper galls on oak, Phytophthora spp on alder and Dutch elm disease. There are fears that climate change could increase the invasiveness of some species, or lead to new outbreaks of pests and diseases.



<sup>3</sup> Rackham, O. 2003. Ancient Woodland: its history, vegetation and uses in England (2nd ed). Castlepoint Press.

## Outcomes

- A. Active management:** All plant and animal species that are causing significant damage or constitute a threat to the woodland are being actively addressed and in a manner that can be sustained.
- B. Population management:** Where it is practicable, widespread species that are causing damage are being managed, with the aim of bringing populations to a level where the threat to the woodland is low.
- C. Eradication:** Steps are being taken to contain or eradicate invasive plants or animals that are still localised but constitute a threat, providing it is a practical to do so and there is a reasonable chance of success.
- D. Exclusion and protection:** Where populations of animals cannot be adequately controlled then the most vulnerable areas are protected through fencing, or where appropriate, tree protection.
- E. Adverse impacts:** The adverse impacts of any action to manage problem species have been taken into account and minimised.

## Guidance for achieving outcomes

- 1. Sustained management:** The decision to control any species should be based on a careful assessment of the level of threat and the probability of control being successful in the long term. Careful monitoring of the impact of control measures is also needed so that if they are not proving effective the techniques can be modified. Controlling populations or maintaining fencing requires sustained long-term commitment, and should only be done if there is a reasonable chance that the effort can be sustained and the outcome achieved.
- 2. Targeting and scale:** Initial efforts should be targeted at the most vulnerable areas, i.e. where features of greatest value are being most seriously threatened. However, control is almost always more successful, longer lasting and cheaper if it is tackled at the landscape scale. Collaboration between neighbouring landowners is often not easy, but it should be mutually beneficial and is strongly recommended.
- 3. Retained specimens:** There are situations where species that might normally be considered a threat are retained because of their cultural or historic significance (e.g. specimen trees, flowering shrubs or deer in parkland). In these situations managers should have robust measures in place to ensure that they do not spread into adjoining areas. There will be a particular responsibility on managers to remedy promptly any escape or spread of such species.
- 4. Reducing risk of spread:** Operations which increase the vulnerability of the woodland or which favour the spread of invasives (such as thinning, coppicing or felling), may have to be delayed until the problem species have been brought under control.
- 5. Eradication:** Complete eradication is strongly recommended for invasive plants (or animals) that have not yet spread and only occupy a small proportion of a woodland. Where large populations of invasive non-native plants are already present, eradication is only appropriate where collaborative action is feasible and sustainable at a landscape scale.
- 6. Introductions:** Any plant or animal species that could become a threat should not be introduced to ancient or native woodland. When considering the threat, managers should bear in mind that climate change may mean that some species no currently invasive could become so in the future. Managers must not introduce any species scheduled under the Wildlife and Countryside Act

**7. Managing native species:** Apart from conventional weeding of regenerating areas (covered in Chapter 6) and cutting of open areas (see Chapter 7) the management of native, competitive plant species (e.g. bracken, bramble) is rarely necessary. It is generally only recommended for localised areas, where there are over-riding environmental concerns, such as conserving a priority species or protecting a heritage feature.

**8. Chemicals:** The use of herbicides to control invasive plant species may sometimes be required and should follow existing guidelines (see Forestry Commission Practice Guide 15). Care should be taken to minimise impact on non-target species, for example by only using herbicides where there is a dense canopy of the invasive species or for localised treatment of cut stumps.

**9. Pests and diseases:** There is often not much that can be done by individual managers to prevent attack or to control a pest or disease. The most common situation with native pest species is low level 'endemic' damage or loss, and the only management usually required is to mitigate the impacts. The value of the deadwood created should be taken into account when responding to such incidents. More serious pest and disease outbreaks are not covered by this publication and specific advice should be sought if an outbreak occurs.

**10. Grey squirrels:** Even relatively low populations of grey squirrels can jeopardise the production of high quality oak, beech and sycamore timber. In the long term they may also affect the proportion of the canopy occupied by such susceptible species, due to damage to young trees, stems or crowns. . They can also increase the risk to users of the woodland from falling dead branches. Local and sustained control is recommended where grey squirrels are critically threatening the sustainable management of the woodland. Appropriate techniques should be used so as to avoid possible impacts on priority species, such as dormice and red squirrels.

**11. Deer and rabbits:** Control via culling is recommended as the most beneficial option. This is best done through collaborative action with other woodland owners at a landscape scale e.g. through effective Deer Management Groups. However, lack of co-operation from neighbours should not necessarily deter a manager from carrying out their own deer management regime. Deer and rabbit control will in all cases need to be concentrated on those areas being restocked, regenerated or restored, and where regrowth of scrub and under-storey would otherwise be jeopardised.

**12. Fencing:** Where control of rabbits or deer is not feasible at local or landscape scales fencing will be the next best option. The areas being restocked will be the most vulnerable (felled sites, coppice coupes and young plantations). But continuous cover areas, thinned stands where the understorey has been cut, and PAWS that are being restored will also be vulnerable. Where fencing has been erected it should be regularly inspected, promptly repaired and well maintained in order to sustain the protection. There is a risk that excluding deer and rabbits from one area can increase pressure on others, and in some situations a certain level of grazing or browsing can be desirable.

**13. Tree protection:** The protection of individual, planted trees is usually the least desirable option as it leaves other trees and the ground flora vulnerable to damage. However, it is an appropriate and effective solution where populations are kept sufficiently low that only the most palatable tree species need to be protected.

