



Reclaiming our forgotten inheritance

The race to save Britain's hidden woodland treasures



The Woodland Trust
Campaigning to keep woodland alive

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The Woodland Trust is the UK's leading woodland conservation charity. It is working to prevent further loss of ancient woodland, and to restore and improve the biodiversity of woods by acquiring native and ancient woodland and managing it appropriately, by planting new native woodland and through a wider advocacy role. Established in 1972, the Woodland Trust now has over 1,000 sites in its care covering over 18,000 hectares (46,000 acres). Around 360 of these sites contain or comprise ancient woodland, over 6,000 hectares (15,000 acres) in total.

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This page: "...hundreds of thousands of hectares of Britain's beautiful and irreplaceable ancient woodland were felled and replanted, mostly with commercial conifers..." Archie Miles/WTPL

Facing page: "We need action on a national scale to restore nature's cathedrals..." Tom Curtis

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Summary

Priceless treasures have lain buried and forgotten for decades in more than a quarter of Britain's ancient woods. The key to reclaiming these jewels of the natural world lies within our grasp, but unless we act now we will lose them for ever.

Between the 1930s and 1980s, hundreds of thousands of hectares of Britain's beautiful and irreplaceable ancient woodland were felled and replanted, mostly with commercial conifers, or a mixture of conifers and broadleaved trees. This well-intentioned government strategy to make Britain more self-sufficient in timber had dire consequences for wildlife. Whole fragile ecosystems were devastated, and since then remnants of the unique communities of plants, animals and fungi that depend on ancient woodland have clung to life in isolated pockets within dense plantations.

Research commissioned by the Woodland Trust, the UK's leading woodland conservation charity, shows that we must start to restore replanted ancient woods **immediately**, before the opportunity is lost.

The research, led by Oxford University's Forestry Institute, found that in the next 10 years most of the conifers planted on ancient woodland sites will reach economic maturity. If they are felled and replaced with more conifers, then the wildlife dependent on ancient woodland will not survive.

There is a choice. If last century we had allowed our ancient buildings and monuments to be clad with pebble-dash, the Government would now almost certainly be leading a nationwide initiative to save and restore them to their former glory. Yet in an opinion poll conducted by the Woodland Trust, 90 per cent of those interviewed considered ancient woodland to be as important to our national heritage as castles and cathedrals.¹ We need action on a national scale to restore nature's cathedrals and the treasures hidden within them. It might seem a mammoth task, but is in fact a unique opportunity, one of the most significant actions we can take to help woodland wildlife in Britain to survive in the face of accelerating climate change.

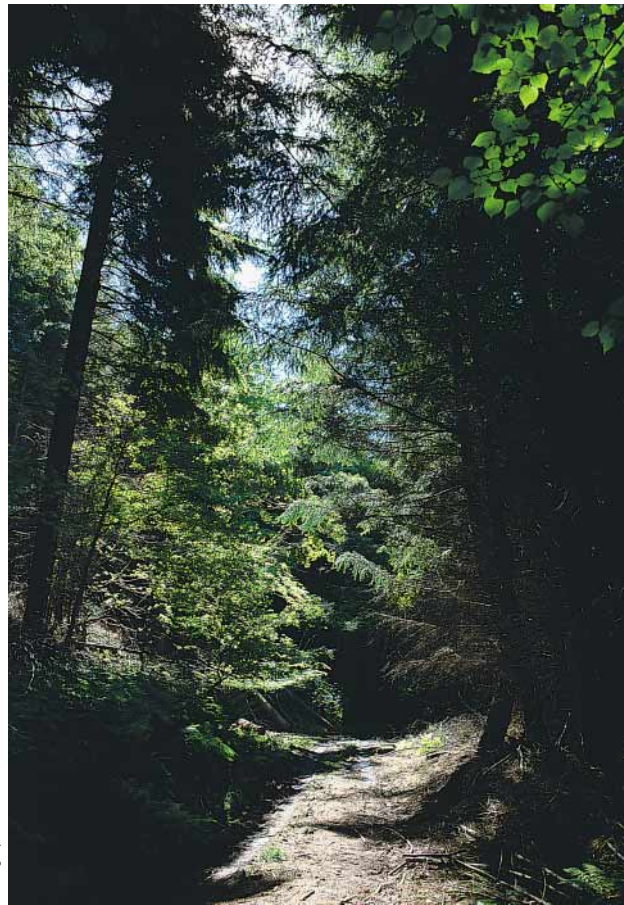
Just as one would not bring in bulldozers to restore St Paul's Cathedral, so planted ancient woods need



To prevent the potential permanent loss of wildlife in a third of Britain's ancient woods the Woodland Trust is calling for:

- The Government to enable Forest Enterprise to commit to restoring all its ancient woodland sites planted with conifers and in doing so act as a catalyst by setting an example to other landowners
- The Forestry Commission, in its current reviews of incentives for woodland management in England, Scotland and Wales, to give high priority to restoration of conifer planted ancient woodland sites, and to target incentives for restoration to give maximum benefit to biodiversity
- The Forestry Commission to adopt a policy to restock all conifer planted ancient woodland sites with native species
- The Government to review the UK Forestry Standard² to reflect the importance and priority of restoring conifer plantations on ancient woodland sites
- The UK Woodland Assurance Standard³ for certification of sustainably produced timber to be reviewed to reflect the findings of the research
- The restoration targets enshrined in the UK native woodland Habitat Action Plans⁴ to be re-defined to reflect the need to conserve the communities of species which are characteristic of ancient woodland.

