The State of the UK’s Forests, Woods and Trees
Perspectives from the sector

A report to mark the International Year of Forests 2011
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A report to mark the International Year of Forests

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Executive summary

The United Nations General Assembly declared 2011 the International Year of Forests, to raise awareness on sustainable management, conservation, and sustainable development of all types of forests across the globe.

While this has been an opportunity to look outwards, at forests across the globe, it has also been a chance to take stock of forests, woods and trees in the UK. This report draws on the best available evidence, along with perspectives from across the forestry and woodland sector. It sets out some top-line facts and figures, trends and issues, and draws out some of the key opportunities and challenges facing our tree and woodland resource. It covers the resource in its widest sense, from urban to rural landscapes, and from vast forests to individual trees.

What emerges is that the International Year of Forests marks a potential turning point. We are witnessing both a time of opportunity, and a time of unprecedented challenges, for forests, woods and trees. While this is now recognised to a degree in policy, we are still not seeing it translated quickly or effectively enough into practical outcomes. The challenge to all government, and especially any government aspiring to be the ‘greenest government ever’, is to shift up a gear to ensure a robust future for our forests, woods and trees, and to maximise the many benefits they offer.

The benefits of tree cover have never been clearer. There is increasingly strong evidence and a growing consensus that trees, woods and forests have a key role to play in climate change mitigation and adaptation, and in delivery of ecosystem services in both rural and urban areas. This offers a compelling rationale for expanding tree cover, expansion of markets for UK timber and wood with associated opportunities for sustainable management, and potential for new sources of funding for forestry and woodland conservation through payment for delivery of public goods.

At the same time forests, woods and trees face unprecedented challenges. Climate change, pollution, globalisation, increasing competition for natural resources and pressure on land-use, financial and economic crises and constraints all have serious implications.

Forests, woods and trees moved up the agenda dramatically early in 2011, when the proposed sell-off of the public forest estate in England generated a vociferous public campaign. But over recent years, government has increasingly begun to recognise the multiple benefits of forests, woods and trees. We already have a substantial body of research and evidence to support expansion of tree cover across the UK, protection and restoration of its most valuable assets, strengthening of the economic forestry sector, delivery of environmental and social benefits, and creation of resilient, functional landscapes. We also have a good deal of the required policy in place, albeit in different forms, and to different degrees, across the UK.

The challenge is to seize the moment and drive that policy into practice. Three broad themes emerge from this report:

First, a recognition of the need for diversity – diversity within the forest resource, but also diversity in our approach to it. We need to think about the forest resource in all its forms, actual and possible, from woods and trees on farms, to the urban forest, to biodiversity-rich ancient semi-natural woods and ancient trees, to productive plantations. We need to assess how all these diverse aspects can be nurtured, expanded, and appropriately used. We should consider diversity in governance, for example where communities may have something to offer through greater involvement in woods and forests, and vice versa. And we need to think about the structure and make-up of our forests, and our wider landscapes, and how diversity can help to make wooded habitats and their wildlife more resilient for the future.

Second, there needs to be joined up thinking. The policies may be there, but they reside with different government departments. We need government to be truly joined up in the way it approaches policy
so that the opportunities for trees, woods and forests, and for us to benefit from them, are maximised. Forests, woods and trees need to be embedded in all areas of policy, from planning to public health, from agriculture to water. The woodland and forestry sector must also be joined up. This report demonstrates the variety of objectives, of concerns, and of challenges the different parts of the sector are dealing with, but it also demonstrates a huge amount of common ground. The forestry and woodland sector is relatively small, but has potential to be powerful where it can speak with one voice. We need to keep talking and listening to one another.

Third, and perhaps most important, a common thread emerges: the need for public support and awareness. While people may not, if asked, rank woods and trees among their critical concerns, this doesn’t mean they don’t care about them. We have seen that perceived threats to woods and trees can elicit a strong response. Most people agree that woods are important for wildlife and recreation, and understand the benefit of trees for climate change mitigation and adaptation. The challenge is to take this broad engagement and truly capture the public imagination to deepen it to a real understanding of, and support for forests, woods and trees as crucial habitats for wildlife and working landscapes.
Introduction

The United Nations General Assembly declared 2011 as the International Year of Forests, to raise awareness on sustainable management, conservation and sustainable development of all types of forests across the globe. The strapline to the International Year of Forests badge is ‘Forests for People’. It underlines the intimate connection we have had through history with forests, woods and treescapes of all kinds, the pivotal role they play in our planet’s life-support systems, and the need to consider carefully our stewardship of them into the future, for our own welfare as well as for the benefit of the wider environment.

While the International Year of Forests has been an opportunity to look outwards, at forests across the globe, it has also been a chance to consider the adage of ‘Think globally, act locally’. The UK has relatively little woodland cover, albeit considerably more than it had a century ago. That resource, which covers only 13 per cent of our land area, makes important contributions economically, environmentally, and socially. Outside woodland, the UK has a rich resource of trees in wood pastures, parkland, hedgerows and orchards, in fields and village greens, and in urban areas. While there are still gaps in our understanding, overall we are better informed than ever about the nature of the resource, its value, and potential, but there are also challenges in ensuring that this is fully recognised in both policy and practice. What better time than in the International Year of Forests to take stock, and reflect on how we can ensure a vibrant future for all aspects of the UK’s tree cover?

This report does not set out to cover in detail every aspect of forests, woods and trees in the UK. This is already covered in other recent publications such as the UK National Ecosystem Assessment. The intention is rather to draw out some top-line facts, figures, and trends, giving a snapshot of the resource, and the main issues it faces, in order to stimulate some thinking from across the ‘forest’ sector. Each chapter includes perspectives contributed by a cross-section of organisations working in the sector, including those in the forestry industry, those working with communities, and those concerned with wildlife and conservation. While the views expressed in these are the organisations’ own, there are common threads that should signal to government and others where the biggest challenges lie.

Scope of the report

While 2011 was clearly labelled the International Year of Forests, we have considered, as far as possible, the whole of the UK’s tree resource in all its variety.

In our highly populated and industrialised country, individual scattered trees, small groups and belts of trees, and more open wooded landscapes such as wood pastures, are as much a part of the potential network of wildlife habitat as are larger woods and forests, and play an important role in delivery of ecosystem services. The urban forest, including parks, gardens, and street trees, is as important as rural woods. For this reason, whether the report refers to forests, woods or trees, or all three at once, the reader should bear in mind that this does intend to encompass the whole of the resource.
1 Forest cover in the UK

Key points

- World forest cover is around 30 per cent.

- The UK is one of the least wooded areas of Europe, with 13 per cent woodland cover (Forestry Commission 2011) compared to around 37 per cent for European Union (EU) countries (Forestry Commission, 2010).

- Within the UK, Northern Ireland has the least woodland cover, just 6.5 per cent, followed by England at 9.9 per cent. The next lowest in the EU is the Republic of Ireland with 9.7 per cent (excluding ‘micro-states’ such as Malta, Monaco and Andorra).

- Of the approximately 3,079,000ha of woodland in the UK around 1 million ha is estimated to be native woodland.

- 552,000ha in the UK is ancient woodland sites (around 2.3 per cent of land area) and of this 223,000ha is planted with non-native species referred to as planted ancient woodland sites (PAWS).

- There are no accurate figures for the area of priority wood pasture and parkland habitat, or estimates of conversion of this habitat to non-native conifer plantation.

- 45 per cent of the UK’s woodland area is certified. Around 87 per cent of harvested softwood (conifer) timber in 2009 was certified. This included both private sector and all Forestry Commission timber.

- There are estimated to be around 3,814 million trees of all types in Great Britain. The majority – 56 per cent – are in Scotland, a further 34 per cent in England and the remainder in Wales (Forestry Commission, 2007).

- There are estimated to be around 123 million trees outside woodland in the countryside in Great Britain.

- Around 30 per cent of UK woodland is managed by the Forestry Commission and Forest Service Northern Ireland.

Introduction

The Ministerial Conference on the Protection of Forests in Europe (MCPFE) defines Sustainable Forest Management (SFM) as “The stewardship and use of forests and forest lands in a way and at a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems.”

1Where figures are available for the whole of the UK these are given. In some cases only figures for GB are available.
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The UK is committed to maintenance and appropriate enhancement of the forest resource and its contribution to global carbon cycles, as part of ‘Pan European Criteria’ (PEC) for SFM (Forestry Commission, 2004). The UK Government reports on the extent of forest cover as a key indicator of SFM.

History of forest cover

In pre-Neolithic times tree cover dominated much of the UK landscape. This may have been as closed forest or as more open wooded landscapes. This declined through a combination of human and climatic factors and by the Middle Ages woodland cover was down to around 15 per cent of land area (Rackham, 1976). It continued to decline, reaching a low of around 4.7 per cent by the beginning of the last century.

In 1916 the Government appointed the ‘Acland’ Committee to look at ways of developing forest resources. This led in 1919 to the Forestry Act, which established the Forestry Commission. Through the expansion of the public forest estate, and later through support for planting by the private sector, the area of forest cover grew throughout the 20th century and particularly in the post second world war period up until 1990. Most of the forest expansion during this period was through an expansion of conifer plantations.

Although recent decades have seen continuing afforestation, the rate of woodland creation has slowed significantly. There has also been a shift to predominantly broadleaved woodland planting.

Forestry and woodland statistics

A number of statistics describe the extent and type of woodland in the UK and Europe.

Statistics of land-use cover use a variety of census or sampling techniques, maps and aerial photographs or remote sensing data to arrive at estimates. Almost all have degrees of error and many are under a programme of refinement and review.

Figures used in this report for comparison with other European and global forest resources are drawn from the United Nations Food and Agriculture Organisation Global Forest Resource Assessment 2010 (FAO 2010) and earlier UNFAO reports, together with the 2007 report on the State of Europe’s Forests From the Ministerial Conference on the Protection of Forests in Europe (MCPFE, 2007).

Other figures are from the Forestry Commission’s published statistics and from the National Forest Inventory (Forestry Commission, 2011).

Comparisons are based on a number of standard definitions.

Definitions

A tree

A tree is defined by the UNFAO Global Forest Assessment as a woody perennial with a single main stem, or in the case of coppice with several stems, having a more or less definite crown, able to reach a height of 5m at maturity (FAO, 2005).

United Kingdom government statistics supply a list of British forest species but impose no minimum height for trees to form woodland at maturity. The UK definition includes woodland scrub but not areas of gorse, rhododendron, etc., outside woodland.

Based on the National Inventory of Woodland and Trees (NIWT) there are estimated to be around 3,814 million trees of all types in Great Britain. The majority – 56 per cent – are in Scotland, a further 34 per cent in England and the remainder in Wales (Forestry Commission, 2007).
A forest or wood

A wood or forest is defined by the UNFAO as an area of 0.5ha or greater with a canopy cover of 10 per cent and a minimum height at maturity of 5m. It does not include land that is predominantly under agricultural or urban land use or stands of trees in agricultural production systems, for example in fruit plantations. The term also excludes trees in urban parks and gardens.

The National Forest Inventory for Great Britain (Forestry Commission, 2011) defines woodland as areas with a canopy cover of 20 per cent or more (or the potential to achieve this), a minimum area of 0.5ha and a minimum width of 20m. Areas of less than 0.5ha of open space within woodland are included as part of the total woodland area, being considered as an integral part of the woodland ecosystem. Integral areas of greater than 0.5ha of open space are excluded. The Forestry Commission suggests that the UNFAO measurement and the UK definition give a similar figure for woodland in the UK. The UK Government reports woodland cover to the UNFAO Global Forest Assessment based on the 20 per cent canopy cover definition.