## Chapter 8: Species conservation



In most situations managing the woodland habitat, to ensure both diversity and continuity, is sufficient to conserve the vast majority of the species making up the woodland wildlife community. However, there are some species that are particularly rare or vulnerable, or whose populations or ranges are declining alarmingly, that merit special attention.

Some such species have specific legal protection under several different Acts, and it is important that managers do not contravene such legislation. Many others listed under section 41 of the NERC Act (for England) BAP priority species, which have targets under the UK Biodiversity Action Plan. Some species groups, such as woodland birds, bats or butterflies, are used as national indices or 'barometers' of overall woodland biodiversity.

For the sake of simplicity in this guidance, the term 'priority or protected species' is used to cover any species which merit special attention. It is important to recognise that there will often be dozens of such species found in each woodland, and it is not practicable to try to ascertain the presence of them all, nor to cater for all their special needs. Managers will have to make a judgement, with input from others, on which are the most significant.

There are plenty of publications giving advice on good practice for many of these species, usually produced by organisations with specialist expertise. The information given below is only a summary, and managers should heed the more detailed published guidance for species relevant to their woodland.

## Outcomes

- A. Legal protection:** Managers have taken the necessary steps to comply with the various pieces of legislation providing protection for different species or groups of species.
- B. Information on priority species:** Managers have taken reasonable steps to ascertain which priority species are likely to be found in the wood and are aware of the published guidance for those present.
- C. Site assessments:** Managers are aware of the habitats and features that are important to the most significant priority species, and have identified where these occur in the woodland.
- D. Reducing or avoiding damage or disturbance:** Activities that could be harmful in the long-term to the populations of priority species have been avoided or modified to reduce the impacts.
- E. Improving the habitat:** Opportunities have been taken to improve the abundance and condition of the micro-habitats and features that are particularly valuable to significant priority species, even if this may involve some short-term disturbance.
- F. Other conservation measures:** Where the survival of a priority species on a site is at stake, and experts agree that special measures are necessary, then providing these are reasonable, managers should ensure they are implemented.
- G. Response to monitoring information;** Managers take account of any reported changes in the populations of priority species in the woodland and if they are not improving, consider other steps they can take.

## Guidelines for achieving outcomes

- 1. Legal protection:** A summary of the most relevant species and groups subject to legislation, and the type of protection provided, is given in appendix 5. The key points from relevant good practice guidance are provided in the appendix, but managers are referred to the full published guidance. Lack of awareness of the presence of the species, or a claim that any disturbance was 'unintentional', are not valid defences under some of the legislation.
- 2. Information:** It is recommended that managers use one or more of the following to make themselves aware of the likelihood of priority species occurring in their woodland:
- Good practice guidance published by Forestry Commission and Natural England on protected species
  - The National Biodiversity Network online ([www.searchnbn.net](http://www.searchnbn.net))
  - HaRRPS (a web-based decision tool for rare, protected and priority species produced by Forest Research)
  - Local Biological Record Centres
  - Local Natural History or Mammal Groups
  - County Wildlife Trusts and local naturalists
  - Specialist organisations and local experts
- Information on rare species must be used carefully and at times kept in confidence to avoid use by people who may harm the species; this is particularly true of birds of prey and badgers.
- 3. Site assessments:** Managers should make thorough assessments in the field to identify obvious areas of habitat, breeding sites and other features (e.g. ponds, badger setts and veteran trees). It is crucial that the presence and location of key features is communicated to operators subsequently working on the site. Hazard tape around key features can be the most effective protection measure of all, but more subtle means may be needed to avoid drawing attention to sensitive sites. Put such warnings in place for the minimum period of time and then remove them.

**4. Expert advice:** In most situations managers are not expected to commission specialist surveys, employ experts or to acquire expert knowledge themselves. Local amateur naturalists can be a very valuable source of advice and detailed information. However, where the site is one of a handful of sites for a nationally rare species it is recommended that managers do seek expert advice.

**5. Species presence:** Confirmation of the presence of a species on the site may not be necessary. If the area is within the expected geographic range of the species, and contains the type of habitat highly suitable for that species, then it could be important. Even if not currently present on that site the wood could be an important habitat for future expansion of the population. If there are past records for that wood or nearby sites, then it may be best for managers to assume the species is likely to be present.

**6. Climate change:** The impacts of climate change on the likely future range of a species should be considered. This may mean some existing strongholds will not be so ideal in the future, and that new areas will need to be made available.

**7. Avoiding damage or disturbance:** Where an operation or activity is going to change the habitat, alter a breeding or nesting site, or could potentially disturb a priority species, it should be modified to reduce or mitigate the impacts. A summary of the specific recommendations for European protected species is given in appendix 5, but in general such mitigation is likely to require one or more of the following:

- Excluding areas from the operations or activities altogether (e.g. leaving areas of low disturbance to which there is no access for walkers with dogs)
- Protecting key features and micro-habitats during operations (e.g. retaining clumps around roost trees or marking long-established piles of deadwood)
- Phasing the operations so that only part of the area is disturbed at a time and is allowed to recover to favourable habitat before the next area is worked (e.g. felling in several coupes over several years)
- Reducing the intensity of the operation or activity (e.g. reducing the number of pheasants in rearing pens)
- Carrying out the activity at a time of year that reduces disturbance (e.g. outside the breeding season)

**8. Improving the habitat:** Reasonable measures should be taken to try to improve the habitat for important priority species, providing this does not jeopardise other objectives. This is particularly important where a population is falling, or the quality of otherwise suitable habitat is in decline. Such measures will commonly include increasing the number or area of suitable habitats and ensuring a supply of new sites or areas are being created into the future.

