Practical guidance
Module 1

Ancient woodland restoration

Introduction to the Principles of Restoration Management

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WOODLAND TRUST

Contents

Owning or managing an ancient wood means being a steward of a unique and precious part of our natural and cultural heritage. It brings with it the responsibility of ensuring that it is secured for the future.

All ancient woods are unique and face varying challenges: from the legacy of historical land management practices to the pressures of current and emerging threats.

Ancient woodland restoration is always a long-term process and must be adaptable to this constantly changing backdrop.

It's not an aspiration to return a woodland to some past condition. It's about looking ahead to restore and maximise the ecological integrity and resilience of these incredibly special places.

This guide is the first in a series of publications on ancient woodland restoration. It sets out the thought processes underlying ancient woodland restoration in recognising that all ancient woods are unique and require different management. The thought processes and management outlined in these guidance publications can also be applied more broadly to managing any woodland.

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Ancient woodland: why I should protect and restore

Ancient woods are scarce in our landscape and yet embedded in our cultural and natural heritage. Restoration recognises the multiple challenges that ancient woods face today, from climate change to intensive land use and the need for woodlands to be adaptable and resilient against this constantly changing backdrop. While the ultimate aim of restoration is to maximise the ecological integrity of these wooded ecosystems, it recognises that landowners have different objectives, and a pragmatic approach can often ensure irreplaceable ancient woods are secured for the future alongside the delivery of other outcomes.

Ancient woodland and restoration management

Ancient woodland is a descriptive term used to group woods that share centuries of continuity on largely undisturbed natural soils. They encompass many different native woodland types, from mixed broadleaved woods and beechwoods in the lowlands of the south and east, to woods of oak, birch and Scots pine in the north and west.

This concept and classification of ancient woodland is critical to identifying woods of high biodiversity value and helps guide practical efforts towards halting further loss or degradation.

Around half of all ancient woodland has been cleared and replanted with introduced tree species, often as dense even-aged plantations. These are known as Plantations on Ancient Woodland Sites (PAWS). Many more suffer from invasive plants and woody shrubs, such as rhododendron, or other damaging impacts.

This introduction of exotic and invasive species has had a detrimental and disrupting effect on native woodland biodiversity and ecological functioning. However, these woods still retain valuable remnant biological and cultural features from their past. These are the building blocks for restoration. They include:

- woodland specialist plants
- relic deadwood and stumps
- pre-plantation and relic native trees
- archaeological and cultural remains

Although these ancient woodland remnants are a focus and help to guide the early phases of restoration management, they are only visual expressions of a much more complex woodland ecosystem.

Various impacts result in these surviving ancient woodland remnants being under threat. Careful restoration management can secure and enhance the remnants of ancient woodland, and build its ecological integrity and resilience.

Biodiversity value

Ancient woodland has evolved into a complex array of ecological communities of interdependent plants, animals and fungi, including invertebrates and soil micro-organisms rarely found in younger woods. Each wood is unique, having developed according to its local environment, soils, and management over many centuries.

Ancient woodland and PAWS represent fragments of a dynamically changing landscape, which is now more intensively managed than in the past, especially in the lowlands. In the uplands, grazing pressure and browsing by deer threatens the existence of the diminishing ancient woodland, preventing natural mobility in the landscape. These woods often hold the last vestiges of species that can no longer move easily through the landscape.

The natural environment, and particularly woods and the species that rely on them, are subject to rapidly increasing pressure from climate change, air pollution and a new suite of pests and diseases affecting a range of tree species.

The restoration of wooded ecosystems makes them more robust and increases connectivity and permeability across landscapes. This allows natural processes to adapt in the face of rapid environmental change.

Cultural value

Ancient woods can also be treasure troves of archaeological and cultural features that give insight into historical land use.