Other wooded areas and trees outside forests (or woodland)

In addition to the UNFAO classification of forest, it identifies ‘Other land with tree cover’, spanning more than 0.5ha with a canopy cover of more than 10 per cent of trees. This includes groups of trees and scattered trees in agricultural landscapes, parks, gardens and around buildings, provided that the area, height and canopy cover criteria are met. It also includes trees established mainly for other purposes than wood, such as fruit orchards.

UNFAO also identifies ‘Trees outside forests’ (FAO, 2011) which incorporates stands smaller than 0.5ha and includes tree cover in agricultural land, e.g. agroforestry systems, home gardens, orchards, trees in urban environments and trees along roads.

The ‘Strategy for England’s Trees, Woods and Forests’ makes specific reference to Trees Outside Woods (TOWs): “…in fields, hedgerows, orchards, gardens, urban parks and streets, rural parklands and wood pastures. UK figures are not available for the area covered by most of these features, but in 2000, England had around 558,150km of woody boundaries, including hedgerows, shelter belts and lines of trees, providing habitats for wildlife, character to the landscape and cultural links to our past” (DEFRA, 2007).

The NIWT estimated there are 123 million trees in Great Britain outside discrete blocks of woodland. Many of these, particularly in rural areas, will be native tree species. Trees outside woods have particular importance for continuity of ancient trees in the landscape and for their contribution to landscape character. As keystone features in the landscape they also act as a stepping stone for species including some associated with ancient woodland. Given their extent, and the canopy cover they represent, they are likely to be of importance across a wide range of social and environmental functions also associated with ‘woodland’ (Brown and Fisher, 2009).

Woodland cover in the UK

The area of woodland in the UK at 31 March 2010 was estimated to be 3,079,000ha. This represents 13.0 per cent of the total land area in the UK, 9.9 per cent in England, 17.8 per cent in Scotland, 14.3 per cent in Wales and 6.5 per cent in Northern Ireland.

Of the total woodland cover, around 47 per cent is in Scotland, 40 per cent in England, 10 per cent in Wales and 3 per cent in Northern Ireland.
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Table 1. Area of woodland by forest type and owner (Forestry Commission, 2011a)

<table>
<thead>
<tr>
<th>Type and ownership</th>
<th>England</th>
<th>Scotland</th>
<th>Wales</th>
<th>Northern Ireland</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conifers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC/ FS woodland</td>
<td>155</td>
<td>447</td>
<td>98</td>
<td>55</td>
<td>755</td>
</tr>
<tr>
<td>Non-FC/ FS</td>
<td>256</td>
<td>633</td>
<td>69</td>
<td>10</td>
<td>969</td>
</tr>
<tr>
<td>Total conifer</td>
<td>411</td>
<td>1,081</td>
<td>167</td>
<td>66</td>
<td>1,724</td>
</tr>
<tr>
<td>Broadleaves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC/ FS woodland</td>
<td>59</td>
<td>33</td>
<td>16</td>
<td>6</td>
<td>114</td>
</tr>
<tr>
<td>Non-FC/ FS</td>
<td>827</td>
<td>276</td>
<td>121</td>
<td>17</td>
<td>1,241</td>
</tr>
<tr>
<td>Total B/L</td>
<td>886</td>
<td>309</td>
<td>138</td>
<td>22</td>
<td>1,355</td>
</tr>
<tr>
<td>Total all</td>
<td>214</td>
<td>481</td>
<td>114</td>
<td>61</td>
<td>870</td>
</tr>
<tr>
<td></td>
<td>1,083</td>
<td>909</td>
<td>190</td>
<td>27</td>
<td>2,209</td>
</tr>
<tr>
<td>Total</td>
<td>1,294</td>
<td>1,385</td>
<td>304</td>
<td>88</td>
<td>3,079</td>
</tr>
</tbody>
</table>

Conifer woodland

Conifer woodland covers over 1.7 million ha, including both native Scots pine and non-native conifer species. Around 44 per cent of this is managed by the Forestry Commission. Planting of significant areas of conifer forest did not begin until after the establishment of the Forestry Commission in 1919, and most has happened in the last 60 years to support an increase in domestic timber production.

In the last two decades the rate of afforestation of conifer woodland has decreased sharply following changes to the tax regime relating to forestry.

Broadleaved woodland

Around 44 per cent of woodland is broadleaved, both native and non-native tree species. There is no single definitive figure for native woodland. The UK Biodiversity Action Plan (UK BAP) figure is adjusted from the Forestry Commission figures which use broadleaved woodland as a surrogate for native woodland. The revised UK BAP gives the native woodland area as 1.058,721 ha, lower than the total broadleaved figure.

In contrast to conifer woodland, over 90 per cent of broadleaved woodland is owned and managed by private landowners, conservation organisations and others.

Ancient woodland

Ancient woodland sites are those that have been woodland since at least 1600 (1750 in Scotland). Ancient semi-natural woodland (ASNW) is woodland on ancient woodland sites that has semi-natural characteristics (predominantly native species of trees, ground plants and animals (Forestry Commission, 2010).

During the last century around 38 per cent of ancient woodland sites were felled of native woodland and replanted, mostly with non-native conifers, but also with other broadleaved species and Scots pine. These are categorised as Plantation on Ancient Woodland Sites (PAWS). Some of these sites are now being restored by both the Forestry Commission and private woodland owners to predominantly native tree species.
A further 7 per cent of ancient woodland sites were cleared of woodland, mainly for agricultural production.

**Table 2. Ancient and semi-natural woodland** (Forestry Commission, 2009)

<table>
<thead>
<tr>
<th>Woodland type</th>
<th>England</th>
<th>Scotland</th>
<th>Wales</th>
<th>Northern Ireland</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASNW</td>
<td>206</td>
<td>89</td>
<td>34</td>
<td>0</td>
<td>329</td>
</tr>
<tr>
<td>PAWS</td>
<td>135</td>
<td>59</td>
<td>28</td>
<td>1</td>
<td>223</td>
</tr>
<tr>
<td>OSNW*</td>
<td>210</td>
<td>44</td>
<td>47</td>
<td>15</td>
<td>316</td>
</tr>
<tr>
<td><strong>Total ancient</strong></td>
<td><strong>341</strong></td>
<td><strong>148</strong></td>
<td><strong>62</strong></td>
<td><strong>1</strong></td>
<td><strong>552</strong></td>
</tr>
<tr>
<td><strong>Total semi-natural</strong></td>
<td><strong>416</strong></td>
<td><strong>133</strong></td>
<td><strong>81</strong></td>
<td><strong>15</strong></td>
<td><strong>645</strong></td>
</tr>
</tbody>
</table>

*OSNW (other semi-natural woodland) is semi-natural but not ancient.

**Priority wood pasture and parkland**

Wood pasture and parkland are mosaic habitats valued for their trees, especially veteran and ancient trees, and the plants and animals that they support. Grazing animals are fundamental to the existence of this habitat. Specialised and varied habitats within wood pasture and parkland provide a home for a wide range of species, many of which occur only in these habitats, particularly insects, lichens and fungi which depend on dead and decaying wood. Individual trees, some of which may be of great size and age, are key elements of the habitat and many sites are also important historic landscapes.

These habitats occur throughout the UK, though more extensively in some areas than others. The extent of the habitat varies from landscape scale (the New Forest, Epping Forest) to small discrete sites comprising a few veteran trees. At present, there are no reliable statistics on the extent of the overall resource, nor on historic or current rates of loss or degradation of this habitat. An estimate of 10-20,000 ha currently in a working condition, on which a 2006 BAP target was based, was a best guess.

**The urban forest**

Urban forests relate to all woodland and tree cover in urban and peri-urban areas, including woods, small groups of trees and individual trees. Urban forestry as a distinct area of forestry practice began in the mid-1960s in the USA and only took hold in Europe during the 1970s and 1980s. The emergence of urban forestry as a practice in the UK can be seen, for instance, in the development of the community forestry programme in England (Konijnendijk, 2003) and through community forest initiatives in other parts of the UK, such as the Woods in and Around Towns initiative in Scotland.

There is no single reliable source of information on urban tree cover. Nonetheless, there have been attempts to begin to quantify urban tree cover in a number of cities in the UK and elsewhere in order to measure the contribution of urban trees to a number of ecosystem services.

Part of the difficulty in making comparisons comes from the definitions used in recording urban forests. Some use the UN or European definitions of forests within inventories (areas of 20 per cent canopy cover over 0.5ha) whilst others use total canopy cover.

Thus the average of 18.5 per cent for 26 larger European cities cited by Konijnendijk (2001) only includes woodland, not trees in small groups and individual trees outside woods. This compares with the figures from the ‘Trees in Towns II report’ (Britt and Johnston, 2008) which surveyed 147 English towns and cities and found an average of 8.5 per cent canopy cover.

Tree cover as reported by Britt and Johnston (2008) was unevenly spread in towns across England, with towns in the South East (11.8 per cent) and South West (11.1 per cent) highest, and those in the North
East (4.0 per cent) lowest. Town size had no effect on mean canopy cover. This suggests that many towns and cities in England are below the European average.

Designations, protection and certification

A small proportion of UK woodland is protected by designations – Sites of Special Scientific Interest (SSSI) or Areas of Special Scientific Interest (ASSI) in Northern Ireland, National Nature Reserves (NNRs), Special Areas of Conservation (SAC) or Special Protected Areas (SPAs). Figures are drawn from a report on protected forest areas in the UK produced by Pryor and Peterken (2001).

Table 3. Area of woodland under statutory protection (Forestry Commission, 2011a)

<table>
<thead>
<tr>
<th>Type of protection</th>
<th>England</th>
<th>Scotland</th>
<th>Wales</th>
<th>Northern Ireland</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAC</td>
<td>24</td>
<td>22</td>
<td>1</td>
<td>0</td>
<td>47</td>
</tr>
<tr>
<td>SPA</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>NNR</td>
<td>9</td>
<td>19</td>
<td>1</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>SSSI</td>
<td>80</td>
<td>38</td>
<td>9</td>
<td>2</td>
<td>129</td>
</tr>
</tbody>
</table>

These designations are based on biodiversity value, but trees may also be covered by other statutory protection based on amenity or landscape value, such as Tree Preservation Orders or Conservation Areas.

Certification is a voluntary process through which woodland owners agree to inspection of their forest management practices by an independent organisation against an agreed standard. For timber products to achieve certification, both forest management practices and the ‘Chain of Custody’, which tracks timber from forest to final sale, are assessed. The UK Woodland Assurance Standard provides the standard against which independent certification organisations can measure compliance with SFM practices.

Overall, 45 per cent of the UK woodland area is certified (Forestry Commission, 2010). The total certified woodland area in the UK is 1.28 million ha, including all Forestry Commission/Forest Service woodland. Around 87 per cent of harvested softwood (conifer) timber in 2009 was certified. This included both private sector and all Forestry Commission timber.
Comparing UK woodland cover with the rest of Europe and beyond

Total world woodland or forest cover is around 30 per cent of land area.

Table 4. World forest cover (United Nations State of the World’s Forests report 2009.)