**9. Other measures:** Occasionally other action may be recommended to ensure nationally important species do not disappear from a woodland. These might include such things as provision of artificial breeding sites, control of predators, fencing or other protection. Providing these measures are reasonable, and have a good chance of working, managers should try to accommodate them.

**10. Monitoring success:** It is not realistic to expect managers to monitor changes in populations of species, especially those that are difficult to identify or record. But if experts, including local amateur naturalists, are able to help, good use should be made of any offers of assistance. Any information on species numbers should be used to gauge whether management is having a positive effect on priority species, and if not, modifications should be made to the regime.

## Chapter 9: Recreational, educational and sporting uses



Woodlands provide opportunities for a wide range of activities, and since ancient or native woodlands comprise nearly half the area of woodland in England it is a major component of this vitally important resource. Ancient or native woodland provides a highly attractive and distinctive environment for many forms of outdoor recreation. Their rich wildlife and ancient history also make them an ideal resource for outdoor education and learning. For some activities, such as bird watching and shooting, the woodland habitat itself is critically important to the activity. For the majority, such as walking, mountain biking and horse riding, the deciduous woodland environment will simply be part of the appeal but will nevertheless enhance the experience.

Most recreational activities are perfectly compatible with growing timber, conserving wildlife and protecting the heritage of the woodland. But almost all recreational activities can be a problem if carried out intensively. Some of the specialist activities can cause disturbance or damage, and even apparently benign activities can have an impact on intensively used sites. It is therefore important that recreational uses are managed with the high environmental value of native woodland in mind.

Managers are referred to other more general guidance on recreation management and public safety in woodlands see section 9 in appendix 1, further reading; the coverage given here is intended to highlight aspects of particular relevance to native woodland. The guidance in this publication is aimed at managers, but users of the woodland are referred to the countryside code and other good practice relevant to each recreational activity (see appendix 1).

Any building, construction or excavation (including new tracks or roads) or change of use will require planning permission or notification as permitted development, and this is not covered by this Practice Guide.

## Outcomes

- A. Access:** Rights of way and other access routes are clear and well maintained, to provide safe and appealing opportunities for the public to enjoy the woodlands.
- B. Activities:** On appropriate sites opportunities have been taken for the woodland to be used for recreation, specialist activities, education and learning, particularly where the distinctive appeal of ancient or native woodland will enhance these activities.
- C. Avoiding damage:** Recreational, educational and sporting uses are undertaken and managed to ensure there is no serious damage or disturbance to the woodland, particularly its wildlife or cultural heritage.
- D. Vandalism:** Reasonable steps have been taken to prevent vandalism and control unwelcome activities which could damage the woodland.

## Guidance for achieving outcomes

- 1. Rights of way:** Managers must comply with their legal obligations, which include keeping the paths free of overhanging vegetation, unobstructed and clear to follow. In native woods on fertile ground this may require relatively frequent cutting to prevent shrubs growing across the paths.
- 2. Other access opportunities:** Ancient and native woodland is particularly valuable for many outdoor recreational activities. Where there are limited opportunities in the locality for people to enjoy the wildlife or heritage of native woodland, managers are encouraged to consider providing for some form of permissive public access or visits.
- 3. Safety:** Where native woods contain large, mature and even over-mature trees near to routes used by people then particular care should be taken to ensure they are reasonably safe. This will require regular inspection and appropriate tree surgery, or where absolutely necessary felling of trees that constitute a severe risk. Fencing and signs around dangerous features, such as unsafe veteran trees, mine workings and old buildings which are being kept for historic or habitat reasons, may well be necessary.
- 4. Infrastructure:** The timeless and natural feel of native woods is a key part of their appeal. Waymarks, signs, and other infrastructure should generally be relatively low-key and where possible use wood or other natural materials. Native woodland can be a challenging environment for some visitors, and whilst respecting its natural character, managers should try to improve accessibility for all and reduce any potential obstacles.
- 5. Education value:** Ancient and native woodlands, with their rich wildlife and long history are particularly valuable for education and community involvement. Where appropriate, initiatives such as outdoor classrooms, community involvement and guided walks should be facilitated.
- 6. Special recreational features:** Native woodland often contains subtle elements or features that can be highly valued by those who visit or use the woodland. These can be very specific and diverse, and include things such as characterful or architectural trees, view points for walkers, rides or canopy gaps for shooting and bumps for mountain bikes. Managers should try, within reason, to protect or sustain any such features, and maintaining a good dialogue with users is usually the key.
- 7. Recreational usage:** Managers should make users of the woodland aware of any codes of good practice they are expected to follow. Owners and managers have a right to expect users to behave responsibly and to comply with the good practice relevant to their particular recreational activity. Where the failure of users to do so results in persistent problems, it is reasonable for any permissive usage to be restricted or curtailed.

**8. Disturbance:** In almost all ancient or native woodlands quiet and informal recreational uses can be accommodated without any adverse impacts. The Countryside Code <sup>4</sup> asks owners to keep dogs under close control, and to ensure that they do not wander where they might disturb birds that nest on the ground or other wildlife. In heavily used or very sensitive areas, the use of dog leads may be encouraged during the breeding season. Where there are high visitor numbers and/or potentially disturbing recreational or sporting activities, 'zoning', path re-routing or appropriate restrictions should be used to protect sensitive areas or species. However, fencing alongside footpaths detracts from the experience of people who use the path and should only be done where absolutely necessary.