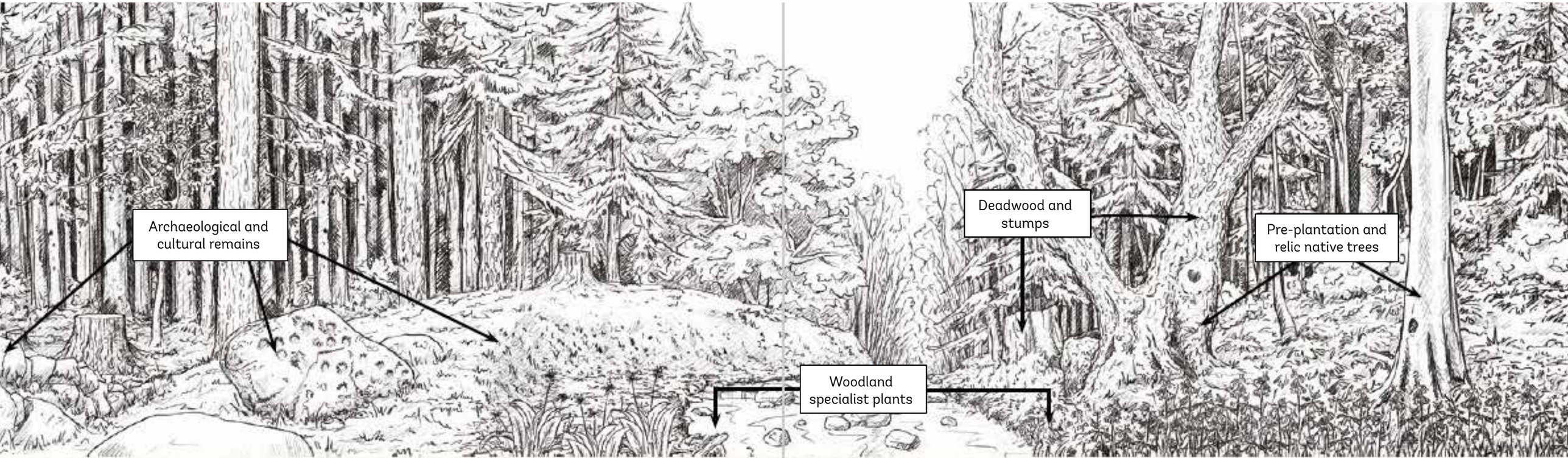
They frequently hold clues to our past: anything from Bronze Age hillforts to the rough shelters of charcoal makers. Old boundary features, such as medieval woodbanks, or simple dry stone walls and stock shelters, show the ebb and flow of land use over the ages. Clues to previous woodland use can be found in old coppice stools, charcoal hearths and other remnants of early industry, showing the extent to which our ancient woodlands were utilised in the past.

Economic value

The restoration management of ancient woodland can often involve the production of timber and woodfuel in addition to a wide range of other benefits. These can all have a positive economic benefit and deliver important management objectives.

Restoration management can often be adapted in pragmatic ways to fit with commercial reality and continued economic aspirations. Solutions can be found, taking biodiversity and timber production into account. Both can usually exist side by side. Restoration management brings timber to market, can often improve timber quality, and produces other non-timber forest products and services.

Restoration management of PAWS is enshrined in the UK Forest Standard (UKFS) which underpins government grant schemes. Adhering to these standards, or those of the independent UK Woodland Assurance Standard (UKWAS) for certified properties, ensures eligibility for grant support.



The concept of restoration management

Five key principles to guide restoration practice:

1. Ancient woods are complex and irreplaceable ecosystems. Where damaged, they require positive restoration management.

2. Without restoration management, damaged ancient woods (eg those planted with non-native trees) may become irreversibly degraded over time.

3. Restoration starts from the basic premise that all damaged ancient woodlands are likely to retain some remnants of the rich ecological and archaeological value that previously flourished.

4. Surviving biological remnants are often adapted to the conditions and seasonal shade of native woodland. These remnants respond positively to management of light levels.

5. Restoration management is a long-term process, but there is an urgency to start in many situations where remnant features are in a critical condition, to ensure no further degradation occurs.

Restoration aims to develop future ecosystems with greater ecological integrity. These may have similarities to historic communities, but this is not the aim of management. The process of restoration should not be seen as turning the clock back to some point in history.

Restoration is a long-term strategy. There is an important emphasis on not rapidly replacing a plantation crop with native trees. The rapid and extensive removal of introduced conifers or heavy shade-casting plantation broadleaves (eg beech) followed by restocking of native trees, may give an impression of a quick win. But this does not achieve the restoration of ecological integrity. It presents risks to remnant features and fails to maintain ecological functions and processes.

But it should not be assumed that there is no role for more rapid transformations. This can be unavoidable due to various practical constraints, or where certain management may be economically unviable. The rapid removal of some threats, such as invasive species, is often vital.

Practice

Summary of our approach

The approach to restoration is based initially on reducing immediate impacts to remnant ancient woodland features in a critical condition. Typically, this will include targeted 'first-aid' management to halt any further decline in the most critical areas.