<table>
<thead>
<tr>
<th>Country</th>
<th>Forest area (million ha)</th>
<th>Total land area (million ha)</th>
<th>Forest as per cent of land area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td>Total EU-27</td>
<td>156</td>
<td>419</td>
<td>37</td>
</tr>
<tr>
<td>Non-EU</td>
<td>37</td>
<td>152</td>
<td>25</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>809</td>
<td>1,689</td>
<td>48</td>
</tr>
<tr>
<td>Total Europe</td>
<td>1,002</td>
<td>2,261</td>
<td>44</td>
</tr>
<tr>
<td>Asia</td>
<td>571</td>
<td>3,087</td>
<td>19</td>
</tr>
<tr>
<td>North &amp; Central America</td>
<td>706</td>
<td>2,144</td>
<td>33</td>
</tr>
<tr>
<td>South America</td>
<td>832</td>
<td>1,743</td>
<td>48</td>
</tr>
<tr>
<td>Africa</td>
<td>635</td>
<td>2,968</td>
<td>21</td>
</tr>
<tr>
<td>Oceania</td>
<td>206</td>
<td>849</td>
<td>24</td>
</tr>
<tr>
<td>World</td>
<td>3,952</td>
<td>13,053</td>
<td>30</td>
</tr>
</tbody>
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The UK is one of the least wooded countries in Europe. Only the Netherlands at 10.8 per cent and Denmark at 1.8 per cent are lower than the UK (excluding micro-states). Within the UK, Northern Ireland at 6.5 per cent and England at 9.9 per cent are the lowest in terms of woodland cover. Wales and Scotland are 13.7 per cent and 17.2 per cent respectively.

For comparison France and Greece both have slightly less than 30 per cent woodland cover and Spain has almost 36 per cent cover. Average woodland cover for the whole of Europe is around 45 per cent, although this figure is heavily influenced by the proportion of forest cover in the Russian Federation.

There do not appear to be comparable figures for trees outside woodland. However the UK is unusual in the number of individual trees in the countryside, largely due to its history of enclosure by hedgerows – leading to large numbers of trees in these linear features – and its parklands and pasture woodland. The UK is particularly important for ancient and veteran trees; not only are these relatively numerous compared with other countries, they are of very high value for biodiversity and culturally.

Trends and issues

Globally, deforestation continues though some regions of the world are seeing increases. In the decade between 2000 and 2010 over 13 million ha of forest were lost (FAO, 2010). Europe, including the Russian Federation, represents 25 per cent of the total global forest resource.

Maintenance and enhancement of the forest resource is one of the criteria for sustainable forest management under the agreement of the Ministerial Conference on the Protection of Forests in Europe (MCPFE 2007). Between 1990 and 2010 the area of forest in the UK rose from 2.6 million ha to 2.8 million ha, at a time when forest cover across the whole of Europe also increased.

Total forest area of the UK is now around 13 per cent compared to around 37 per cent for the EU. The 1970s and 1980s saw annual UK afforestation rates in excess of 20,000ha, the majority of which was non-native conifer plantations. Recent decades have seen a decline in afforestation rates and a move towards a greater proportion of broadleaved species.
One issue of concern is the difficulty of recording forest loss. While creation of new woodland is included in statistics through grant schemes, permanent removal of woodland is not always accounted for. With woodland creation continuing at a low rate, and forests being permanently removed, for example for wind farms and other development, or for restoration of open-ground semi-natural habitats, there is a risk of net deforestation occurring.

The decline in afforestation has implications for the UK forest carbon sink. While it increased from 1990 to 2004, as carbon accumulated in growing trees planted during the period of rapid forest expansion in the second half of the last century, it may now start to decline due to reduced planting rates in the last 20 years and harvesting of mature trees. This apparent decline reflects the rules for carbon defined by the Kyoto protocol which excludes second generation forests from the carbon sink.
Britain’s forest resources

Prof Julian Evans OBE FICFor, Vice President Institute of Chartered Foresters

Compared with much of Europe, Britain is poorly wooded. But we are a small island with a high population density, hence much competition for land. Farming, urban needs, and industry all rightly compete with other uses. When we throw into the mix nature reserves, water bodies, moorland and mountain the statistic of 13 per cent of land under trees is perhaps more impressive than it appears.

Less appreciated is that today’s 13 per cent is two-and-a-half times what it was just over a century ago. Estimates for 1900 suggest that forest cover had dwindled to less than 5 per cent. Not surprisingly we were the world’s largest timber importer; today we are down to third largest but still import around 80 per cent of our requirement.

Since 1900, and mainly since the Forestry Commission was established in 1919, afforestation – planting trees on bare land – has added nearly 2 million ha. Because of the type of land available, mainly poorer quality farmland, conifers had to be the main choice, but this fitted well with industrial demand for softwood i.e. coniferous timber. And softwood remains by far the largest requirement today whether met by imports, for example, from Scandinavia or the Baltic states, or home-grown.

There has been a surprising spin-off from creating a planted forest estate, even though on infertile land. Thanks to careful choice of species, research into effective establishment, optimum management and of course our climate, we can grow trees faster than almost anywhere else in Europe. Britain has one of the most productive forest estates for its size. And that’s just what one would hope for in a densely populated island carefully husbanding its land resource. Just as agriculture today is urged to increase productivity per hectare, so too are our forests provided, of course, they are not displacing important habitats.

And this brings us to two black spots. The coniferisation of many ancient woods was both expensive to implement and, we now realise, mistaken in most cases. Secondly the blocks of new plantations on our hillsides were ugly and unsympathetic to land form. Today the response to the former, PAWS, is steadily rectifying past wrongs, while for the latter, restructuring and better forest design at the landscape level are largely eliminating old eyesores.

This experience with planted forests, Britain’s success in creating them and our response to what we got wrong, has led the world in this way of growing trees. This is no small role since it is estimated that 70 per cent of the world’s timber requirement will soon come from just 7 per cent of the world’s forest, namely the planted forests (Evans, 2009). The easing of pressure to source timber from natural forests, whether our limited area of ancient semi-natural woodland or tropical rainforest, will be evident.

Our aim today is to grow timber efficiently where it is appropriate to do so on this island of ours. It begs the question, is there a target forest cover we should aim for? And the further question, what proportion should be given to the conifers industry needs, bearing in mind that the bulk of new planting in the last 30 years has been native broadleaves planted with conservation as a primary objective?
The need for a target in England?

Dr Sophie Churchill OBE, Chief Executive The National Forest Company

The National Forest has been one of the most sustained forest creation projects in the country since the early 1990s. As at 2011, forest cover has trebled, reaching nearly 19 per cent in an area that averaged 6 per cent at the outset. In the central area, most affected by mining, the cover has moved from 1 per cent to 27 per cent. In recent years forest creation within The National Forest’s 200 square miles has represented approaching 10 per cent of the new woodland planted in England, a percentage of course achievable partly because of the decline in national planting rates, as described in this chapter. The government which came into office in 2010 has the aspiration to be ‘the greenest government ever’, so should there be a target for forest and woodland creation, given all the well-known reasons why it is ‘green’ to plant woodland? If there were a target, would the UK begin to ‘catch up’ with other states, assuming, as implied in this chapter, this may be what we want to achieve?

Whilst at the National Forest Company we work to an annual target, it does not follow that having a national target would do the same at a bigger scale. There is only a rationale in having a target if there are sufficient incentives and intensity of effort over that area to make that target attainable. As I write, the Woodland Carbon Task Force and the Independent Panel on Forestry are grappling with what those incentives might be to achieve a step change in forest creation. Moreover, a key limiting factor is land availability, with afforestation assisted in some countries by agricultural abandonment and low demand for land in certain rural areas. Happily, for agriculture, this is not the case in most of England, where land prices have remained buoyant in the face of declines in other sectors, in recent years. With pressures for housing development and lifestyle purchasers, there are market constraints on the land available for forestry.

Another argument against a national target for forest cover is that it says nothing about how the planting is done and ongoing management. It is immensely exciting in 2011 to see national commitment to large-scale ecological restoration, expressed in the Natural Environment White Paper. Adopting this approach across England would promote integrated areas of mixed habitats, with woodland taking its place within other ecologically valuable land cover. It is possible that simply decreeing a target for any one of the many habitats required to achieve restoration at a national scale will blunt this more sophisticated aspiration.

Finally, against the argument for a national forest cover target, the private sector remains vital to UK forestry, for all that relatively small-scale broadleaf planting with amenity value has somewhat been in vogue. Production of softwood for commercial markets is a vital part of national forestry and this is not susceptible to national targets, rather the vagaries of the market. So, does a national target for forest cover seem an unnecessary millstone around our necks?

Despite the argument above, perhaps it should be kept open as an option. Let us be optimistic that new incentives will emerge and that we get to understand fully the role of woodland in a major national effort for ecological restoration, of a sort never seen in this country. Let us believe that within this, the commercial sector will continue to contribute to higher forest cover than we have had in the last twenty years. If all this pertained, we would be in a strong position to achieve an ambitious target, not just for the sake of doing it but knowing why and how and achieving the aims of sustainable forestry as eloquently quoted in this report.
Integrating forest expansion in the wider landscape

Mike Townsend OBE FICFor, Senior Advisor Woodland Trust

With only 13 per cent woodland cover, the UK is still one of the least wooded countries in Europe. The value of increasing this substantially is now recognised, if not with specific targets, then at least in policy, in all four countries.

Native woodland makes up less than a third of the total forest resource. Native woods confer significant biodiversity benefits, and an expansion of native woodland would make a major contribution to ecologically functional landscapes that are permeable to wildlife. Native woodland should therefore make up a significant proportion of forest expansion.

The notion of ecosystem services brings together the range of benefits which trees and forestry provide. This includes the ‘provisioning services’, in particular timber production, ‘regulating services’ such as water management and carbon storage, and ‘cultural services’ such as recreation and education. The nature of new forests should also take into account the variety of ecosystem service needs, and in particular the locational dependency of many of these ecosystem services. New woodland creation should be a mix of treed landscapes to meet a range of material, social and cultural functions that support society.

So while forest expansion may include looking for the opportunities for expansive areas of forest, particularly on marginal agricultural land, we must also consider the need to maintain and increase good quality tree cover elsewhere.

For example, in urban areas, trees have a marked impact on urban heat island effect, providing shade from radiant heat, but also reducing ambient temperatures through evaporation from soil surfaces and transpiration from leaves. Careful siting and species selection can also help improve air quality through adsorption of pollutants and reduction in ground level ozone.

Access to high quality green space, and trees in particular, has been shown to encourage healthy lifestyles and promote both physical and mental health. But many town and cities are poorly served by tree cover or have an ageing and deteriorating tree stock. Maintenance and expansion of the urban forest is essential to making towns and cities well adapted. The canopy spread of trees makes them well suited to provide large areas of green cover, even in paved town centres.

In the agricultural landscape, a dichotomous view which sees farming and forestry as competing activities is unhelpful, particularly when food security has become a major driver for land use policy. An increase in tree cover on farms can support productive farming, providing shade and shelter to improve animal welfare and increase food efficiency, reducing wind damage to crops and improving the efficiency of irrigation through reduced evaporation, providing an alternative source of on-farm energy, timber, and so on.

But it requires us to re-evaluate the way we look at trees in such landscapes. There has been little focus on the importance and value of scattered trees, shelter belts and hedgerow trees in the rural landscape. And yet these trees outside woods represent a significant proportion of canopy cover, contributing both to productive agriculture and to ecosystem services such as water management, biodiversity and cultural landscapes.

Many of the benefits from expansion of tree and forest cover are public goods. We need to acknowledge and measure the value of these services and properly reward those who supply them.
2 Governance

Key points

- Tenure of forests, woods and trees in the UK is complex, with a multitude of ownerships, leasehold and management arrangements. More than a quarter of forests and woods are state-owned, though the proportion varies very widely between the different countries of the UK.

- Regulation is through a multifaceted approach of legislation, policy and incentives, and regulatory powers split across different arms of government, and further complicated by devolution.

- There are opportunities for the public to comment on forestry proposals. However, direct ownership, management or stewardship of woodland and forests by communities, though increasing, is still relatively rare.

- Questions are often raised over whether it is appropriate for a state organisation to be forest manager, timber producer and trader, and regulator at the same time. However, recent proposals around privatisation of public forests have generated strong public opposition.

Introduction

This chapter looks at the frameworks and systems that determine how our forests, woods and trees are managed, including land tenure and stewardship, regulation through legislation and policy, and opportunities for wider consultation and participation.