“This research... shows we must seize the opportunity now”



Photograph: Archie Miles/WTPL

sensitive handling. The research found that in most cases the work will need to be carried out over many years, if not decades, or it will destroy the very features we are seeking to restore. The sooner restoration starts the better, so that the work can be phased to limit disturbance and allow the ancient-woodland ecology a chance to recover and keep pace rather than be erased by rampant weed growth. Every planted ancient woodland site is unique. For each the restoration work will need to be tailored to its special characteristics. It may be a long, slow process, but the end result will be better for wildlife. What about the cost, however? The research rebuts the traditional argument that restoration will always be financially disastrous for woodland owners. Detailed economic analyses show that, given current low conifer timber prices, some woodland owners would actually make a profit in the long term by restoring their planted ancient woodland sites. Some good quality broadleaved trees can be as profitable as conifers. Even where there is a cost, the

losses would not be enormous. In addition, gradual restoration turns out to be more profitable than the ‘quick-fix’ approach of clear-felling and replanting with native trees.

This all sounds great news for woodland wildlife, but in reality it may not be so easy to achieve restoration. How can we persuade woodland owners to restore planted ancient woodland sites if they cannot afford to wait decades for a profit from their woods, or have sites where broadleaved trees will never make as much money as conifers? How do we persuade those who are doing nothing with their planted ancient woods, maybe because they have poor access or other problems which make them expensive to manage, or simply because it is too much trouble? How do we change

the hearts and minds of those foresters or owners who for decades have been geared towards growing conifers that there could be a future in growing broadleaved trees?

This research, the first to look comprehensively at the ecological and economic implications of restoring planted ancient woods, shows we must seize the opportunity now. But it also shows that rescuing these great natural treasure troves will not be easy. The full weight of a national campaign is needed, led by the Forestry Commission and backed by the Government. Forest Enterprise, the forest management arm of the Forestry Commission, is by far the most significant owner of planted ancient woodland sites. It must lead by example and commit to restoration of all those planted with conifers in its guardianship. Changes in national policy, incentives, information and guidance are needed to encourage woodland owners to restore sites sympathetically. This action is needed without delay, otherwise the next 10 years will see permanent losses in Britain’s woodland wildlife.

What are planted ancient woodland sites?

Ancient woodland (land continuously wooded since at least 1600, and often much longer) is our richest habitat for wildlife. It is home to dozens of rare or threatened species, and is important too for its undisturbed soils, and the historical and archaeological features that it preserves. It is an irreplaceable and scarce resource, covering only around two per cent of Britain.

Ancient semi-natural woods generally consist of trees that have never been planted. Planted ancient woodland sites are ancient woods that have been converted to plantations. Between the 1930s and 1980s, hundreds of thousands of hectares of ancient woodland in Britain were felled and replanted with the aim of making us more self-sufficient in timber, but these actions have been at the expense of our woodland wildlife. The plants and animals that depend upon the stable environment which ancient woodland provides have been devastated, if not by felling and clearance using heavy machinery, then by the chemicals used to prevent regrowth, by the dense shade cast by the closely planted new trees, or by smothering from deep layers of conifer needles.

Planted ancient woods are still valuable for their latent potential. Many contain remnant populations of the animals and plants that are characteristic of ancient woods, frequently concentrated in small, isolated pockets. They are also living history books, often punctuated by features such as prehistoric earthworks, medieval ridge and furrow, charcoal pits, ore furnaces and kilns which tell the story of Britain’s landscape and the people who shaped it. Hidden within the rows of planted trees there may be reminders of the previous native tree cover: a grand ancient tree drowning in the rising tide of the conifers around it, or the mighty limbs and stump of a centuries-old oak cut down 40 or 50 years ago, still surviving with an amazing number of species using it as a food source or nesting site.

Until recently, planted ancient woodland sites have received comparatively little attention in

forestry and conservation policies. Despite the introduction of the Broadleaves Policy of 1985, which recognised the value of ancient semi-natural woods and was intended to stop their conversion to conifers, most have continued to be managed as productive plantations, with little attention to their value for biodiversity. The UK Forestry Standard, which sets out the Government’s approach to sustainable forestry, does not specify that planted ancient woodland sites should be restored, and states that they should be given special treatment only ‘where restoration is an objective of management’. Incentives to promote restoration have been almost non-existent for many years, and the resources put into this vital process have been a tiny fraction of those provided for creation of new native woodland.

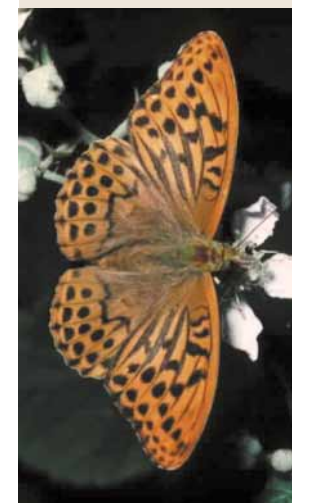
Now interest in restoring planted ancient woodland sites to native woodland is increasing rapidly, driven by three key influences. Firstly, targets for restoration of planted ancient woodland sites are included in the UK native woodland Habitat Action Plans, which specify action needed to fulfil the UK Government’s targets for biodiversity. Secondly, the Forest Stewardship Council’s certification standard⁵ and the equivalent UK Woodland Assurance Standard require woodland owners to commit to conservation of all surviving ancient-woodland features on these sites. They also require enhancement of a proportion of planted ancient woodland sites through restoration. Compliance with these standards gives assurances to purchasers of wood products that the woods they came from are managed responsibly. Finally, the dramatic reduction in conifer timber prices in recent years has led to more realistic consideration of the alternatives.

The research

Aims of the research

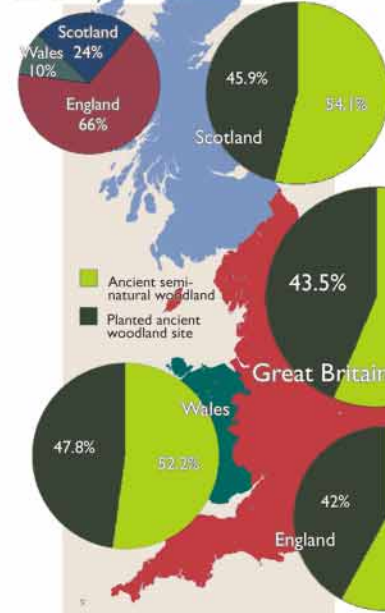
The need for restoration is beginning to be recognised but translating this into practice is a different matter. There has been very little guidance on what ‘restoration’ means, or how it should best be carried out. This is being addressed by the Forestry Commission, which is producing a practice guide. However, the policy direction and means of delivering this policy are still missing.