**9. Avoiding sensitive areas:** New paths and trails should be carefully routed, and it may even be desirable to re-route existing non-statutory routes, to avoid particularly sensitive parts of the woodland. These might include wetland habitats, vulnerable historic features and areas used by or containing very sensitive priority species (e.g. vulnerable rare plants). Wherever possible paths should be kept a safe distance from veteran trees. In some situations it may be necessary to restrict or discourage access to certain areas during the breeding season or other particularly sensitive times of year.

**10. Vandalism:** The first step in reducing fly-tipping, abandoned cars and unauthorised motorcycles is to modify or restrict the vehicle access points and pull-ins. Tackling problems such as persistent unauthorised use or vandalism is often best addressed by working with local contacts and communities.

**11. Game management:** Shooting and deer stalking needs to be carefully timed and possibly zoned to ensure that it does not constitute a risk to other known users of the woodland. The rearing, feeding and shooting of pheasants, and associated control of predators, should be done in accordance with good practice. The impacts of pheasant shoots in ancient or native woodland should be minimised in the following ways:

- Try to reduce the number of release pens in ancient woodland areas, and avoid locating new ones in areas with a good ground flora;
- Avoid a high density of birds in release pens and feeding areas, and keep the canopy over pens in PAWS well thinned to encourage an understorey.
- Avoid the use of herbicides around pens in ancient woodland, and try not to move such pens very often.
- Avoid spreading straw on long-established rides which have a rich flora
- Encourage pheasants out of the woodland by establishing cover on the woodland margins
- Ensure predator control does not disrupt the balance of the woodland ecosystem
- Conserve the populations of rarer native game species, especially woodcock and brown hare.

<sup>4</sup> The Countryside Code, published by Natural England  
[www.countrysideaccess.gov.uk](http://www.countrysideaccess.gov.uk) revised 2004

Practice Guide

# Glossary and appendices

# Glossary

## **Ancient semi-natural woodland (ASNW)**

Ancient woodland composed of predominantly site native tree species, usually derived from coppice or natural regeneration; the composition may be modified by past management and more recent planting of native species.

## **Ancient woodland**

A classification for woodland which has been in continuous existence from before AD 1600 in England, Wales and Northern Ireland and from before AD 1750 in Scotland.

## **Ancient woodland components**

The ecological and cultural features associated within ancient woodland sites e.g. native tree canopy, ancient woodland ground flora species, specialist faunal and floral communities, veteran trees, archaeological and other historic features etc.

## **Ancient woodland inventory (AWI)**

A provisional inventory containing ancient woodland over two hectares in size compiled in the 1980s and 1990s by the Nature Conservancy Council in England, Scotland and Wales and updated and maintained by its successor organisations in those countries.

## **BAP – Biodiversity Action Plan**

The UK and country plans setting proposals and targets for conserving and enhancing biodiversity.

## **Biodiversity**

The variety of ecosystems and living organisms (species), including genetic variation within species.

## **Broadleaves**

Broadleaved trees and woodlands. In the UK, most have laminar leaves and are deciduous. Often referred to as hardwoods.

## **Buffer**

An area of non-invasive trees or other land use of sufficient width to protect semi-natural woodland from significant invasion by seed from a nearby non-native source or to protect the woodland from pollution from surrounding land use.

## **Clear felling**

Cutting down of an area of woodland (if within larger area of woodland is typically a felling greater than 0.25 hectares). Sometimes a scatter or clumps of trees may be left standing within the felled area.

## **Conifers**

Coniferous trees – also referred to as ‘softwoods’. In the UK, conifers all have needles or scale-like leaves and most are evergreen.

## **Coppice**

Management based on regeneration by regrowth from cut stumps (coppice stools). The same stool is used through several cycles of cutting and regrowth.

## **Coppice with standards**

Coppice with a scatter of trees of seedling or coppice origin, grown on a long rotation to produce larger sized timber and to regenerate new seedlings to replace worn out stools.

## **Coupe**

An area of woodland that has been or is planned for clear felling.

**Cultural features**

Archaeological sites, historic buildings and ruins, historic landscapes, including ancient woodland.

**Ecosystem**

A community of plants and animals (including humans) interacting with each other and the forces of nature. Balanced ecosystems are stable in the long term (hundreds of years in the case of woodlands and wooded landscapes).

**European Protected Species**

Animals and plants (listed on Annex IV of the Habitats Directive) that receive protection under the Conservation of Habitats and Species Regulations 2010, these update the regulations that were first made in 1994.

**Exotic species:** not naturally found in England nor NW Europe, but may nevertheless be naturalising here.

**Felling licence**

Licence issued by the Forestry Commission to permit trees to be felled. With certain exceptions it is illegal to fell trees in Great Britain without prior Forestry Commission approval.

**Frontier species**

A species at or in advance of its defined range. In this Guide, used specifically in the context of climate change adaptation and likely range shifts for native and near-native species.

**Gene-pool**

The collective genetic information contained within a population of sexually reproducing organisms.

**Group selection**

A method of managing irregular stands in which regeneration is achieved by felling trees in small groups.

**Glade**

Small area of permanent or temporary open ground forming an integral part of a woodland.