Historical context

The history of land ownership in the UK, and the systems that have resulted, are complex. Broadly, though, private ownership of woodland dominated for centuries, with ordinary people retaining common rights to gather firewood, fruit and fungi, or to use land for grazing and pannage. These rights were curtailed by enclosure of land, for example through the Enclosure Acts in England.

The establishment of the Forestry Commission in 1919 signalled a shift in tenure of woodland and in the way its management was regulated. Set up in response to the need to create a strategic timber reserve, at a time when woodland cover was at a low point, by the 1940s the Forestry Commission was the largest landowner in the country (Lawrence et al., 2009), pursuing a successful programme of afforestation and responsible for administering both grants to private landowners and forestry policy. In Northern Ireland, state forestry began even earlier, with the first acquisition in 1910.

Towards the end of the 20th century in other sectors, a rash of privatisations moved many state assets into corporate hands, but the Forestry Commission and Forest Service have remained.

Current situation

The Forestry Commission/Forest Service owned or managed 28 per cent of the total woodland area in the UK in 2011 (though in fact true ‘ownership’ of state forests actually lies with government rather than the agencies themselves). This proportion ranged from 16 per cent of the woodland area in England to 69 per cent in Northern Ireland.
Table 5. Ownership of woodland in the UK (Forestry Commission, 2011a)

<table>
<thead>
<tr>
<th>Ownership</th>
<th>England</th>
<th>Wales</th>
<th>Scotland</th>
<th>Northern Ireland</th>
<th>UK</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>000’s hectares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry Commission/Forest Service¹</td>
<td>214</td>
<td>114</td>
<td>481</td>
<td>61</td>
<td>870</td>
</tr>
<tr>
<td>Non-FC/FS woodland</td>
<td>1,083</td>
<td>190</td>
<td>909</td>
<td>27</td>
<td>2,209</td>
</tr>
<tr>
<td>Total woodland</td>
<td>1,297</td>
<td>304</td>
<td>1,390</td>
<td>88</td>
<td>3,078</td>
</tr>
</tbody>
</table>


Up-to-date figures are not available breaking down the types of non-Forestry Commission/Forest Service ownership, but figures from the National Inventory of Woodland and Trees, dating from 1995-99, showed the majority of this was classed as ‘personal’ or ‘business’ ownership, with only small percentages of woodland owned by forestry or timber businesses, charities, local authorities, and communities.

In terms of the ‘personal’ owners, there is little information about their profile, though there is evidence that it has changed and is still changing. In Scotland, for example, in the second half of last century there was a substantial shift from traditional landed estates, which dominated ownership in the 1960s, to corporate ‘investment’ owners. In England, a number of recent studies have demonstrated a small but potentially significant shift from farmers owning woods towards those interested in rural lifestyles, or associated with new rural businesses (Lawrence et al., 2010). This reflects a shift in ownership of farmland generally – in 2000, 39 per cent of farms sold in Britain were bought by non-farmers.

Many European countries have a stronger tradition of community ownership than the UK. In France, there are 11,000 forest communes owning around 20 per cent of the total forest area, and much more wooded common land. However, the area under community management has grown considerably in 15 years, and there are now at least 600 community woods in Great Britain (Lawrence et al., 2011). A valuation of the economic and social contribution of forestry for people in Scotland states that in 2007 there were at least 8,100ha in community ownership and more than 10,000ha in other forms of community management. These figures do not include substantial areas of new woodland created since 1995 on common grazings of townships in the crofting counties. In Scotland, the Land Reform Act 2003, and the National Forest Land Scheme have created additional opportunities for community-owned woodland. The Localism Bill, covering England and Wales, and the ongoing review of the England public forest estate, may create similar opportunities there.

The figures available on ownership do not reflect ownership of trees outside woods, and there is not comprehensive information available on this. However, in urban areas, responsibility for street trees, many urban woods, and parks is likely to lie with local authorities; wood pastures, parkland, hedgerow and other trees scattered across the landscape are likely to be owned by large estates and farmers.

A wide range of ownerships means a multitude of objectives among owners. State forests were initially established mainly with the aim of timber production, but more recently, delivery of public benefits has become the key driver, including environmental and social benefits. This is reflected in wider forestry policy and strategy. For example, in the Scottish Forestry Strategy (Scottish Government, 2006), outcomes include improved health and well-being of people and communities, economic growth, and a high quality, robust and adaptable environment. The Welsh Assembly Government’s Woodlands for Wales Strategy (Welsh Assembly Government, 2006) has four key themes: responding to climate change, woods for people, a competitive and integrated forestry sector, and environmental quality. Many of the charities that own woodland, such as the Woodland Trust, The Wildlife Trusts and RSPB, have biodiversity as a key objective. For others, like the National Trust, landscape and historical context may also feature strongly. Woodland and trees owned by local authorities often have amenity and recreation as key objectives.
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Private owners have various objectives, often multiple, though the priorities will vary. A review of several studies of private landowners’ attitudes showed a clear pattern in the evidence on owners’ reasons for having and planting woodland, with landscape and conservation ranked highest, and shooting also high. Production and profit were low in the list of priorities, and provision of public recreation even lower (Lawrence et al., 2010). However, this needs to be considered in the recent economic and social context, where landowners have had low expectations of financial return from timber and wood production, and may therefore see landscape and conservation improvement as the main values their woods are able to deliver.

Regulation

Regulation of forestry and woodland in the UK sits within an international framework. The UK Government is committed to international agreements that require it to report every five years or so, through the Global Forest Resources Assessment (GFRA) and the pan-European (MCPFE) indicators. These indicators show the extent and condition of woods and forests, together with social and economic aspects of sustainable forestry. Forestry also features in other international indicator sets on which the UK reports, such as those for the Convention on Biological Diversity (CBD) and the UN Framework Convention on Climate Change.

There are a number of important EU directives, conventions and guidance, implemented through UK laws, which affect forestry practice. These include:

- **The Habitats Directive (92/43/EEC)** which protects and monitors threatened habitats, identifies wild flora and fauna as European protected species, and controls developments that may affect them.
- **Forest Reproductive Material Directive (1999/105EC)** on the marketing of forest reproductive material.
- **The Water Framework Directive (2000/60/EC)** which is designed to improve and integrate the way the water environment is managed throughout Europe.
- **The Environmental Liability Directive (2004/35/EC)** which seeks to achieve the prevention and remedying of environmental damage to habitats and species protected by EC law. It reinforces the ‘polluter pays’ principle – making operators financially liable for threats of or actual damage.
- **The European Landscape Convention (ELC)** which provides a basis for closer co-operation in the planning, protection and management of landscapes and recognises that landscape has important cultural, ecological, environmental and social dimensions as part of sustainable development.

The Forestry Commission has a range of powers and duties under the 1967 Forestry Act and amendments. In Northern Ireland, Forest Service performs an equivalent role in respect of the 1953 and 2010 Forestry Acts (Northern Ireland).
Forestry policy in England, Scotland, Wales and Northern Ireland is devolved, and is the responsibility of the respective administrations. National forestry strategies set out priorities and programmes agreed in each country. Policy is applied directly through public forests managed by the Forestry Commission and Forest Service, and for other forests, woods and trees through a range of regulatory instruments and incentives. The forestry authorities also fund research relating to forestry and provide advice and guidance.

Under the Forestry Acts, it is illegal to fell more than 5 cubic metres of growing trees per quarter in Great Britain and, since 2010, in Northern Ireland, without prior approval, although there are exceptions for trees below a specified size and dangerous trees. International commitments on preventing forest loss mean that replanting is usually required. Where trees or woods are subject to designation, for example Site of Special Scientific Interest (SSSI) or Tree Preservation Order (TPO), the consent of the relevant statutory authority is required for management activity.

The Forestry Commission and Forest Service also have legal powers to prevent the entry of non-endemic pests and diseases of trees, under the Plant Health Acts. Trade in ‘reproductive material’ (seed, plants or cuttings) is also controlled under Forest Reproductive Material regulations implementing the EU Directive 1999/105EC on the marketing of forest reproductive material.

Forestry management is not defined as ‘development’ and so does not come within the scope of planning legislation. However, where development, e.g. housing, is proposed on a woodland site, planning procedures apply and override the requirement for a felling licence.

Most trees outside woods have little protection beyond the requirement for a felling licence to fell trees over the minimum volume requirement, unless, for example, they host a bat roost which is protected by national and European legislation. Tree Preservation Orders are the principal way of permanently protecting trees of amenity value and have no geographic/location or size limitation. Trees in Conservation Areas, which are designated for architectural or historic interest also have temporary protection (Brown and Fisher, 2009). Other countries in Europe have identified remarkable trees for individual legal protection but in the UK, even the most special trees could be damaged or felled since they fall below the minimum quarterly felled timber volume requiring a licence (5 cubic metres, equivalent to the loss of two or three large trees). Even the small proportion of ancient and veteran trees covered by designations are vulnerable because of exemptions in the legislation and issues around safety and liability.

Proposals for new planting (including short rotation coppice), deforestation, forest road construction and quarries come under the forestry provisions of the EU Environmental Impact Assessment Regulations. Proposals that might have significant environmental impacts require an Environmental Impact Assessment (EIA). The Forestry Commission and Forest Service are responsible for implementing the regulations. If an EIA is needed, the applicant must prepare a comprehensive plan, an exploration of the relevant environmental effects and a statement of the environmental impacts.

The Wildlife and Countryside Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife (birds, and some animals and plants) in Great Britain and 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/EEC) are implemented here. Similar legislation is enacted to fulfil these obligations elsewhere in the UK.

European Protected Species are animals and plants that receive additional (to the Wildlife and Countryside Act 1981) protection under The Conservation of Habitats and Species Regulations 2010. This legislation updates and consolidates all the amendments to the Regulations since they were first made in 1994. It is an offence for anyone to deliberately capture, injure or kill any such animal or to deliberately take or destroy their eggs. It is an offence, even accidentally, to damage or destroy a breeding or nesting place of such an animal. It is also an offence to have in one’s possession or control,
Governance

any live or dead European Protected Species. It is an offence to deliberately pick, collect, cut, uproot or destroy a wild plant of a European Protected Species, or for any purpose to possess, sell or exchange such a plant.

Forest management is also covered by health and safety legislation, with duties under the Health and Safety at Work Regulations 1999 for all those involved in forestry and other tree work.

Grants are offered in each country, targeted at delivery of the country forestry strategies, and covering planting, natural regeneration, felling and restocking and other management operations. These may require an approved forest plan, and forestry work undertaken through the grant schemes must meet the requirements of the UK Forestry Standard. This sets out the Government’s approach to sustainable forest management, and includes a comprehensive set of guidelines. This Standard is periodically revised and updated.

In parallel with the UK Forestry Standard, independent certification schemes have been developed. These grew out of pressure on timber users to demonstrate independently that the timber they use is from sustainably managed forests. The UK Woodland Assurance Standard (UKWAS) has been developed by a multi-stakeholder group to meet this need. This Standard is recognised by the two main international forest certification schemes, the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification Schemes (PEFC). The requirements for certification are more onerous and wide ranging than those set out in the UK Forestry Standard. Certification has been taken up by commercial forest owners more than smaller woodland owners.

There are tax benefits to commercial woodland ownership. While this is not strictly regulation, it does influence land ownership decisions. For commercial woods, no Income or Corporation Tax is charged on the occupation of, or timber income from, the land and Capital Gains Tax is not payable on the gain in value of standing timber; only the increase in value of the underlying land is assessable. Non-commercial woods are subject to normal Capital Gains Tax rules. Commercial woodland also currently attracts 100 per cent business property relief from Inheritance Tax provided the transferor has owned the ‘relevant business property’ for a minimum of two years immediately before the transfer. There is no definition of commercial woodland. They are best described as woods which are ‘managed on a commercial basis with a view to the realisation of profits.’