This is followed by the recovery of the woodland ecosystem through the wider transformation of threatened stands. Often the most appropriate way to achieve this is through long-term, gradual change and the management of light levels while controlling other risk factors, such as herbivore impacts, and managing regeneration. It is this part of the process where owners' objectives influence decisions most, and where appropriate management systems can support the recovery of the woodland ecosystem and deliver on other aims. But it is vital to ensure that remnant features never regress into critical condition.

The ultimate aim of ancient woodland restoration is the transformation to a native woodland composition, and the rebuilding of ecological integrity. This can only be maximised by developing missing features, such as old-growth characteristics, appropriate levels of dynamism and disturbance, and considering how any individual wood influences, and is influenced by, what is happening in the wider landscape.

Assessment of remnants and threats

Restoration management is always informed by an assessment process. This identifies and records important features, their condition and threats, so action can be prioritised. By repeating assessments, it is possible to observe how a woodland is changing and how restoration is progressing. The survey and assessment process is covered in detail in Module 2 of this guidance series.

The main four categories of ancient woodland remnants used in the assessment process are: specialist woodland plants, relic deadwood and stumps, pre-plantation and relic native trees, and archaeological remains. As part of the survey and assessment process, these are assessed for their distribution, abundance, and the associated threat factors.

These four key remnant features are all fairly easily identifiable and are valuable proxies for more subtle or difficult to identify biological remnants. This makes the task of assessing woodland possible without too much specialist knowledge. While the identification of more cryptic remnants (lichens, invertebrates, etc) may require specialist skills, an appreciation of the likelihood of their presence is important, and understanding their needs may have a bearing on decision-making in terms of appropriate restoration management. A precautionary approach should always be taken.

Typically, threats to remnants often include the continual imbalance of light levels, as excessive shading from introduced species, or too much light as a result of rapid removal of trees for example, resulting in coarse vegetation dominance. There may be other threats which play a part in their deterioration.

It should be remembered that while no remnants may be visible on the woodland floor in some sites, and at certain times of year, there is often latent survival of plant material such as seed banks, bulbs and rhizomes, as well as fungi, which is invisible for most of the year.

Soils in ancient woodland must never be overlooked. The protection of soil on these sites is a vital element of management decision-making. Damage to soil profiles through any new disturbance, such as unplanned or excessive timber extraction routes, should be considered a threat.

Restoration strategy and planning

The presence of a threat to a particular suite of remnants should trigger an appropriate management response. Gradual change is particularly important in the first phase of restoration as it avoids high-impact operations and sudden changes when remnants are at their most vulnerable.

Given this assessment of remnants and threats, we can assign a threat level – **critical**, **threatened**, or **secure** – to create a prioritised **restoration strategy** to feed into a long-term management plan. The threat assessment should be reviewed as a matter of course at the time of management plan renewal at least every four to five years, with the ongoing sureveillance of threat guiding management interventions in response.

[1]Restoration management is always informed by an assessment process. This identifies and records important features, to prioritise action.
Photo: Laura Shewring/WTML.

Three phases of restoration

Dependent on the levels of threat identified within a wood, we classify restoration management as three different work phases. The three phases do not need to run sequentially but can overlap in practice as a wood is gradually improved and monitored.

Phase one: halting further decline

For ancient woodland sites in the most critical condition, there is an urgent need to stop further decline. 'First-aid' management is essential to maintain and protect what remains. This is reactive and usually highly targeted. It could include felling selected plantation trees around remnant features (eg halo thinning), or removing dense, invasive non-native plants covering the ground.

In all circumstances, irrespective of what subsequent wider management intervention is carried out through phase two, all critical remnant features should generally receive some focused phase one management. It is about giving these remnants – be they an overtopped veteran oak or a struggling hotspot of flora – the space to steady themselves before a wider stand intervention; whether that is continuing to thin and adopt gradual phase two methods or a more rapid wider stand transformation where this is required.

It is sometimes possible and most practicable to combine the more targeted phase one interventions with wider phase two forestry interventions. However, it is vital that planning for phase two management does not take precedence over any essential operations required to maintain critical features where these occur. It can take a long time to plan and set-about undertaking a more extensive operation, and during this time there is a risk that any critical features may further decline.

Critical sites should be dealt with as a priority to ensure irreplaceable remnant features are not lost. This is supported by UKFS, which states: "The minimum required is to ensure remnant features are retained." Work should continue until remnant features are judged to no longer be in a critical condition, and are considered robust enough to benefit from a wider intervention. 'First-aid' interventions like halo-thinning are not a one-off. They buy more time, but follow-up management is always required to maintain these features and ensure they never regress back into critical condition.