**Habitat networks**

A configuration of habitat that allows species to move and disperse through a landscape. E.g. a forest habitat network focuses on how woodland species utilise woodland habitat and disperse through this and other habitats in the wider landscape.

**Invasive species**

Usually an introduced non-native species which spreads readily and dominates native species eg Japanese knotweed. Native species can also behave in an invasive manner, dominating other species eg bracken.

**Legally Protected species**

Those protected by the EU Birds Directive, EU Habitats and Species Directive, or Wildlife and Countryside Act 1981 (as amended).

**Minimum intervention**

Management with no systematic felling or planting of trees. Operations normally permitted are fencing, control of exotic plant species and vertebrate pests, maintenance of paths and rides and safety work.

**National Vegetation classification (NVC)**

A comprehensive classification system for vegetation communities in the UK used to describe habitats.

**Native species**

Species that have arrived and inhabited an area naturally, without deliberate assistance by man. For trees and shrubs in the United Kingdom usually taken to mean those present after post-glacial recolonisation and before historic times. Some species are only native in particular regions – hence locally native.

- **Native to England:** a species that occurs naturally within England, though in some cases only in part of the country.
- **Historically native:** a species that would naturally have been found in the past (i.e. in the post-glacial era) in that locality or on that site.
- **Advancing natives:** a native tree species occurring in the area where the species might be expected to be found during the 21st century, taking into account predictions and uncertainties of climate change. They may be historically native to that site, native to England ('advancing species'), or near native but generally excludes exotics.

**Native woodland**

Woodland predominantly made up of tree species that would naturally be found on that site, that is, at least 80% of the canopy comprises species that are suited to that site type and are within the natural range of that species, taking into account uncertainty due to climate change. This definition includes open woodland, pasture woodland and parkland, providing there is, or will shortly be, at least 20% canopy cover. Young woodland where there is currently no canopy qualifies, providing it appears likely to develop into maturing woodland within 10 years. Open space which forms an integral part of a native woodland also qualifies.

**Naturalised**

A species long introduced to an area, which is capable of completing its life-cycle there without human intervention.

**Near native and honorary natives**

those species not naturally and historically native to England, but occurring in Europe, and whose climate space is expected to expand to cover England; those that are already naturalised or naturalising in England and known as 'honorary natives' e.g. sweet chestnut.

**Non-native species**

Species not naturally and historically found in England.

**Old growth**

Old growth forest stands are stands in primary or secondary forests (including wood pastures and parkland) that have developed the structures and species normally associated with old primary woodland of that type that have sufficiently accumulated to act as a woodland ecosystem distinct from any younger age class. In simple terms, old growth has been defined in a UK context as woodland with trees over 200 years old where there is continuity of old trees reaching into the past.

**Old growth features**

Old growth features are those associated with veteran and decaying trees. They include the heartwood of trees, decaying snags, rot holes, sap runs, loose bark, standing, fallen and canopy deadwood, water filled holes in trees and other similar features. Old growth features are particularly important in providing specialist niches for many rare deadwood-specialist invertebrates, lichen communities and cavity dwelling birds and bats.

**Other semi-natural woodland (OSNW)**

Woodland established post AD1600 and composed primarily of native species derived from natural colonisation and regeneration.

**Pesticides**

Any substance, preparation or organism prepared or used, among other uses, to protect plants or wood or other plant products from harmful organisms to regulate the growth of plants; to give protection against harmful creatures; or to render such creatures harmless.

**Plantations**

Woodlands composed of trees of primarily planted origin. In the context of PAWS (see Box 1) 'plantation' most often refers to planted non-native or non site-suited species, whether broadleaf or conifer.

**Plantations on ancient woodland sites (PAWs)**

Ancient woodland site which has been converted to a plantation dominated by non-native broadleaved or conifer species.

**Priority habitats**

Habitats listed under section 41 of the Natural Environment and Rural Communities Act 2006.

**Priority species**

Species listed under section 41 of the Natural Environment and Rural Communities Act 2006.

**Protected species**

Protected species are those covered by Schedules within the Wildlife and Countryside Act 1981, and the Badgers Act etc.

**Provenance**

Location of trees from which seed or cuttings are collected. This term is often confused with origin which is the original natural genetic source

**Recent planted native woodland (RPNW)**

Woodland which has been planted on previously open ground, and which comprises predominantly native trees and shrubs. Where such woodland has been created within the last decade it is often referred to as 'new native woodland'.

**Regeneration**

Renewal of woodland through sowing, planting, or natural regeneration.

**Restocking**

Replacing felled areas by sowing seed, planting or natural regeneration.

**Restoration (of Plantations on ancient Woodland sites)**

At a very simplistic level restoration is a shift from exotic species to native species composition both in the canopy and understorey layer.

**Ride**

Permanent unsurfaced access route through woodland.

**Semi-natural woodland**

Woodland composed of mainly locally native trees and shrubs which derive from natural seedfall or coppice rather than planting.

**Shelterwood system**

Felling a proportion of trees within an area leaving some trees as a seed source and shelter for natural regeneration. The seed trees may be subsequently removed.

**Silviculture**

The techniques of tending and regenerating woodlands, and harvesting their physical products.

**Single tree selection**

A method of managing irregular stands in which individual trees of any size are removed more or less uniformly throughout the stand.

**Small coupe felling**

A small scale clear-felling system. The system is imprecisely defined but coupes are typically between 0.5ha and 2.0ha in extent, with the larger coupes elongated in shape so the edge effect is still high.