Woods may also qualify for the conditional exemption from Inheritance Tax which is available for assets of national heritage quality e.g. land of outstanding scenic, historic or scientific interest.
Consultation and participation

While the UK does not have a strong tradition of community forest management, there has been a more general move towards greater local involvement in woodland, particularly through projects such as the Central Scotland Forest, and the National Forest and Community Forests in England, and grant initiatives including Cyd Coed in Wales, and the Woods in and Around Towns project in Scotland. These recognise the importance of community engagement, the value of woods to health and well-being, and the potential role of woodland in regeneration and sustainable development.

In addition, it is possible for anyone to comment on forestry proposals. For example, where an Environmental Impact Assessment is required, there is extensive consultation. All felling licences, forest plans and grant schemes are entered on the Public Register of New Planting and Felling. Many of the UK’s forests are voluntarily and independently certified. A requirement of certification is consultation with affected and interested stakeholders. Forest certification has contributed significantly to consultation and participation particularly during the periodic review of management planning documentation.

In Wales, the Forestry Commission has produced a Public Involvement and Social Enterprise Framework (Forestry Commission Wales, 2011) to promote and facilitate community activities on the public forest estate, including supporting community woodland organisations.

Issues

State ownership accounts for a considerable percentage (more than a quarter) of woodland and forest in the UK. The consultation over the future of the public forest estate in England in early 2011 was not the first time this has been put under scrutiny. The first calls for the abolition of the Forestry Commission were in 1922, soon after its inception; a committee on National Expenditure recommended that it be merged with the Board of Agriculture, and there were other, similar calls, later
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than this. Forestry Commission sites have been sold off over the years in a piecemeal way. Concerns are often raised as to whether it is appropriate for the Forestry Commission and Forest Service to be both manager and regulator of forests. In other parts of the world with a similar forestry history, state ownership has been dismantled, for example in New Zealand, where privatisation was seen as a logical change in the way the country managed its plantation forestry resource consistent with the maturing of the industry.

Yet the idea of privatising forests sparks strong public opposition. The consultation in England in 2011 was abandoned in the face of vociferous campaigning. Proposals by the Scottish Government to lease 25 per cent of state forests were also abandoned in 2009. The concept of community ownership and management has gained ground, especially in Scotland. This still accounts for a small percentage of the total forest area, but it is clear from their response that the public as a whole wishes to have a stake in the UK’s forests in some way, even if this is only through better consultation and retaining their right to access and enjoy the forest resource. This suggests that ownership may not always be the key question: what matters to people is whether governance arrangements and regulation enable forests to deliver all that we require from them, and people as a whole feel they have a genuine stake in decision-making.

Regulation of forests, woods and trees is complex, and increasingly varying across countries. The challenge is always to maintain a balance between sufficient safeguards and enabling a productive forestry sector. In 2011 a Forestry Regulations Task Force was established by the Forestry Minister to look at regulation affecting forestry in England, but also to advise where issues relevant to devolved administrations were identified. The aim of the Task Force was to look at ways of ensuring the regulatory burden on forestry is fit for purpose. The Task Force delivered its report in October of this year (Forest Regulations Task Force, 2011) recommending a system that reduces regulation for managers with a good track record of sustainable woodland management, as well as a simplified guide to the UK Forestry Standard, more effective and streamlined applications for grants and easier web access to advice on felling licences including reporting suspected illegal felling activity.
Trees don’t care who owns them... so why should we?

Jon Hollingdale, Chief Executive Community Woodlands Association (Scotland)

Many people will be aware that Scotland’s land ownership patterns are unique in their concentration of so much in the hands of so few, and that asking “Who owns Scotland?” is a politically charged act; one that official bodies systematically avoid.

Recent, as yet unpublished, research commissioned by the Forest Policy Group has quantified just how unusual our forest ownership patterns are. Two key findings emerge: of 20 European countries studied, Scotland has the largest average private forest holding size at 259ha, four times larger than the next (Sweden); and of the two-thirds of Scotland’s forest in the private sector, two-thirds is owned by absentees, three-quarters of whom are from outside Scotland.

This might just be of academic curiosity, were it not that, as the Scottish Government itself has stated: “there is a wide consensus that we are not getting the best from Scotland’s land even though we continue to demand more and more from it”. The Land Use Strategy identifies the changes necessary for better land use to deliver improved and enduring benefits and enhance the well-being of the nation:

● Delivering multiple benefits
● Partnerships with nature
● Linking people with the land

Do we really believe that the two issues: who owns the land, and the public benefits it delivers, are not in some way connected? As it seems likely that many of Scotland’s forests are owned by those who have never visited, and may even be unaware of what they own, it’s hardly surprising that our forests aren’t delivering all that they might.

Naturally, as an advocate for the community sector I’m going argue that community ownership is uniquely placed to deliver not only the full gamut of multiple benefits, economic, environmental and social, of which forestry is capable, but also gives added value by providing a genuine opportunity for collective action, community empowerment and civic pride. At the same time I’ll happily acknowledge that we have no monopoly on virtue, and that there are many beautiful, well-managed and multiply-productive forests in the public and private sectors.

As yet, however, they are still more exception than rule. Too much of Scottish land ownership and acquisition is predicated on the tax breaks and subsidies that land ownership brings, and too much of our land is valued by its owners as a long term repository of capital and a handy signifier of social power and status, than for its productive capacity. Unless we address our land ownership issues, we are going to find it very difficult to “get the best from Scotland’s land”.

Woods for people, the new opportunity

Forest Policy Group (Scotland)

The time has come for a new, more balanced vision for forestry in rural Scotland. The overwhelmingly dominant model of large conifer plantations (94 per cent of the publicly owned estate) has an important place, but it needs to be part of a bigger and more balanced picture, delivering a more diverse array of products and benefits. There is a need for more emphasis on small, locally-owned, diverse, multifunctional and productive woodland.

The Scottish Government is committed to an expansion of woodland, and it will benefit communities more if much of this expansion comes from a de-centralised approach, leading to a more varied pattern of ownership, and greater social and environmental benefits. Redressing the balance in this way will also strengthen rural communities; trees and woods should be a key feature of most holdings and landscapes, helping to address the fragility and insecurity of rural settlements and the ecosystems on which they depend, especially in the uplands. On farms, we need to break through the artificial divide between agriculture and forestry.

There is an appetite, with nearly 200 member groups of the Community Woodlands Association, and the Scottish Crofting Federation putting the case for more crofts, including woodland crofts. Diversifying ownership and management of forests to include a greater number of locally based people and communities would involve more sectors of society in forestry, bring more innovation to the industry, and provide different income streams and a more robust and socially just ownership pattern.

Achieving all this requires believing in people and investing in their ability to create and manage a resource that meets local as well as national needs.

Specifically, it requires greater recognition of the contribution that this kind of forestry could make to rural development, simpler grant schemes that emphasise local priorities and diversity, better promotion of the National Forest Land Scheme and facilitation of syndicate approaches to purchase public forest land, grants and restocking plans that favour other species to re-balance the dominance of Sitka spruce, regulation of deer management on the basis of a stronger presumption in favour of woodland expansion, and more emphasis on the productive potential of new native woodland.
Small woods
Judy Walker and Phil Tidey, Small Woods

Small woods from one to 100ha make up half the UK's woodland cover. They are easily overlooked, but together they provide rich habitat, profit for small woodland businesses, and add value to rural and urban landscapes. They provide places for employment and industry especially for those who seek a second chance in life. Wood products help to reduce fossil fuel use and combat climate change. Our small woods are under threat from development, from garden encroachment, and from neglect, and are generally undervalued for the contribution they make to the landscape. Some small ancient woods are neglected and unmanaged, with declining habitats that are unproductive and poor (especially for ancient woodland flora species, which have declined by 34 per cent in the last 20 years).

Sixty per cent of the annual increment of 7.1m tons of wood produced by woodland in England is currently not harvested. Most of this is in smaller unmanaged woods. The current increase in demand for woodfuel (if it is not to be met by imports) should provide a driver to bring more of these wood into management with economic, environmental and social benefits. The new type of woodland owner, interested in the 'third way' of woodland management for multiple objectives rather than commercial timber production, or low/non-intervention conservation management, needs the tools and support to deliver.

The abortive Public Forest Estate consultation in England in 2010-11 surprised many in the sector with the depth of feeling shown by the public (albeit sometimes from an ill-informed standpoint) about the ownership and governance of the UK's woods. People care about our woodland. We at Small Woods interact on a daily basis with woodland owners and those interested in woodland, and their passion for managing their woodland, be it for timber, woodfuel, conservation, crafts, recreation or a combination of these, is marked.

Owners and managers of small woods contribute much to their local environment and communities through the management of their woods. Recent surveys by www.woodlands.co.uk and by Small Woods show that of responding owners nearly half manage their woods, most often for domestic woodfuel, and most purchased their woods for conservation and family relaxation, providing a place for physical exercise, to learn about woodland management and for birdwatching.

In Scotland (with support from the Community Woodlands Association) and in Wales (where Llais y Goedwig was formed in 2010) communities have taken ownership of their local wood through leases, management agreements and purchase. Political support and legislation following devolution in Scotland and Wales together with a positive response from the Forestry Commission has seen groups facilitating rural development and creating jobs. There is a need for a genuine (and properly resourced) programme in England to support community groups to become more involved in the management of their local woods, and mechanisms are needed to enable motivated and experienced groups with clear objectives to lease or buy local woodland.
From discord to accord: a decade’s work building consensus on sustainable forest management

Peter Wilson FICFor CEnv, Executive Chair UK Woodland Assurance Standard

The UK forest industry found itself in the public spotlight for all the wrong reasons in the 1970s and 1980s. Public concern, championed by NGOs and much reported in the media, centred primarily on the expansion of Britain’s much depleted forests and woodland. On the face of it, expansion was of course a good thing but, if one chose to dig a little deeper, a multitude of conflicting objectives were revealed. The expansion was largely taking place on the land available at the time, mainly upland semi-natural habitats, whilst existing semi-natural woods were often modified into plantation-style woodlands. In both, there was an emphasis on commercial timber production hence the choice of high yielding, often exotic, species. By the end of the 1980s, debate on forestry matters was characterised by polarity.

In the 1990s, much work was done to counter this polarity by building bridges and seeking consensus on a common agenda. In 1996, a UK Forestry Accord was agreed between business and environmental and social NGOs on a set of objectives and principles for responsible forestry; in 1998, European forestry ministers agreed pan-European operational level guidelines for sustainable forest management and the UK Government launched its UK Forestry Standard setting out how to achieve sustainable forest management in practice.

This period also saw rising consumer concern about the environmental impacts of forest management across the world and a demand for assurance that timber products were sourced from well-managed forests. There was much debate on how best to achieve this in the UK context. Initially there was considerable disagreement; some advocated reliance on the governmental controls already in place and others championed a new process known as forest certification involving independent verification against a published certification standard defining sustainable forest management.

In time, the UK’s forestry, environmental and social communities chose to work together to develop an independent ‘audit protocol’ or certification standard. The Forestry Commission played an invaluable role as a facilitator and the stakeholders agreed that ownership of any certification standard must rest with the stakeholders and that all decisions must be based on consensus. The concept developed was for an independent certification standard for use in others’ certification programmes. In 1997 work began to develop a standard that would reflect the requirements of the governmental UK Forestry Standard and through this the guidelines adopted by European Forestry Ministers. The Forest Stewardship Council (FSC) in the UK had started developing a certification standard already and this work informed the development of the independent standard so that it would be conformant with FSC’s principles and criteria for forest stewardship. The UK Woodland Assurance Standard (UKWAS) was endorsed by FSC and launched in 1999.