“Planted ancient woodland sites are still valuable for their latent potential. Many contain remnant populations of the animals and plants...”



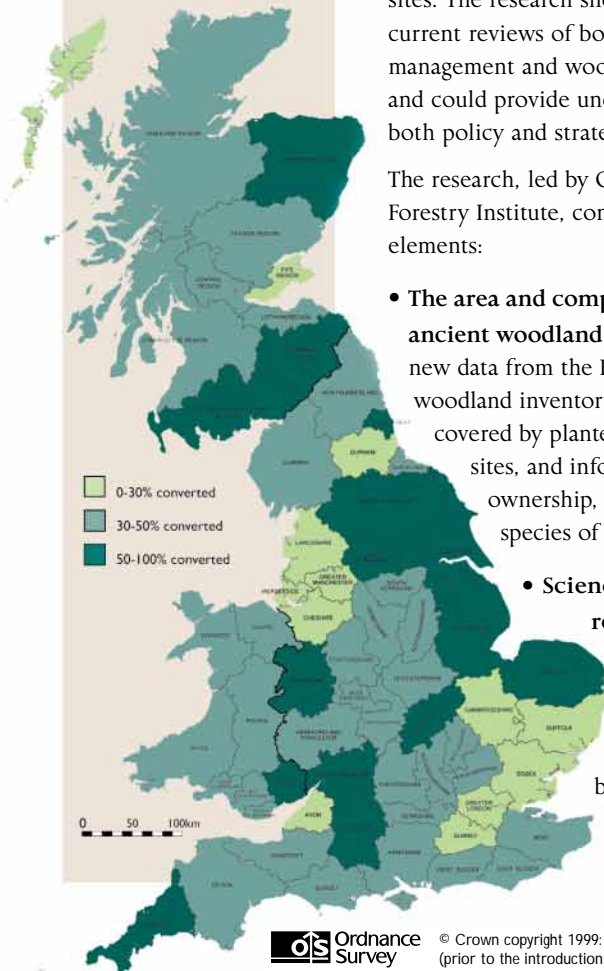
Photograph: D & L Studios

Percentage of Great Britain's ancient woodland cover for each country:



▲ Figure 1: Percentage of ancient woodland converted to plantation by country

▼ Figure 2: Percentage of ancient woodland converted to plantation by county (England & Wales) or region (Scotland)



There has been no analysis of the possible effects of what is essentially an ecologically driven strategy on a forestry industry already facing many challenges. Woodland owners have seen the drive towards restoration as a threat because of the perceived costs and loss of income. Forest Enterprise has started the ball rolling by carrying out an assessment of its woods in England and Wales with a view to developing strategies for restoration, and is already carrying out major restoration work in some areas such as Rockingham Forest, Northamptonshire. However there are no incentives to encourage private woodland owners to follow suit.

Our research aims to inform the development of policies, strategies and practice in relation to the management of planted ancient woodland sites. The Forestry Commission has made clear it is keen to incorporate important messages from our research in the forthcoming practice guide to restoration of planted ancient woodland sites. The research should also influence current reviews of both woodland management and woodland creation grants, and could provide underpinning data for both policy and strategies.

The research, led by Oxford University's Forestry Institute, consisted of three elements:

- **The area and composition of planted ancient woodland sites:** an analysis of new data from the Forestry Commission's woodland inventory to determine the area covered by planted ancient woodland sites, and information such as ownership, forest type, age and species of trees present
- **Science and practice of restoration:** a review of previous research in this field and a study of a sample of projects currently being carried out by the Woodland Trust across Britain

- **The costs and benefits of restoring planted ancient woodland sites:** an economic analysis of a wide variety of different management options.

The area and composition of planted ancient woodland sites

The provisional ancient woodland inventories produced in the 1980s showed that planted ancient woodland sites covered almost half the area of ancient woodland in Britain. The inventories defined the boundaries and areas of planted ancient woodland sites but showed little other information.

The research produced, for the first time, detailed information on the make-up of planted ancient woods across the whole of Britain. It used the Forestry Commission's recently completed National Inventory of Woods and Trees: a new digital map of all woodland in Britain, which was derived from interpretation of aerial photographs. This was overlain on the ancient woodland inventories to identify all the planted ancient woodland sites which appear to have survived to the present. More detailed information which had been collected for the National Inventory of Woods and Trees within sample squares covering about one per cent of woodland was then analysed in respect of planted ancient woodland sites. This showed forest type, age, species and ownership information.

How much of our ancient woodland has been replanted?

Across Britain as a whole, 44 per cent of ancient woodland is classified as planted ancient woodland; the proportion is slightly higher in Wales and Scotland and lower in England (see Figure 1).

The broad figures mask huge local and regional variations within each country. Data were analysed for Government regions in England, and pre-1998 counties and regions in Wales and Scotland respectively. These areas were large enough to include sufficient sample squares to give a reasonably accurate picture. In England some analysis was also carried out at county level (see Figure 2).

The analysis showed that in some English counties more than half of ancient woods are

planted, whereas in others the proportion is less than a third. In Wales, the spread is more even, with between 40 and 47 per cent of ancient woods being planted in most counties. In Scotland, the Highland region stands out as having nearly half the area of planted ancient woodland. In all other regions except Fife there has been more than 40 per cent conversion.

What do planted ancient woodland sites look like today?

At its simplest, some ancient woods were replanted with conifers, others with broadleaved trees and some with a mixture of both. Planted ancient woodland sites have been classified according to these distinctions: this shows that nearly half are mainly coniferous. However, the proportion of conifer and mixed plantation varies dramatically between the countries (see Figure 3).