**Stakeholder**

Any individual or organisation with a legitimate interest in a specific site or issue.

**Thinning**

Tree removal, which results in a temporary reduction in basal area, made after canopy closure to promote growth and greater value in the remaining trees.

**Thinning to waste**

As above but felled trees retained on site and allowed to decay naturally.

**The Wildlife and countryside act**

The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in Great Britain. It does not extend to Northern Ireland, the Channel Islands or the Isle of Man. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/FFC) are implemented in Great Britain.

**Veteran and ancient trees**

A veteran tree is a tree that is of interest biologically, culturally or aesthetically because of its age, size or condition. Further guidance, including tree features and trunk diameters, is given in appendix 2.

**Windthrow**

Uprooting of trees by the wind.

**Wood pasture and parkland**

Is managed by a long-established tradition of grazing, producing a valuable mix of wooded and grazed habitats. Veteran trees are common features and, depending on the degree of canopy cover, other semi-natural habitats, including grassland, heath and scrub may occur in mosaic with woodland. This definition encompasses some historic parks that have reverted, or been actively converted, to complete canopy woodland, but nevertheless retain the communities and historic features associated with their parkland past. Strict definitions are unhelpful and in reality there is a continuum of woodland types ranging from very open pasture, or 'treescapes', to closed canopy grazed woodland.

# Appendix 1: Further Reading

Forestry Commission publications are available on the Internet via [www.forestry.gov.uk/publications](http://www.forestry.gov.uk/publications) or from Forestry Commission Publications, PO Box 501 Leicester, LE94 0AA, T/F: 0844 991 6500, e-mail [forestry@mrm.co.uk](mailto:forestry@mrm.co.uk)

Publication codes for Forestry Commission publications are given below. Please quote these when ordering.

Woodland Trust publications are available as free downloads from [www.woodland-trust.org.uk](http://www.woodland-trust.org.uk)

## **Policies, strategies and other core publications Defra/Forestry Commission England**

The Coalition: our programme for government  
<http://programmeforgovernment.hmg.gov.uk/> (2010)

Keepers of Time; a Statement of Policy for England's Ancient and Native Woodland <http://www.forestry.gov.uk/keepersoftime> (2005)

The UK Forestry Standard: The Government's Approach to Sustainable Forestry (Guidelines series which form part of the UKFS are currently being revised). Forestry Commission (FCFC001)

Defra (2002) Working with the grain of nature: a biodiversity strategy for England <http://www.defra.gov.uk/wildlifecountryside/biodiversity/biostrat/>

Defra (2007) A Strategy for England's Trees, Woods and Forests <http://www.defra.gov.uk/wildlife-conservation/rddteam/forestry.htm>

Biodiversity: the UK Action Plan (Cm2428) HMSO, 1994 [www.ukbap.org.uk](http://www.ukbap.org.uk)

Sustainable Forestry: the UK programme (Cm2429) HMSO, 1994

Harmer, R., Kerr, G. and Thompson, R. (2010) Managing native broadleaved woodland. The Stationery Office, Edinburgh. [www.tsoshop.co.uk](http://www.tsoshop.co.uk)

Climate Change – Impacts on UK Forests. Forestry Commission, Bulletin (FCBU125)

The Management of Semi-Natural Woodlands series:

Lowland Acid Beech and Oak Woods. Forestry Commission Practice Guide (FCPG001)

Lowland Beech-Ash Woods. Forestry Commission Practice Guide (FCPG002)

Lowland Mixed Broadleaved Woods. Forestry Commission Practice Guide (FCPG003)

Upland Mixed Ash Woods. Forestry Commission Practice Guide (FCPG004)

Upland Oakwoods. Forestry Commission Practice Guide (FCPG005)

Upland Birchwoods. Forestry Commission Practice Guide (FCPG006)

Native Pinewoods. Forestry Commission Practice Guide (FCPG007)

Wet Woodlands. Forestry Commission Practice Guide (FCPG008)

Restoration of native woodland on ancient woodland sites. Forestry Commission Practice Guide (FCPG014)

Read, H. (2000) Veteran Trees – A Guide to Good Management. English Nature, Peterborough. Free download: [www.english-nature.org.uk/pubslink.htm](http://www.english-nature.org.uk/pubslink.htm)

Read et al. 2009. Combating climate change – a role for UK forests. An assessment of the potential of the UK's trees and woodlands to mitigate and adapt to climate change. The main report. The Stationery Office, Edinburgh. [www.tsoshop.co.uk](http://www.tsoshop.co.uk)

## Chapters 1 and 2: assessment, monitoring and management planning

Nearest Neighbour Method for Quantifying Wildlife Damage to Woodland. Forestry Commission Practice Note (FCPN001)

Practical techniques for surveying and monitoring squirrels. Forestry Commission Practice Note (FCPN011)

Monitoring vegetation changes in conservation management of forests. Forestry Commission Bulletin (FCBU108)

How many deer? A guide to estimating deer population size. Forestry Commission Field Book (FCFB018)

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Controlling Grey Squirrel Damage to Woodlands. Forestry Commission Practice Note (FCPN004)

Managing deer in the countryside. Forestry Commission Practice Note (FCPN006)

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The Countryside Code, published by Natural England [www.countrysideaccess.gov.uk](http://www.countrysideaccess.gov.uk) revised 2004

# Appendix 2: Veteran Tree identification

A veteran tree is a tree that has a large diameter trunk for its species and shows 3 or more of the growth and decay characteristics listed in Read 2000, section 2.1.1, pp14

Diameter is used as a surrogate for age, (see table below for appropriate sizes) but veterans may also be younger trees that have the same characteristics as old trees due to disease or damage (e.g. lightning strike), truly ancient trees can be differentiated from these by significant (natural) crown dieback and significant hollowing of the trunk. They may also be of a significantly greater size class than those suggested below.