The launch of the UKWAS was a landmark event for UK forestry; it was achieved through a sense of common purpose and the sheer hard work of those involved and it put the UK at the forefront of the global certification movement. In addition to the FSC’s endorsement, the
UKWAS was endorsed by PEFC in 2002 so allowing UK woodland to be dual-certified to the two leading global certification schemes. This allows the UK forestry sector to respond to demand for certified products in most international markets.

Certification is now an established part of the UK forestry scene and the UKWAS has made an important contribution to raising the standards of woodland management. A revised Second Edition was published in 2006 and a third edition will be launched in 2011. The UKWAS continues to serve a vital role in enabling producers to demonstrate their good credentials to consumers and it is a testament to what hard work, partnership working and good will can do to overcome polarity.
Applying international standards
Charles Thwaites, Executive Director Forest Stewardship Council (UK)

A charge sometimes made against FSC is that its forest management standards work best in large tropical or temperate forests; they are not so much suited to the relatively small and varied woodlands that characterise the landscape of much of the UK. This may be true to an extent – the size and uniform nature of some large forests elsewhere in the world inevitably provide a few efficiencies of scale – but it does not mean that FSC makes no effort to tailor its standards to encourage the uptake of certification whatever the circumstances of individual countries.

FSC’s fundamental requirements for responsible forest management are known as its principles and criteria. These are general rules that can be applied anywhere in the world and for any woodland type. All FSC expects is that these rules are reflected in a national forest management standard which, in the case of the UK, is the UK Woodland Assurance Standard (UKWAS).

A more detailed explanation of the UKWAS process is contained elsewhere in this section. However, the fact that FSC is represented on the UKWAS Steering Group at senior level ensures that the principles and criteria are translated through UKWAS into practical actions that UK forest managers can utilise on the ground. Interpreting FSC’s requirements into a national certification standard, agreed through consensus obtained within a multi-stakeholder group, remains the most powerful means of FSC adapting its requirements to local circumstances.

FSC also allows countries a measure of flexibility to decide the area size of woods that can be regarded as ‘small’. Small woodland managers may provide a lower level of evidence (particularly less documentary recording) to demonstrate to auditors that they meet the requirements of the UKWAS. Auditing frequencies for small woods are also reduced in comparison to larger holdings. The UK has recently agreed to increase the upper area threshold for small woods from 100ha to 500ha.

At the micro-level, FSC is closely monitoring trials taking place in continental Europe of a checklist approach to certifying woodland of under 30ha. This may prove particularly valuable to owners of very small woods who wish to provide certified material to the biomass market. Unfortunately it is too early to tell how and when this concept will be incorporated into UK forest management.

The area of certified woodland in the UK has not significantly increased for some years. Yet demand for FSC timber in the marketplace continues to grow and will increasingly encompass emerging products, such as biomass. This short perspective is to provide a level of confidence that this conundrum can be addressed and that FSC, with all its rules and requirements, should be as relevant and useful for UK woodland owners as it is to the commercial manager of a large forest concession in the tropics or elsewhere.
3 Productivity and sustainable forest management

Key points

- Forests, woods and trees in the UK have always been managed; their value as providers of timber, wood and other products has often ensured their survival.

- The way they are managed has evolved through time, but is now regulated to a large extent by the UK’s commitment to principles of sustainable forest management.

- The UK is a large net importer of timber and wood products, though there is potential to increase domestic production. Demand for wood fibre is increasing, particularly to meet government targets on renewable energy.

- While this presents an opportunity for UK forestry, it also presents challenges in maintaining the balance between new and traditional markets, maximising potential productivity while adhering to sustainable management, and in building capacity within the industry to cope with change.

Introduction

Forests, woods and trees provide us with a wide range of goods and services, but it is their ‘provisioning’ role as a source of timber, fuel, and other non-wood products that has often ensured their survival and has helped determine their current nature. They make an important contribution to our economy, with potential to contribute a good deal more. Recognition that they are a valuable and limited resource has led to principles of sustainable forest management being enshrined in policy in the UK, to ensure that they are managed in such a way that they continue to provide for us.

After the Earth Summit in Rio de Janeiro in 1992, the UK Government undertook a commitment to sustainable forest management, which is now embedded in UK policy cascading from international agreements. The definition below was developed by the Ministerial Conference on the Protection of Forests in Europe (MCPFE) and has since been adopted by the United Nations Food and Agriculture Organisation (UN FAO).

“The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.”

Historical context

Forests, woods and trees in the UK have been subject to human intervention for millennia. There is virtually no ‘untouched’ woodland (if any), and woodland has survived in many areas precisely because of its usefulness in providing timber and other products. Medieval woodbanks and ditches found particularly in south and east England show an early preoccupation with boundaries and security, and court records show that thefts of products from underwood to acorns were viewed as serious
The State of the UK’s Forests, Woods and Trees

enough to incur fines (Rackham, 1976). Woods and treed landscapes across the UK show evidence of management through coppicing and pollarding over centuries. The range of products from woodland and trees was vast, including: timber for construction; firewood; rods for hurdles, wattle, and baskets; charcoal for a range of industries; fodder, grazing and pannage for livestock; chemicals for tanning; medicines; and game.

Towards the end of the 19th century and beginning of the 20th century traditional management fell into decline as traditional markets disappeared. The coming of the railways brought cheap coal to the countryside, at a time when prices were high for oak bark and timber, and there was a subsequent reduction in coppicing or pollarding and increase in growing timber trees. While specialised trades using underwood (e.g. those making rakes, hoops and hurdles) and pollard products survived into the 20th century, they too suffered in the agricultural depression of the 1930s (Rackham, 1976, 1986). Industrial uses of wood as a fuel had virtually disappeared by the 1950s (UK NEA, 2011).

Modern forestry systems began to be applied on a large scale from the end of the 19th century. This trend was accelerated with the establishment of the Forestry Commission in 1919, with extensive afforestation to replace woodland lost over preceding centuries, new plantations were inevitably large and even-aged, encouraging increased mechanisation and economically efficient systems of clear-felling and restocking. Towards the end of the 20th century, though, large scale commercial planting and felling became increasingly regulated to comply with developing thinking on sustainable forest management.

Current situation

Productivity and contribution to the economy

The UK currently imports most of its wood and wood products, and exports very little. It is the third largest net importer of forest products in the world, behind China and Japan (Forestry Commission, 2010). Imports accounted for 81 per cent of all wood in the UK in 2010 (Forestry Commission, 2011) – though this has fallen from around 96 per cent in the 1940s. As a producer, in the context of Europe as a whole, the UK is a minor player, producing 2.1 per cent of Europe’s sawnwood, 3.8 per cent of its wood based panels, and 4.4 per cent of paper and paperboard in 2008 (Forestry Commission, 2010a).

Production of softwood is considerably greater than that of hardwoods. In 2010, 9.6 million green tonnes of softwood was produced in the UK, around 48 per cent of which was from Forestry Commission or Forest Service forests and the remainder from privately-owned woods. The majority of both Forestry Commission and Forest Service softwood (53 per cent) and softwood from privately-owned woods (75 per cent) was produced in Scotland (Forestry Commission, 2011a).

In 2010, production of 0.5 million green tonnes of hardwood was recorded in the UK. The majority of this (87 per cent) was from privately-owned sites. However, total production was similar to the previous year, with considerable increase from 2008, reversing a declining trend, with the majority used for woodfuel. Figures for hardwood production do not take into account all wood cut for firewood for domestic heating, since much of this is done by individuals as an informal business or for their own domestic use. Some estimates suggest the size of the market could already be anything from 200,000 to 1 million tonnes per annum (John Clegg Consulting, 2010).
Table 6: Deliveries of softwood from UK woods in 2010 (Forestry Commission, 2011a)

<table>
<thead>
<tr>
<th>Delivered to</th>
<th>Thousand green tonnes</th>
<th>% total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawmills</td>
<td>5,616</td>
<td>60</td>
</tr>
<tr>
<td>Pulpmills</td>
<td>428</td>
<td>5</td>
</tr>
<tr>
<td>Wood based panels</td>
<td>1,375</td>
<td>15</td>
</tr>
<tr>
<td>Fencing</td>
<td>349</td>
<td>4</td>
</tr>
<tr>
<td>Woodfuel</td>
<td>1,050</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>135</td>
<td>1</td>
</tr>
<tr>
<td>Exports</td>
<td>467</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,420</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 7. Deliveries of UK-grown hardwood in 2010 (Forestry Commission, 2011a)

<table>
<thead>
<tr>
<th>Delivered to</th>
<th>Thousand green tonnes</th>
<th>% total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawmills</td>
<td>75</td>
<td>14</td>
</tr>
<tr>
<td>Pulpmills</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wood based panels</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Woodfuel</td>
<td>400</td>
<td>75</td>
</tr>
<tr>
<td>Other*</td>
<td>59</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>535</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Includes round fencing and roundwood exports

Wood product exports from the UK were valued at a total of £1.5 billion in 2009, a decrease of 15 per cent from the 2008 total of £1.8 billion. Total exports of wood products in 2009 comprised 89 per cent pulp and paper (mainly paper), 7 per cent wood-based panels, 3 per cent sawnwood and 1 per cent other wood.

Table 8. UK export quantities 2006-2010 (Forestry Commission, 2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sawnwood</th>
<th>Other wood1</th>
<th>Wood based panels</th>
<th>Paper</th>
<th>Pulp</th>
<th>Recovered paper</th>
<th>Total pulp &amp; paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>415</td>
<td>1,214</td>
<td>510</td>
<td>1,002</td>
<td>24</td>
<td>3,996</td>
<td>5,022</td>
</tr>
<tr>
<td>2007</td>
<td>346</td>
<td>1,353</td>
<td>599</td>
<td>971</td>
<td>24</td>
<td>4,749</td>
<td>5,743</td>
</tr>
<tr>
<td>2008</td>
<td>222</td>
<td>1,289</td>
<td>520</td>
<td>1,031</td>
<td>10</td>
<td>4,891</td>
<td>5,932</td>
</tr>
<tr>
<td>2009</td>
<td>203</td>
<td>674</td>
<td>451</td>
<td>896</td>
<td>22</td>
<td>4,444</td>
<td>5,361</td>
</tr>
<tr>
<td>2010</td>
<td>195</td>
<td>1,118</td>
<td>509</td>
<td>1,220</td>
<td>36</td>
<td>4,388</td>
<td>5,645</td>
</tr>
</tbody>
</table>

Source: UK overseas trade statistics (HM Revenue and Customs), industry associations

On average, annual fellings in UK forests and woods are around half the annual increment (rate of tree growth) (Forestry Commission, 2010a). However, this differs significantly between softwood and hardwood, with only around 20 per cent of the gross annual increment of broadleaves harvested.

Over the period 1971/72 to 2009/10 mean softwood standing sales prices for the Forestry Commission estate fell in real terms by about two-thirds. This appears to follow a longer-term downward trend. Available data also suggests hardwood prices fell by at least a third between 1989 and 2007/08, consistent with a decline in demand for UK-grown hardwood. Profitability in forestry has been low in recent decades, with grants and tax incentives a major influence on woodland planting rates.
Forestry and related industries form a relatively small part of the UK economy, reflecting the small size of the UK forest area and use of the resource. Figures collated for all countries in Europe (Forest Europe et al., 2011) suggest the percentage of gross value added to the UK economy by forestry, manufacture of wood products, and the paper industry is relatively low — similar to the figure for the Netherlands, but half that of Germany and just over an eighth that of Sweden. A report by the Centre for Economics and Business Research for Confor and the FC (CEBR, 2006) stated that forest industries supported 2.5 per cent of the UK economy in 2005 through their direct and indirect operations (a total of over £26 billion gross value added). However, this figure includes processing of imported timber and therefore does not accurately reflect the contribution made by UK forests alone.