A more detailed analysis by species showed that conifers occupy 60 per cent of the tree canopy of planted ancient woods. Around a quarter of the canopy area of planted ancient woods is occupied by the densely shading conifer species: spruce and Douglas fir. Scots pine and larch, the least productive conifers, occupy another quarter of the canopy area. In Scotland the proportion of these sites covered with conifers is much higher than in England and Wales, as is the percentage covered with spruce and Douglas fir (see Figure 4).

Surprisingly, the study suggested that more than 90 per cent of the canopy area of planted ancient woodland sites occupied by broadleaved trees comprises species that are native to Britain. Less than 20 per cent of the broadleaved area was beech, which casts dense shade. This means around one-third (70,000 hectares) of the area of planted ancient woodland in Britain already comprises native broadleaved trees, although it is not all native woodland in the strict sense of species being native to the site. A proportion of the area of Scots pine in Scotland might be considered broadly native and could be added to this figure.

Analysis of the age of trees showed that more than three-quarters of the conifer area of planted ancient woods is already over-mature or will reach maturity in the next 10 years,

based on standard models of forestry economics. This means 94,000 hectares or nearly half of the total area of planted ancient woodland sites will be ready for felling over the next decade. If this were all to be felled it would entail a massive five- to ten-fold increase in the current turnover rate of felling and replanting. The analysis also showed that replanting with conifers has continued on sites that were identified in the 1980s as planted ancient woodland and that the proportion of conifers being planted is actually increasing.

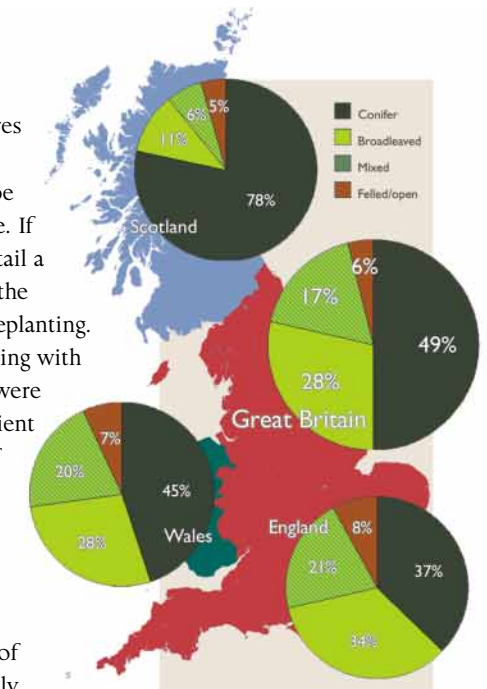
Who owns planted ancient woodland sites?

In Wales and Scotland, 'ownership' of planted ancient woods is split roughly equally between Forest Enterprise and others. In England, Forest Enterprise has about one-third of the total area of planted ancient woodland sites.

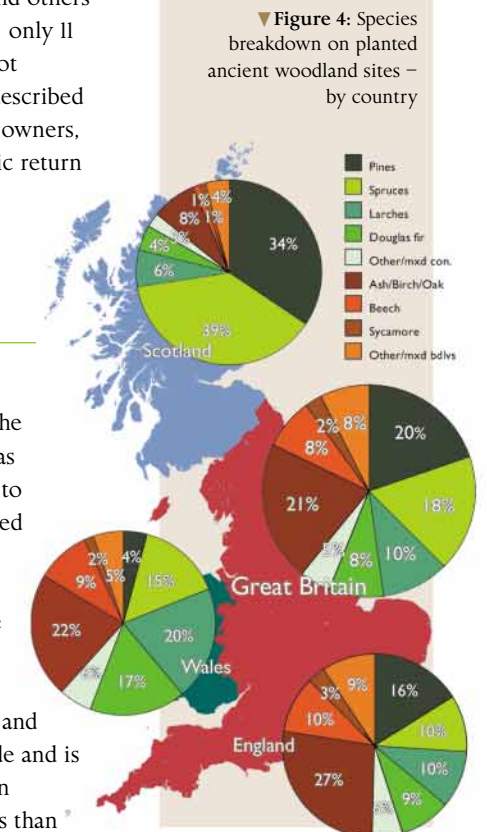
Of the planted ancient woodland sites not owned by Forest Enterprise, more than 70 per cent belong to private landowners, with non-government organisations (such as the Woodland Trust), local authorities and others owning only five per cent. However, only 11 per cent of planted ancient woods not managed by Forest Enterprise were described as belonging to 'businesses' by their owners, and being managed with an economic return in mind.

Science and practice of restoration

The review concentrated on ancient woods planted with conifers, since the need for restoration of these sites was deemed much greater than the need to restore those planted with broadleaved trees. Conifers have more impact on the ecology of an ancient wood because of their dense shade and the acidifying effects of their leaf litter. Most broadleaves on planted ancient woodland sites are native to Britain, and although beech also casts heavy shade and is considered currently as non-native in northern Britain, it accounted for less than



▲ Figure 3: Forest types found on planted ancient woodland sites – by country



▼ Figure 4: Species breakdown on planted ancient woodland sites – by country

“The species associated with ancient woodland...do not generally have long-lived seed”

20 per cent of the broadleaved area, and is likely to be suited to much of western and northern Britain within a few decades due to climate change. Though a stand of closely planted even-aged beech may be as damaging to ancient woodland communities as a similar conifer plantation, the approach needed is one of ‘restructuring’ rather than ‘restoration’.