Characteristic features of veteran trees taken from Read, H. 2000. Veteran Trees - A guide to good management:

- girth large for the tree species concerned;
- major trunk cavities/progressive hollowing;
- naturally forming water pools;
- decay holes;
- physical damage to trunks;
- bark loss/loose bark;
- large quantities of dead wood in the canopy;
- sap runs;
- crevices in the bark, under branches or in the root plate sheltered from direct rainfall;
- fungal fruiting bodies (e.g. from heart rotting species);
- high number of interdependent wildlife species;
- epiphytic plants;
- an 'old' look;
- high aesthetic interest.

In addition a tree may also:

- have a pollard form or show indications of past management;
- have a cultural/historic value;
- be in prominent position in the landscape.

Minimum sizes for a tree to be veteran. Diameter at Breast Height (DBH) classes are adapted from Mauld environmental & FCS (2010) and Castle & Mileto (2005).

Species	Dbh (cm)
Birch, Aspen, Hawthorn, Hazel	50
Field maple, Rowan, Holly, Cherry, Goat willow Grey willow, Hornbeam	75
Scot's pine, Alder	80
Oak, Ash, Yew	100
Sycamore, Lime, Horse chestnut, Elm Poplar, Beech, Other willows, Other conifers Sweet chestnut	150

# Appendix 3: Assessing woodland ecological condition

Whilst a full assessment of woodland condition is not a requirement practitioners might find the following checklist useful which is based on the five key aspects of ecological condition adapted from the standard condition assessment for Sites of Special Scientific Interest. Some of the most important features that are observed in the field are listed as bullets each attribute.

## **Extent (area)**

This requires an assessment of the boundaries of the wood or stand to check for losses or changes in land use within the wood.

1. Any loss of woodland since last assessment.

## **Structure and natural processes**

This covers the vertical structure (i.e. the canopy and under-storey layers) and the age structure (including deadwood). It also covers the horizontal structure (i.e. the mosaic of different stand ages and woodland habitats within the wood).

1. Understorey density and vigour.
2. Canopy cover and structure/layers, in relation to the character, history, particular values and objectives of the woodland.
3. Deadwood abundance, type, size and location.
4. Veteran trees, their condition and health.

## **Regeneration**

The abundance and species composition are relevant as well as prediction of likely regeneration success.

1. Evidence of tree and under-storey regeneration, through coppice re-growth and/or seedlings.
2. The proportion of any restocked area being regenerated by planting.
3. The provenance of any trees being replanted.
4. Damage to seedlings and saplings e.g. from browsing or disease.
5. Assessment of whether regeneration is in sufficient density to regenerate the canopy over time.

## **Species Composition**

The composition of the canopy and under-storey in relation to the site characteristics and the history of the site.

1. The proportion of native or accepted site-native species in the canopy and under-storey.
2. Is their relative abundance appropriate to that woodland type and site?

## **Quality indicators**

A range of factors are covered under this heading, including non-woodland habitats, notable species and other special features of the individual woodland e.g.

1. Ground flora composition (measured for example by NVC type).
2. Wet flushes and watercourses.
3. Priority or other rare species.

# Appendix 4: Recommended management plan structure

This structure is consistent with the English Woodland Grant Scheme, UK Forestry Standard and UK Woodland Assurance Scheme. The detail and length of any management plan will be related to the size of the wood and the complexity of the objectives.

## **Background information**

1. Location
2. Description of woodland in the landscape
3. History of management

## **Woodland information**

1. Areas and features
2. Woodland resource characteristics (e.g. timber, woodfuel, non-timber forest products)
3. Site description
4. Significant hazards, constraints, trends and threats

## **Long term vision, management objectives and strategy**

1. Evaluation of the important features of the woodland
2. The desired state for the woodland
3. The benefits which it is hoped the woodland will provide
4. The long term overall objectives – including silvicultural system(s) for achieving these

## **Management prescription/operations**

### **Consultation**

### **Monitoring proposals**

### **Work programmes**

1. An outline of the long term work programme
2. Short term work programme

### **Maps**

The EWGS management plan template can be found here:  
[www.forestry.gov.uk/pdf/plan-template.doc/\\$FILE/plan-template.doc](http://www.forestry.gov.uk/pdf/plan-template.doc/$FILE/plan-template.doc)

The UKWAS guidance on management plans can be found here:  
[www.ukwas.org.uk/standard/certification\\_standard/standard/documentation.html](http://www.ukwas.org.uk/standard/certification_standard/standard/documentation.html)