In addition there are a number of non-timber products. Christmas tree growing is valued at over £50 million per year; this includes purpose plantations as well as Christmas trees sourced from multi-purpose forests. Venison produces around £3.5 million a year. Non-timber forest products such as moss, foliage, fruit and fungi are harvested commercially and non-commercially and can be important in supporting local industries and preserving skills. In 2005, the total value of these products was estimated at over £9.2 million (UK NEA, 2011).

Management of woodland for game is increasing, with organised pheasant and partridge shooting having increased substantially over the last 20 years, adding about £640 million to the UK economy (UK NEA, 2011).

The number of people employed in forestry and related industries has been declining and comprises a small percentage of the UK workforce. The Annual Business Inquiry carried out by the Office for National Statistics recorded average employment in 2008 of 14,000 in forestry, an increase on previous years, and 26,000 in primary wood processing in the UK, with a steady decline overall in the last five years. The number of primary wood processing establishments using UK grown roundwood has fallen by more than a quarter since 2000, principally due to the loss of sawmills using wood from broadleaved forests.

Table 9. Employment in forestry and wood processing* 2004-2008 (Forestry Commission, 2010)

<table>
<thead>
<tr>
<th>Standard Industrial Classification (SIC)</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry</td>
<td>12</td>
<td>11</td>
<td>13</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Wood products</td>
<td>85</td>
<td>86</td>
<td>86</td>
<td>79</td>
<td>65</td>
</tr>
<tr>
<td>Pulp &amp; paper</td>
<td>76</td>
<td>74</td>
<td>67</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Total wood processing</td>
<td>161</td>
<td>160</td>
<td>153</td>
<td>143</td>
<td>129</td>
</tr>
<tr>
<td>Total primary wood processing</td>
<td>30</td>
<td>32</td>
<td>29</td>
<td>29</td>
<td>26</td>
</tr>
</tbody>
</table>

Source: Annual Business Inquiry — average employment in year (Office for National Statistics, June 2009 and June 2011)

**How woods and trees are managed**

Following the Rio summit in 1992, the UK Government made a commitment to sustainable management of forests. The UK Forestry Standard (UKFS) and its associated guidelines set a performance standard for this to be achieved. Woodland owners must comply with the UKFS to obtain approval under Environment Impact Assessment regulations, and to qualify for forestry grant schemes and felling licences. The UKFS identifies around 90 requirements which need to be complied with to demonstrate sustainable forest management, around a third of which are legal requirements, the remainder being requirements of ‘good forestry practice’. These include, for example, the impact of forests and forestry on landscape, people, soils and water, and biodiversity.

In addition, certification under the UK Woodland Assurance Standard (see chapter 2) provides independent verification of sustainable forest management. In March 2011, 1.3 million ha of woodland in
Productivity and sustainable forest management

the UK was certified, representing 43 per cent of the total UK woodland area, varying from 26 per cent in England to 72 per cent in Northern Ireland (Forestry Commission, 2011).

Table 10. Woodland area certified in March 2011 (Forestry Commission, 2011)

<table>
<thead>
<tr>
<th>Ownership</th>
<th>England</th>
<th>Wales</th>
<th>Scotland</th>
<th>Northern Ireland</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>000's hectares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry Commission/Forest Service</td>
<td>214</td>
<td>114</td>
<td>481</td>
<td>61</td>
<td>809</td>
</tr>
<tr>
<td>Non-FC/FS</td>
<td>122</td>
<td>19</td>
<td>313</td>
<td>2</td>
<td>479</td>
</tr>
<tr>
<td><strong>Total woodland area certified</strong></td>
<td>335</td>
<td>133</td>
<td>793</td>
<td>63</td>
<td>1,325</td>
</tr>
</tbody>
</table>

All softwood currently produced from Forestry Commission and Forest Service land, and around 72 per cent of softwood from other land, is certified as meeting sustainable forest management criteria, equating to 85 per cent of all softwood removals (Forestry Commission, 2011).

Around 58 per cent of forest area is under a management plan or equivalent, including state forests with formal Design Plans, other forests with management plans in grant schemes, and other areas within grant schemes. (Forestry Commission, 2010a). This is relatively low in comparison with other European countries, many of which have 100 per cent of forest area under a management plan or equivalent (Forest Europe et al. 2011) – for example, Sweden, Finland, the Ukraine, the Netherlands, Bulgaria, Hungary. In France the figure is 64 per cent, and in Germany 68 per cent. However, the form and content of management plans is very variable across different countries.

The majority of new planting in the UK is carried out under grant schemes. Grants are also paid for management, though many owners opt to carry out management under felling licences only, rather than applying for grants, probably due to bureaucracy and delay associated with the latter. With devolution, schemes have diverged between the countries of the UK, and it is increasingly difficult to provide comparable statistics for the amount of public subsidy given to forestry. Grants for trees outside woods and forests, including wood pasture and parkland, may be covered under agri-environment schemes.

Table 11. Grant money paid in 2010-11, by type of grant (Forestry Commission, 2011)

<table>
<thead>
<tr>
<th>Type of grant</th>
<th>England</th>
<th>Wales</th>
<th>Scotland</th>
<th>GB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£ million</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New planting</td>
<td>16.6</td>
<td>0.4</td>
<td>12.8</td>
<td>29.8</td>
</tr>
<tr>
<td>Restocking</td>
<td>1.5</td>
<td>0.9</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Management grants</td>
<td>10.1</td>
<td>2.2</td>
<td>6.2</td>
<td>18.5</td>
</tr>
<tr>
<td>Planning grants</td>
<td>0.4</td>
<td>0.3</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>28.7</td>
<td>3.8</td>
<td>18.9</td>
<td>51.4</td>
</tr>
</tbody>
</table>

Source: Forestry Commission
Notes: England includes grant scheme expenditure managed by the Forestry Commission on behalf of Defra. Scotland includes grants paid under Rural Development Contracts and legacy schemes. Grants for restocking in Scotland are included within the figure for Management grants.

Methods of woodland management have evolved over time in response to woodland type, markets, and available technology and labour (UK NEA, 2011), and more recently with the adoption of principles of sustainable forest management. Both the UKFS and UKWAS recognise that owners have a range of objectives for their woodland or forest – from timber production and woodfuel, to sporting use, wildlife conservation, and recreation, and that their priorities may determine the form that management takes, but both provide an overall framework to guide good stewardship of the forest resource. There has been increased interest in lower impact silvicultural systems used in continuous cover forestry, and ‘closer to nature’ techniques of management.
Issues

Demand for timber and wood is likely to rise in the UK in the future, largely because of the contribution it can make to delivering government policies on mitigation of climate change – for example, use of timber as a low-carbon substitute for products such as concrete (UKNEA, 2011) and biomass for renewable energy. Analysis suggests that after a long period when potential availability of wood fibre in Britain tended to exceed demand, the balance between the two has tightened and there are now significant pressure points (John Clegg Consulting, 2010), and that this shift is largely due to demand for wood fibre for generating energy, and in particular, planned large-scale biomass power plants.

Under the EU Renewable Energy Directive, the UK has a target of meeting 15 per cent of energy consumption from renewable sources by 2020, requiring a five-fold increase from the figure of 3 per cent met by renewables in 2009. The UK National Renewable Energy Action Plan (NREAP) identifies that bioenergy may contribute around 50 per cent to the overall national renewable energy target by 2020.

Government incentives encourage renewable sources of heat and power (the Renewable Heat Incentive and Renewables Obligation respectively). Country forestry strategies envisage expansion of woodland area (Forestry Commission Scotland, 2009) and increased management of unmanaged woodland (Forestry Commission England, 2007 and 2011) providing an increase in wood fibre for the woodfuel market.

Production of softwood is predicted to continue rising to an average of around 12 million green tonnes per annum between 2017 and 2021 as the plantations of the mid 20th century mature, and then decline. Any subsequent increase depends on rates of afforestation from now on and forms of restocking (UK NEA, 2011). However, these predictions do not take account of factors such as disease. Premature felling of plantations affected by, for example, Phytophthora ramorum, could affect production forecasts significantly. In theory there is potential for increased hardwood production, given that so little of the annual increment is currently harvested, but supply chains are not in place for supplying large scale hardwood processing plants (John Clegg Consulting, 2010). Fragmented ownership and typical location of small woods within an agricultural landscape are particular barriers to increasing management of broadleaved woods (UK NEA, 2011). Woodfuel, especially for smaller and medium-scale heat production, is the main potential use of products from these woods, but successful development of the sector requires a number of factors to fall into place at once: development of woodfuel supply chains, consumer confidence in reliability and quality of both fuel and heating systems, and sufficient, independent and appropriate advice and expertise available. Firewood markets, the simpler end of the woodfuel sector (though perhaps more difficult to regulate as to quality and quantity), have burgeoned
Productivity and sustainable forest management

recently as fossil fuel prices have increased. Sales of wood-burning stoves have increased, with 186,000 sold in 2008 alone, according to the Stove Industry Alliance (UK NEA, 2011).

While availability of wood fibre should exceed potential demand up to 2012, after this, demand is forecast to more than double, outstripping potential supply, with most of the additional demand being for wood energy. Much of this may be met by imports, with associated concerns raised by some NGOs about ensuring sustainability of production, but up to 2.7 million tonnes per annum could be sourced from the UK, raising concerns about the impact on traditional markets and the consequences for timber processing industries (John Clegg Consulting, 2010).

Rates of planting of new woodland have fallen steadily in recent years, but significantly higher rates of grant are now being offered in Wales and Scotland, which are leading to an increase in applications.

The demand for biomass for energy production has led to increased interest in short-rotation coppice (SRC) e.g. of fast-growing willow and poplar. Currently specific energy crop grants for establishment of SRC are only available in England, and take-up of these has been low since landowners are able to make more profit growing wheat and oilseed rape, and are reluctant to lock their land into a less flexible land use (IEEP, 2011).

As the potential for forests, woods and trees to contribute to the economy increases, the need to maintain good standards of sustainable management is paramount.

Forests in the UK, like most of those elsewhere in Europe, appear to be in a ‘comparatively good state’ when assessed against criteria and indicators for sustainable management agreed at European level (Forest Europe et al., 2011), and delivering a range of ecosystem services. The UKFS provides a framework for ensuring the forest resource is managed sustainably. Its efficacy depends on monitoring of compliance through grants and licences, which requires sufficient resources to be available for government to do this on an ongoing basis. Management of individual trees outside woodland, including those in wood pasture and parkland landscapes, and urban street trees, often falls outside UKFS since it involves felling volumes too small to be covered by a felling licence.
Certification provides an independently audited route to guarantee sustainable management, but uptake is by no means universal, and is dominated by larger owners, particularly state forests. For other owners, particularly those with smaller areas of woodland, the costs and administration involved may be prohibitive.

If demand for wood fibre sourced from the UK does rise as predicted, there will also be a need to address skills shortages within the forestry sector. These are already apparent, and likely to become much worse if the forestry sector grows as predicted according to government aspirations for woodland creation and increased use of wood for renewable energy.

In England, a group of key forestry organisations have come together to produce a Forestry Skills Action Plan (Forestry Commission England et al., 2011), aimed at addressing skills gaps within the industry. The plan highlights the fact that the number of jobs in the forestry sector could more than double owing to government woodland creation aspirations, and predicted growth in new sectors such as woodfuel. Yet 17 per cent of companies report a vacancy, 43 per cent of which are considered hard to fill. Pay levels in the forestry sector are relatively low, and there has been a shift away from direct employment e.g. by traditional estates, towards using self-employed contractors and consultants, with the associated issues of perceived job security.