There has been only limited research into restoration of planted ancient woods. Oxford University’s Forestry Institute therefore drew on existing information on the wider ecology of ancient woods, as well as work on the impact of commercial conifers on ancient-woodland communities, the survival of seed in the soils of planted ancient woodland sites, and the effectiveness of restoration where it has been started. The report pools their findings and combines them with an assessment of 40 Woodland Trust sites with more than 100 planted ancient woodland stands, where restoration has been completed, is underway or imminent. Woodland Trust sites were selected for convenience but the researchers felt they provided a reasonably representative sample in terms of composition, geographic spread and range of restoration techniques: most were acquired by the Trust in the last 15 years and were previously managed by the Forestry Commission or private landowners.

What is special about ancient woods?

Many species are characteristic of ancient woods and while attention is often focused on the flowers and plants found on the woodland floor, there are other species which are only or mainly found in ancient woods, including trees and shrubs, lichens, mosses, fungi, insects, and to a lesser degree some birds and mammals.

The species associated with ancient woodland share a number of features:

- They do not spread easily to new areas, or they depend on other species that develop slowly, such as mature trees and dead wood
- They need relatively shady and undisturbed conditions, which means they do not adapt well to sudden change
- They are part of a complex ecological system which has taken millennia to develop, so

one species may be dependent on several others for its survival

- They do not generally have long-lived seed. Many conservationists have been guided by the prevailing belief that planted ancient woodland sites have a dormant seedbank waiting to burst into life when trees are felled, but this is simply not the case.

Other features are also associated with ancient woodland: ancient trees and dead wood, undisturbed soils, land forms or cultural artefacts.

What relict features survive in planted ancient woodland sites?

The researchers highlight the importance of remnant ancient trees, those which were past economic maturity when the wood was felled and replanted, and decaying coppice stools, the stumps which remain from a former management regime of regular and repeated cutting to ensure a continuous supply of wood. Both may be as valuable as the ground flora for survival of ancient-woodland communities because of the variety of fungi, lichens, insects, birds and bats they support. The value of fallen dead wood surviving from before replanting has not been fully taken into account in previous research, yet this was found in almost 40 per cent of woods visited by the research team, sometimes in the form of whole, felled trees which had survived over 40 years and provided a direct continuity of habitat back to the previous semi-natural woodland.

The good news is that in more than 80 per cent of the sites studied, there was significant survival of ancient-woodland communities and species. Since the sites were felt to be a reasonably representative sample, the same is likely to be true for all planted ancient woods. The bad news was that many of these were in decline.

Oxford University’s Forestry Institute states that the survival of ancient woodland communities within a planted ancient wood depends on a number of factors, such as the nature of the original wood, the methods used for clearance, replanting, maintenance of the new trees (especially use of herbicides), the species planted on the site and how they were subsequently managed.

Ground vegetation and shrubs often survive in ‘hotspots’. These might be along rides or tracks, in areas where pockets of ancient semi-natural woodland were left to give shelter to the newly planted conifers, where broadleaved trees have regrown or invaded and dominated the conifers, where establishment of the conifers has failed, or where broadleaved trees were included in the original planting mix.

Where large old trees were left on site they support myriad species; they have also left the tree canopy more open, enabling ground flora to survive. Such ancient trees tend to have remained untouched along boundaries, or in locations with some other historical significance. Old trees, stumps, coppice stools and fallen dead wood may be found throughout a planted ancient woodland site, and form a reservoir of species associated with the former ancient semi-natural wood, especially fungi and insects. Field observations confirmed that plants survive better under trees which cast less shade, such as pine and larch, and worse under densely shading species such as Douglas fir, spruce and hemlock.

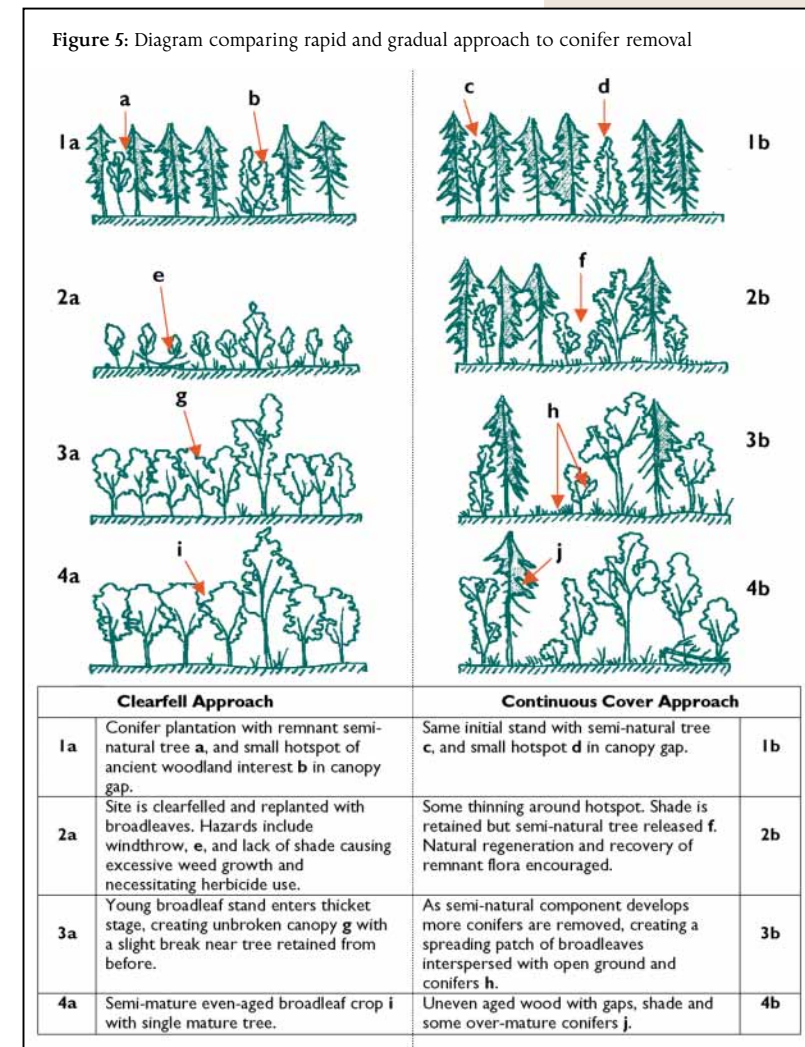
How can we help ancient woodland species survive?