## Appendix 5: Legally protected species

Introduction to management of ancient and native woodland with some protected and priority species.	
<b>Bats</b>	<ul style="list-style-type: none"> <li>• Protect existing trees or buildings confirmed as roosts and buffer to avoid significant change in their micro-climate or levels of disturbance</li> <li>• Protect as many potential roosts as possible, and only disturb a small proportion at any one time</li> <li>• Retain belts of trees and linear woodland as corridors for bats</li> <li>• Retain some undisturbed areas of old growth</li> <li>• Seek expert advice if rare species such as Bechsteins or Barbastelles are suspected of being present</li> </ul>
<b>Dormice</b>	<ul style="list-style-type: none"> <li>• Work in areas which are good dormice habitat in the late autumn or winter</li> <li>• Avoid felling more than a third of such habitat in any five year period (less in smaller woods)</li> <li>• Avoid coppicing more than a quarter of the area of coppice in any one year</li> <li>• Avoid thinning more than two-thirds of the good habitat in any one year</li> <li>• Use a forwarder for timber extraction rather than skidder</li> <li>• Only mow existing short rides and verges</li> <li>• Cut scrub in the winter, and only a small proportion each year</li> <li>• Route new tracks around areas of good habitat, and leave bridges across rides</li> </ul>
<b>Great crested newts</b>	<ul style="list-style-type: none"> <li>• Only work 25% of the area within 100m of a newt pond in any one 5 year period</li> <li>• Do not stack wood which is to be removed within 100m of a newt pond</li> <li>• Use a forwarder rather than a skidder near to a newt pond</li> <li>• Do any brash treatment straight after felling, but don't rake up at all near a pond</li> <li>• Only mow a small proportion of the grassy habitat within 100m of a newt pond in any one year</li> <li>• Avoid constructing any tracks close to a pond.</li> </ul>
<b>Otters</b>	<ul style="list-style-type: none"> <li>• Within 50m of a watercourse used by otters identify all potential holts (old trees, patches of scrub, deadwood) and avoid operations within 50m of these</li> <li>• Within the 50m riparian corridor ensure only a minority of the area is felled at a time, and phase thinning or coppicing over several years</li> <li>• Extract timber away from the river and if brash is to be removed, do so promptly</li> <li>• Timber stacked or brash left in riparian areas should be kept as potential holts</li> <li>• Ensure any new fencing in the riparian corridor is not an obstacle to otters</li> <li>• Avoid new recreational usage or infrastructure within 100m of otter holts</li> </ul>
<b>Badgers</b>	<ul style="list-style-type: none"> <li>• Try to avoid harvesting near setts during the breeding season: Dec – June.</li> <li>• Keep machinery at least 20m away from entrances to occupied setts</li> <li>• Take care not to block entrances when felling trees beside them</li> <li>• Retaining clumps when felling and leaving areas around a sett unthinned is not recommended</li> <li>• Do not heap lop and top or brash near setts</li> <li>• Locate any new tracks, trails or recreational infrastructure a good distance away from the sett</li> </ul>

# Appendix 6: Links to UKWAS

## Chapter 1

The sections of the UK Woodland Assurance Standard that are particularly relevant to woodland assessment and monitoring are:

- 2.2.4, Productive potential
- 2.3.1-5, Implementation and revision of the plan

## Chapter 2

The sections of the UK Woodland Assurance Standard that are particularly relevant to management planning are:

- 2.1.2 Management planning - documentation
- 2.1.3 Management planning - documentation
- 3.1.3 Assessment of environmental impacts

## Chapter 3

The sections of the UK Woodland Assurance Standard that are particularly relevant to woodland structure and harvesting are:

- 3.4.2: Felling rates in plantations
- 3.4.3: Use of low impact silvicultural systems and felling rates in semi-natural woods.
- 4.2.2: Harvesting operations
- 4.2.3: Treatment of lop and top
- 6.2.1: Natural reserves and long term retentions
- 6.2.2: Deadwood
- 6.3.1: PAWS: improvement, restoration, felling plans and operations

## Chapter 4

The sections of the UK Woodland Assurance Standard that are particularly relevant to tree species composition are:

- 3.3.2 - Species selection
- 6.3.3 - Conservation of semi-natural woodlands and plantations on ancient woodland sites

## Chapter 5

The sections of the UK Woodland Assurance Standard that are particularly relevant to restocking are:

- 3.3.2 Species selection
- 3.4.2 Silvicultural systems
- 5.1.1 Planning

## Chapter 6

The sections of the UK Woodland Assurance Standard that are particularly relevant to open areas within woodland are:

- 3.3.2 Species selection

## Chapter 7

The sections of the UK Woodland Assurance Standard that are particularly relevant to species management are:

3.3.4 Species selection

5.1.2 -4 Planning

## Chapter 8

The sections of the UK Woodland Assurance Standard that are particularly relevant to species conservation are:

3.3.4 - Species selection

5.1.2 - 4 Planning

## Chapter 9

The sections of the UK Woodland Assurance Standard that are particularly relevant recreation, educational and sporting uses are:

7.1 Community consultation

7.2 on public access in the Standard.



Managing ancient and native woodland in England has been produced by Forestry Commission England as an aid to forestry and woodland managers working with ancient and native woodland. It brings together current good management practice to ensure these important woodlands are sustained for the future.

Our ancient and native woodlands are one of our oldest land uses and most diverse ecosystems. They have often taken centuries to develop, and for generations they have been an essential source of timber, fuel, coppice products, venison and other sustainable products. They are a vitally important component of the English landscape and every one has it's own long and fascinating history.

This guide gives guidance on all the key issues facing managers of ancient or native woodland:

- how conservation can be totally compatible with harvesting timber and woodfuel
- how to help ancient and native woodland adapt to a changing climate and reduce the risks from pests and diseases
- which is the best way to restore plantations on ancient woodland sites (PAWS)
- new recommendations on natural regeneration, tree spacing and provenance
- how to conserve the habitats of rare and protected species



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