More detail about the vital first phase restoration is provided in Module 3 of this guidance publication series.

Phase two: recovery of the wider ecosystem

Phase two is the long-term process of restoring a wider woodland ecosystem. Identified threats to remnants must be continually managed and reduced. While an area may not be considered critical, the woodland remains under threat, and this phase is about progressing from threatened to a secure condition over an appropriate timescale. Often this is achieved over the long-term.

A considered approach is important throughout phase two restoration. In many situations, continuing with gradual restoration methods will be most appropriate. These can involve the selective and irregular removal of trees to create more complexity and variation. The aim is successively shifting towards a woodland composition and structure that is predominately site-native in character. Promoting and recruiting native trees is a key part of phase two, and its occurrence is a signal that phase two is progressing. This represents a need to think beyond remnant features alone. Sometimes gradual phase two methods can be operationally impractical, and a more rapid or extensive transformation may be required. Numerous constraints or other factors can also influence this.

'Gradual' never implies a lack of urgency with phase two. There is often a need to press on with restoration through this phase. Wider ecosystem recovery can only be achieved through regular or continual management. Without this, there is a risk that remnant features could regress into critical condition or even be lost. Gradual phase two restoration also never means different areas or compartments being dealt with one-by-one. Rather, it is the progressive transformation of entire stands and woodlands.

This complex phase of restoration is covered in considerable detail in Module 4 of this practical guidance series.

Questions to consider are:

- Have phase one actions worked; are the features robust?
- Is regeneration of native trees and shrubs forthcoming after thinning? What other factors (eg herbivore pressures) may be influencing this?
- Are there adequate seed sources for natural regeneration, or is planting required?
- Is the current stand likely to survive long enough to effect a gradual change?
- If pursuing a timber objective, is this realistic in terms of access etc?
- Are there any constraints in terms of tree disease or wind stability that will impact on plans?
- What silvicultural systems are appropriate to maintain woodland biodiversity?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Phase three: maximising ecological integrity

This phase is relevant to all ancient woodland sites that have undergone a longer-term restoration process (ie through phase one and two). While these may now be 'secure', more is required to build ecological integrity. Restoration is never complete with canopy-cover species transformation, and these should never be considered restored.

It is equally relevant to ancient woodlands which may not have suffered such significant historical impacts, as well as to other non-ancient woods and treed ecosystems. This will develop their richness, and consider their role in the integrity of wooded landscapes as a whole.

Phase three is about about considering what is still missing, and working to regain these over the long-term. It is as much about consciously setting a trajectory as it is after immediate results. This is framed around several key aspirations, such as the need for more old-growth characteristics, better disturbance, dynamism and space, and better physical health. It considers woodland sites much more in the landscape context, as part of achieving better treescapes. Consideration to reintroductions and translocations is also part of this phase.

Careful thought is given to the importance of continuing with active and ongoing sustainable woodland management alongside what can be achieved through more passive or natural process-driven approaches.

The aspirations for phase three restoration are detailed in Module 5 of this guidance publication series.

What is the long-term vision for the woodland, and how does this sit in the wider landscape-scale?

- What is still missing (eg ancient trees, large standing and fallen decaying wood, open glades), and how can long-term planning help to ensure more of these features occur?
- How can ongoing management and silvicultural activity continue to enhance the woodland's value to biodiversity, and how can the wood be more self-regulating?
- What external factors are impacting on the woodland (climate, pests, disease, air pollution), and can these be addressed through management?


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Future

Restoration, and the long-term management of ancient woodlands, needs to be part of everyday, sustainable forestry practice. This is important because restoration improves biodiversity, enhances the resilience of ecosystems at a landscape scale, and produces economic benefits and vital environmental services in the face of climate change.

It shouldn't be forgotten that all woods are dynamic ecosystems in a changing environment. Nature is adaptive. It ebbs and flows with disturbance and its intensity of change. Given that the levels of fluctuation and change are increasing rapidly, it is inevitable that our ancient woodlands will have to adapt over time. These are old woodlands with new trajectories. But these woodlands cannot be considered in isolation, and the increased integrity, dynamism and permeability across wider treed landscapes is essential.

Restoration management will aid this process and adapt to new and increasing challenges now facing ancient woodland, along with the woodland sector as a whole. Ancient woodlands can't be restored single-handedly. It is important that organisations, forestry professionals, landowners and managers all work together on restoration projects across the UK.

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