The study of ongoing restoration at Woodland Trust sites showed that where the traditional method of clear-felling conifers and replanting with native broadleaved trees was still being carried out it was often having an adverse effect. Clear-felling was taken to mean anything which would leave no canopy cover, even on an area as small as a quarter of a hectare. The shade-tolerant ancient-woodland plants may be out-competed by coarse vegetation which springs up when an area of woodland is suddenly opened up to the light. Sensitive ground flora may be damaged by the felling and extraction of timber, smothered by the remaining branches and other waste left lying on the woodland floor, and devastated by herbicides used around newly planted trees. Native trees may be unstable after rapid removal of surrounding conifers and the sudden change in microclimate can kill ancient trees and associated species. In addition, subsequent replanting is likely to lead to an unnatural even-aged plantation, albeit broadleaved.



“Clear felling and replanting can be very damaging to sensitive ancient-woodland animals, plants and fungi”

Photograph: Tom Curtis



Photograph: Archie Miles/WTPL

Figure 6: Diagram representing the main management options for planted ancient woodland sites. All crops are assumed to be aged 30 now, and this diagram covers the next 40 years. The vertical line marking the middle of the time-line is the age at which most conifer crops would normally be economically mature (45 – 55 years).

Photograph: WTPL



Observations at other sites revealed that alternative methods could avoid some of these problems. By using a 'continuous-cover' system (see Figure 5) whereby the tree canopy is removed gradually and new trees are established before all of the old plantation is felled, shaded woodland conditions could be maintained. This could prevent coarse weed growth and sudden changes in microclimate, giving retained broadleaved trees time to stabilise and allowing ancient-woodland communities to keep pace. Phased removal of trees and restocking, by natural regeneration

where possible, would result in a wood with trees of varying ages. Whatever felling and restocking regime is used, disturbance could be minimised by avoiding extraction of timber along established rides, often a refuge for ancient-woodland plants, and by hand-weeding new trees rather than using chemicals.

Of course, there are exceptions. In particular, sites which may suffer serious windblow when thinned may have to be clear-felled, though the researchers suggest that where practical it may be preferable to leave such sites to fall apart progressively, which could enable greater survival of ancient-woodland communities.

The researchers also suggest that where ancient-woodland communities have already been virtually or completely wiped out, then it would be appropriate to clear-fell to allow new native woodland to be planted, enabling woodland species to colonise.

The costs and benefits of restoring planted ancient woodland sites

The single greatest obstacle to restoration of planted ancient woods has been the perception that it would leave woodland owners heavily out of pocket, since it has been assumed that native broadleaved woods are inherently less profitable.

The research examined the financial implications of a number of possible management options for a range of timber crops on planted ancient woodland sites. The starting point for each example was a 30-year-old commercial plantation comprising either Douglas fir, Norway spruce, Sitka spruce or beech. The scenarios included repeating the commercial timber crop, or converting to ash, good-quality oak, poor-quality oak, or birch. Mixed woodland was also considered, both as a starting crop and replacement. Cash flows were calculated for eight possible management options (see Figure 6). Other options considered in less detail were felling to waste, where timber is left on site perhaps because access is difficult, and non-intervention.

The calculations used figures for conifer timber prices based on an average of the Forestry Commission's annual statistics on standing timber sales for the last three years. For broadleaved trees, since the Forestry Commission does not produce equivalent statistics, the researchers made estimates from researching recent prices obtained for such timber at roadside (timber which has been felled and extracted) and subtracting the estimated harvesting costs. Grants and incentives were deliberately excluded from the analyses, as were the wider costs such as installing access roads, fencing, and pest control, which vary from site to site.

How much will it cost?

The models generated some surprising results. They suggest we can no longer assume conifers are profitable and broadleaved trees loss-making. Not only are some good-quality broadleaved trees more profitable than some conifers, but the variation within both conifers and broadleaved trees is enormous. Douglas fir, for instance, is twice as profitable as any other conifer crop, and good-quality ash is more profitable than most conifers. Replacing a plantation with a low grade crop of birch, on the other hand, always results in a significant loss of income. Scots pine and larch are the least profitable conifers. A more logical split in terms of economic performance would be between high-quality and low-quality crops.

The study shows that though restoring a site to native broadleaved trees will usually result in a long-term loss of income as compared with replanting with conifers, this cost is not enormous. However, there are some situations where there is no long-term loss of income. For instance, on sites where Douglas fir can be converted to good-quality ash, this would provide virtually the same net income as continuing with Douglas fir. Converting a lower-value softwood plantation, such as larch, to high-quality ash could result in a bigger profit for the woodland owner. However, converting Douglas fir to good-quality oak, which is slow and expensive to grow, would lead to a halving of the average annual income from the site. Converting any conifer crop to poor-quality oak or birch would result in a lower income.

In fact, the timing of felling is more important than what is replanted on the site. Felling a conifer crop before it is mature in order to restore the site would be very expensive for those looking for a return in the short term.

Perhaps most significant is that gradually restoring a site by maintaining continuous cover is generally more profitable than conventional clear-felling and replanting. If the conversion is prolonged still further, and some conifers are retained long term, then the profitability appears even higher.

For plantations on ancient woodland sites which are a mixture of conifers and broadleaved trees, over the long term even poor-quality mixtures could be converted to wholly broadleaved trees without a significant net loss being made.

Felling to waste and non-intervention are both expensive options: in many cases it would be worth investing to improve road access, for instance, to avoid this loss.

Non-financial costs and benefits

In order to put the financial analyses into context, the researchers at Oxford University's Forestry Institute also produced a qualitative appraisal of the other costs and benefits of restoring planted ancient woodland sites. The researchers concluded that as well as the benefits to wildlife which are detailed in the review of science and practice, significant benefits of restoration would include improvements in the landscape and for general recreation. Restoration would bring these culturally important woods back to something more like their original composition and structure. Timber production would be reduced, which could affect sawmills, but the effect would be so long term that it could be addressed by appropriate planning.

Gradual restoration under a continuous-cover system would be more acceptable to people, since it has less impact on the landscape than clear-felling, and would cause less of a public outcry. Where people had become used to seeing conifers they might be glad to see at least some retained. However, on some sites this system means more risk of windblow which can be unattractive and could damage historical features.

"...gradually restoring a site by maintaining continuous cover is generally more profitable..."



Photograph: WTPL

“Within the next 10 years most conifer plantations on ancient woodland sites will have reached economic maturity”

► “Restoring planted ancient woodland sites is the nearest we can get to increasing the area of ancient semi-natural woodland”
Photograph: WTPL



Photograph: Archie Miles/WTPL

Implications for the future of planted ancient woodland sites

Key findings of the research

Taking the three separate elements of the research programme together, the following key points emerge:

- More than a quarter of the ancient woodland in Britain has been replanted with conifers
- More than three-quarters of this conifer area will be ready for felling in the next 10 years
- Forest Enterprise owns half the planted ancient woodland sites in Wales and Scotland, and about one-third in England, making it by far the biggest owner
- On 80 per cent of the planted ancient woodland sites visited there is significant survival of communities and species that are special to ancient woodland. It is therefore likely that a large proportion of all such plantations have a rich inheritance
- We must redefine restoration. It is conserving and enhancing ancient-woodland communities that matters, not just restoring native tree cover
- Clear-felling and replanting can be very damaging to sensitive ancient-woodland plants, animals and fungi: in most cases a gradual approach is needed instead
- The assumption that restoration of planted ancient woods to native woodland is financially disastrous is not borne out
- Gradual restoration to native trees under a continuous-cover system has potential to be more profitable than conventional clear-felling and replanting
- Clear-felling before conifers reach economic maturity, felling to waste, or non-intervention appear to be very expensive options.

As our richest wildlife habitat, ancient semi-natural woods are nature’s cathedrals, sheltering communities of animals and plants that have developed over centuries. Planted ancient woodland sites are home to hidden treasures; unlocking their potential is our opportunity to enrich Britain’s biodiversity in a way that creating new woodland cannot hope to do in the medium term. Restoring planted ancient woods is the nearest we can get to increasing the area of ancient semi-natural woodland. It will certainly ensure that the area of native woodland with many ancient characteristics is increased and the sheer amount of ancient woodland that has been replanted means that these sites have massive significance for wildlife. It is remarkable that they have received so little attention until recently.



The growing recognition by policy-makers of the value of planted ancient woodland sites must be welcomed, but it is not enough. Urgent action is needed to translate it into practice and it needs to be action on a grand scale if it is not to be too little, too late.

The research indicates that in most ancient woods planted with conifers significant ancient-woodland communities remain. They form oases of biodiversity, often concentrated in more open areas that have survived by chance between or within stands of closely planted conifers. They can be seen in the flushes of bright green emerging in

the spring along rides or in glades, highlighted against the dull brown of the dark forest floor beneath the timber trees, or in the dappled shade beneath the twisted, gnarled, lichen-strewn shape of an ancient broadleaved tree, suddenly emerging from among rows of spruce or pine.

But these communities are fragmented and in decline, and, contrary to popular belief, there is no dormant seedbank waiting to burst into life once the conifers are removed. Within the next 10 years most conifer plantations on ancient woodland sites will have reached economic maturity. If they are felled and replanted again with conifers, there is little hope for these fragile remnants.

Even where the will to restore exists, a similar disaster could be precipitated by the simplistic view that exotic conifers should be clear-felled and replaced as quickly as possible with native trees. Our research shows that this approach is likely to wipe out the delicate ancient-woodland wildlife which remains. If we shift our understanding of restoration to mean creating conditions that will conserve and enhance ancient-woodland communities, it becomes clear that continuous-cover forestry is generally better. Restructuring the wood by degrees avoids sudden, dramatic change, and allows the sensitive woodland species to survive and expand under the protective embrace of the tree canopy.

On sites where windblow might result, clear-felling may be the only option, but there may be some remote sites where managers should also consider leaving the wood alone so that the conifer canopy ‘falls apart’. There is a reasonable chance that this might open up the tree canopy over a long period of time thereby providing a gradual transition for ancient-woodland communities. Where virtually no ancient-woodland communities remain sites could be felled more rapidly to allow new native trees to be planted as soon as possible.

Those who have started restoring replanted ancient woods may need to change their approach: the Woodland Trust recognises that it is among them. Woodland managers will need to free themselves from the fetters

of traditional forestry and come up with some new and imaginative ideas, based on a full assessment of each individual planted ancient woodland site. It might mean using several different approaches within a single wood to maximise the conservation of ancient-woodland communities.

More research is certainly needed to assess the effects of different regimes, but the reports make a number of suggestions. Dense plantations could be thinned conventionally to help shaded ground vegetation to recover, with heavier thinning around ancient trees or ‘hotspots’. Small areas could be felled and replanted with native broadleaved trees where no ancient-woodland communities survive. Some conifers could be retained long term to provide valuable over-mature habitat.

Most woodland owners will have to marry all these ecological concerns with economic ones. Two key findings stand out from the cost-benefit analysis. First, the traditional belief that conifers make money and broadleaved trees do not no longer stands. In the long term, high-quality broadleaved trees can be equally or more profitable than average-quality conifers. Second, the economic analyses broadly support the argument for gradual restoration rather than clear-felling and replanting, since over the long term it is more profitable.

Taken together, these two findings might suggest that restoration of planted ancient woodland sites is a viable, even profitable option for woodland owners, and that managing for wildlife and for profit can go hand in hand. In some cases this will be so, and the significance of these findings should not be underestimated since they represent such a huge shift from traditional views on restoration.

However, it would be foolish to be oversimplistic. Although the analyses suggest that a planted ancient wood should not require an annual injection of cash, irrespective of how it is managed, the researchers point out that most forest enterprises are currently making an annual loss. There are clearly many wider costs associated with managing a whole woodland rather than just a single stand of trees.

“Woodland managers will need to free themselves from the fetters of traditional forestry”



Photograph: Edward Parker/WTPL

“...tensions between ecology and economics ...will only be overcome by a package of policy changes and incentives...”

Not all planted ancient woodland sites will be suitable for growing quality ash or oak. For their owners there is likely to be a long-term loss of income in restoring to native woodland. Even where restoration is likely to be profitable in the long term, owners may suffer a short-term loss compared with clear-felling their wood and replanting with conifers.

Clear-felling sites before they reach economic maturity is shown by the research to be expensive. This needs to be balanced against a desire to clear-fell part of a site covered by young spruce, for instance, before the ancient-woodland communities are wiped out by the closing tree canopy.

Minimum intervention might be an attractive option for ecologists on some sites, but Oxford Forestry Institute's economic analysis shows it to be extremely expensive for the woodland owner.

On sites where no ancient-woodland communities remain, it would be easy for woodland owners to argue that restoration is pointless, especially since these sites are more likely to be those planted with densely shading species, and where this is Douglas fir it is twice as profitable as any other conifer. But even these sites have an important role to play in creating ecologically functional landscapes and may be colonised more easily by woodland specialists than new planting sites on arable or improved grassland. These tensions between ecology and economics are a barrier to widespread restoration of planted ancient woodland sites which will only be overcome by a package of policy changes and incentives to persuade landowners to restore.

Forest Enterprise owns far more planted ancient woodland than anyone else, but is subject to conflicting pressures: the desire to provide the woods the public want, but also the limits on its funding from the Government. The findings of this research should enable Forest Enterprise in England and Wales to build on the strategies currently being produced for restoration of planted ancient woodland sites and encourage Forest Enterprise in Scotland,

where it owns a much higher percentage of such sites, to follow suit. The Government has already made some concession to the needs of wildlife, but must show that it is taking its commitment to biodiversity seriously and make a further shift in policy to allow Forest Enterprise to lead the way.

The native woodland Habitat Action Plans, which seek to increase woodland biodiversity, set targets for areas of planted ancient woodland to be 'fully restored'. These are likely to encourage rapid and complete conversion. Instead, the researchers recommend monitoring abundance of 'woodland specialist' species and recovery of ancient-woodland species 'hotspots', as well as canopy species composition and cover. The standards for certification of sustainable production of timber set similar targets which do not encourage gradual restoration.

The Forestry Commission's current review of incentives for sustainable woodland management in England and parallel reviews in Scotland and Wales present an ideal opportunity to take on board the findings of this research and encourage owners to restore planted ancient woodland sites. In particular, incentives could be linked to the conservation of ancient-woodland communities, rather than merely to recovering sites with native trees. They could be used to overcome the desire of woodland owners to take the easy route of clear-felling and replanting with conifers, and to encourage restoration by those who are not currently managing their woods at all.

Thought also needs to be given to the levels of long-term losses incurred by woodland owners. The fact that only 11 per cent of planted ancient woodland sites have private owners who claim to manage their sites as a business may mean that the non-financial benefits of restoration will be more persuasive than previously thought. Then again, many planted ancient woods are not being managed at all. Grants and incentives need to be coupled with information and education, and the study suggests a survey of owners to gauge likely attitudes to restoration would be useful.

What needs to be done

The Woodland Trust's aims for Britain's planted ancient woodland sites are as follows:

- Restoration of all ancient woods planted with conifers started in the next 10 years
- Restoration focused on conservation of the special communities of animals and plants which are characteristic of ancient woodland
- Trees which are native to the site to be used to replace the conifers removed from any planted ancient wood.

To prevent the potential permanent loss of wildlife in a third of Britain's ancient woods the Woodland Trust is calling for:

- The Government to enable Forest Enterprise to commit to restoring all its ancient woodland sites planted with conifers and in doing so act as a catalyst by setting an example to other landowners
- The Forestry Commission, in its current reviews of incentives for woodland management in England, Scotland and

Wales, to give high priority to restoration of conifer planted ancient woodland sites, and to target incentives for restoration to give maximum benefit to biodiversity

- The Forestry Commission to adopt a policy to restock all conifer planted ancient woodland sites with native species
- The Government to review the UK Forestry Standard to reflect the importance and priority of restoring conifer plantations on ancient woodland sites
- The UK Woodland Assurance Standard for certification of sustainably produced timber to be reviewed to reflect the findings of the research
- The restoration targets enshrined in the UK native woodland Habitat Action Plans to be re-defined to reflect the need to conserve the communities of species which are characteristic of ancient woodland



Photograph: Edward Parker/WTPL

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Copies of the full research reports are available from the Woodland Trust, Autumn Park, Grantham, Lincolnshire NG31 6LL

“The Government... must show that it is taking its commitment to biodiversity seriously and... allow Forest Enterprise to lead the way”



Photograph: Tom Curtis



Photograph: Edward Parker/WTPL

Where to find out more

The Woodland Trust is the UK's leading woodland conservation charity. We are committed to:

- No further loss of ancient woodland
- Restoring and improving the biodiversity of woods
- Increasing new native woodland
- Increasing people's awareness and enjoyment of woods

Established in 1972, the Woodland Trust now has over 1,000 sites in its care covering over 18,000 hectares (46,000 acres) of woodland. It offers free access to nearly all of its sites.

The Woodland Trust aims to conserve, restore and re-establish the UK's woodland. To carry out our work, we rely on the generosity of the public, industry, commerce, and agencies. If you would like to support us or would like more information about our work and membership details, please contact your nearest Woodland Trust office.

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