In 2010, a £1 million training initiative, Focus on Forestry First, was launched in Wales to tackle the skills shortage in the forestry sector. This followed a series of resources assessments carried out by the Wales Forest Business Partnership and Forestry Commission Wales that identified a serious shortage of skills in the forestry industry. In Scotland, the ‘Roots for Growth’ strategic plan for the forestry sector envisages the forest industry growing by 30 per cent in the next decade. A key part of the strategy is to implement measures to attract more people into forestry, but also to increase skills and retain the existing workforce.
Forest management and sustainability

Prof Julian Evans OBE FICFor, Vice President Institute of Chartered Foresters

The bulk of the UK’s forest estate is plantation-based since afforestation of bare land was the only realistic means to increase forest cover over the last 100 years. With this came the silviculture of choosing the best species, establishment, tending, thinning, felling and replanting. It created a productive, efficient forest resource: in essence cropping trees just as a farmer crops food. But this production success has brought its own challenges and some pitfalls.

One of these is that an expanding timber resource has been building up which, at the time of writing, is close to a peak because new planting has both declined and switched from mainly conifer to mainly broadleaves. The UK’s small wood processing industry has responded to the emerging timber resource by substantial investment and modernisation, but is at some risk of over-capacity because predicted timber volumes flatten out, even decline, in the foreseeable future.

A second challenge, arising from creating one of Europe’s most productive forest estates for its size, has been the realisation that forests, even planted forests, are far more than just timber or wood fibre factories. They are habitats for wildlife, amenities for public enjoyment, landscapes to admire, and substantial stores of carbon. Reconciling these roles with growing wood is the challenge of our time, but a challenge British forestry is largely successful in addressing. In all the following ways planted forests are becoming more integrated to deliver what is now expected of them:

- Designed and restructured to be in sympathy with land-form
- Increasing gaps, open spaces, and structural diversity within the forest to aid biodiversity
- Extending tree rotations and, in many cases, transitioning from clearfelling to continuous cover systems
- Restoring ancient semi-natural woodlands, upland mires, and not planting sensitive sites

The ICF recites the above examples because it is hard to appreciate the enormity of change in a generation, a change of scale and of quality which has led to certification for many of the UK’s forests and international recognition of leadership in the silviculture of planted forests. But it comes at a cost, namely some loss of timber production. The loss is small but significant and all would agree a very worthwhile price to pay for the benefits. Nevertheless it adds to the point earlier questioning levels of future timber supply.

There is a third challenge. Many of the UK’s lowland, mainly broadleaved woodlands are neglected and unmanaged. Their size, their species composition and sometimes their location have made them uneconomic. But they represent a significant resource and steps to manage them is almost always a win:win. Resumption of coppicing, opening up in thinning, even felling and replanting where appropriate will almost always both produce wood and improve wildlife habitat. Neglect is rarely the best course and the welcome upturn in demand for wood fuel at last brings realistic prospects of better managed woodlands as well contributing to mitigating climate change.

The UK’s forests have evolved with the times. Their sustainability needs to be assured by continued new planting, protection from threats – notably new pests and diseases, and by resumption of management where it has been neglected. In these ways this small but effective resource can serve the many interests the people of this small island nation ask of their woodlands and forests.
Financial sustainability for sustainable forestry

Stuart Goodall, Chief Executive Confor: promoting forestry and wood

When forests are actively managed in a sustainable way, it helps realise their potential and delivers a huge range of benefits — for the economy, the environment, for recreation and for biodiversity.

The UK’s forests have been subject to human intervention for thousands of years. It is their usefulness, in particular as an infinitely renewable supply of wood, that has helped ensure their survival.

While responsible management is beneficial, it has to be paid for. Harvesting trees, providing facilities for visitors and protecting wildlife costs. Addressing this point is at the heart of sustainability.

Of course it is not just all about the money. Forest and woodland owners benefit from access to expert advice and information, from supportive and appropriate research, as well as a standard to measure performance against, complemented by an appropriate balance of regulation and a long-term public policy framework. However, financial sustainability provides the underpinning required for forestry sustainability.

So where will funding come from? Not from the public purse. Facing cuts of more than 25 per cent by 2015, the Forestry Commission has big challenges ahead — and there will be no big rise in public funding of forestry for the foreseeable future.

Sporting is an important revenue stream for some forest owners. A 2006 Jaakko Pöyry report estimated that it could raise approximately £350 million per year. However, this income source is finite and not relevant to most forest owners.

A carbon trading market is developing, but this is confined to woodland creation, where ‘additionality’ can be proven, i.e. the planting (and carbon uptake) would not have happened without that income.

The Government’s Natural Environment White Paper has sparked interest in ‘ecosystem services’, the benefits that forests provide to society. This includes timber and carbon, but also biodiversity and recreation. Government is keen to explore how these services can be valued and paid for; but while there are individual examples of payments being made to forest owners, no clear opportunities exist for replicable funding streams or mechanisms that could have wide relevance.

In practice, the greatest potential is in wood sales. The Forestry Commission itself makes most of its money from selling wood. The UK wood industry has seen substantial growth. Over £1.6 billion has been invested in the last 15 years and employment has risen from 34,000 to around 170,000 over recent decades. It is estimated that the value of this growth displaces the equivalent of £1 billion of imports annually.

Following a decline in value in the 1990s and early 2000s, prices have recovered strongly. There is confidence this will continue as wood is a low-carbon material suitable for a range of uses. Through continued investment in equipment and good growing conditions for conifers, UK softwood producers and processors are internationally competitive with imports.

The UK is not competitive in hardwoods, with the broadleaved forests being of generally low quality, but there is a burgeoning market for firewood, woodchips and wood pellets for energy.

This increase in the value of wood provides exciting opportunities. A stronger market, and price, for wood can both secure the financial sustainability of managed forests and help bring more unmanaged and under-managed woodland back into use. It can also help fund the continuing process of restructuring the commercial conifer forests of the 20th century into multi-purpose forests suitable for the 21st century.
Reviving a wood culture in the UK

Dr Gabriel Hemery FICFor, Chief Executive Sylva Foundation

Trees are the very heart of the British landscape, from majestic trees in fields and hedgerows, to copses in the rolling downs, to ancient hunting forests such as the New Forest, Sherwood and the Forest of Dean. Even so, Britain is the second least wooded country in Europe. At the beginning of the 20th Century just 4 per cent of the country was covered with trees, and as our trees disappeared, so did people’s connection with them. We have forgotten how important trees are to us.

It is not that people don’t care about trees – as the public response to the aborted consultation on the future of the public forest estate in England showed earlier this year: When there was a threat of forests being sold, people responded with unprecedented interest and depth of feeling. This emotional connection however needs to go hand in hand with a deeper understanding of forests as part of a working countryside.

Planting trees merely to green the landscape is a luxury we cannot afford – trees need to work for us while we protect them and make sure they support wildlife. Timber is our sixth largest import: where possible it must be better to use home-grown timber than importing it from far away, working with nature and at the same time supporting rural economies. Yet we know shockingly little about who owns our woods, while many of our woods are not managed. In England the area of forests without management plans, the foundation of sustainable forest management, is equivalent to a 5 mile-wide wall of trees stretching over 450 miles long – running the entire length of England, from Truro to Newcastle. Woodlands in Scotland and Wales are in much the same condition. Some would say that these woodlands are forgotten or even neglected.

Woods need to be managed to support the wildlife that we cherish, and woodland owners need support and encouragement. To achieve this, we need to revive a wood culture in the UK, ensuring the wider public understands how important trees are to us, and the need to manage woodlands.

Very little communication with the public currently deals with woodland management, compared with for example, coverage of tree planting events.

Woodlands can help us meet challenging times ahead in managing carbon and producing sustainable materials, and they will be important in helping us and wildlife cope with climate change. They will help protect and provide for mankind long after my life has passed, and yours. We must work our woodlands to achieve true sustainability.
The State of the UK’s Forests, Woods and Trees

The case for hardwoods in Wales
David Jenkins, Director Coed Cymru

During WWI mainland Britain experienced severe shortages of timber, particularly coniferous roundwood which was vital for coal and iron ore mining at that time. Successive governments from 1919 sought to establish a significant strategic reserve of softwood for the mining industry by the creation of extensive new state forests and by providing grants and tax advantage to private growers. Most of this was in the form of new plantation on poor agricultural soils in the uplands and on lowland heaths. Significant areas of ancient and native woodland were also converted to conifer plantation in a concerted campaign which ended in the 1980s amid growing concern at the loss of important wildlife habitat and the damage to water resources. Latterly, the loss of stored carbon in peat deposits has also become a concern.

The impact of this approach was to more than double the total forest area in Wales; though 40 per cent of ancient woodland sites were converted to plantations in the process. These new forests were usually of a single species, chosen to optimise volume production, in single age blocks, often in exposed, upland locations. Growing on the limit of their climatic tolerance, these are now at high risk from a variety of pests and diseases. The planting of clonal stock with a very narrow genetic base adds to that risk. Diversification of these plantations to mixed age – mixed species stands is a priority for the Wales Woodland Strategy.

There is now recognition of the need to plant more trees in response to changing climate. Much emphasis has been placed on the role of trees in sequestering and storing carbon as part of a strategy of mitigation. The arithmetic is not convincing. We each need over 2ha of woodland to absorb our current CO₂ production which for us in Wales means 6 million ha. We only have 2 million ha of land in total! Much stronger is the argument that some climate change is inevitable, and trees are one of the best ways to enable us to adapt to increased drought and storm in urban and in rural Wales. Farmers at Pontbren, in Powys, have shown how a coordinated approach to planting native trees can deliver ecosystem services such as flood control across a landscape. The financial case for better water management is compelling; water is our most valuable export. As this is compatible with improvements in livestock shelter and biosecurity, everyone benefits.

Since 1985, when more than 80 per cent of our remaining broadleaved woodland was dying of neglect, Coed Cymru has worked to try to rebuild a woodland tradition in Wales. In particular, it has worked with farmers, who own the majority of broadleaved woods, giving advice, help and training. Coed Cymru has promoted cooperation between woodland owners, contractors and timber users, developed hardwood timber products and markets to ensure that broadleaved woods have a firm economic base to ensure their continued management, and acted as an advocate for broadleaved woodland in Wales, championing sustainable woodland management and the use of continuous cover silviculture.

The benefits of closer integration of forestry, farming and wood use, and re-invigoration of the broadleaved woodland resource and associated markets, are manifold. They include greater use for woods for recreation, greater economic and biological diversity, optimum use of harvested materials in the local economy, and reduced dependence on imported timber products.

Since the inception of Coed Cymru in 1985, more than 6,919 woodland management and tree planting projects have been instigated, in all, just over 31,426ha. More than 400 businesses now regularly use Welsh hardwoods, producing everything from firewood to furniture. We believe it is likely that the softwood resource is currently being harvested at or close to annual increment, but cutting of the broadleaved resource is probably well below 20 per cent. This means there is still great untapped potential. The epithet ‘dying of neglect’ is not appropriate now. The initial threat has been removed but there is still much to do.
Managing our unmanaged woodland
Stuart Goodall, Chief Executive Confor: promoting forestry and wood

Unmanaged and under-managed woodland is a missed opportunity, failed by public policy.

In England, the Forestry Commission estimates that almost 500,000ha, or around 45 per cent of the total woodland area, is un/under-managed. There is also a significant area of unmanaged woodland in Wales. It is less of a concern in Scotland and Northern Ireland, partly due to the higher percentage of conifer woodlands, which tend to be more managed.

England’s rich diversity of woodland and woodland owners mean equally diverse management is required, with varying costs. Appropriate management depends on the nature of the woodland and the owner’s objectives, but, for example, all woodlands benefit from regular thinning, which is removing a proportion of stems to increase light to benefit the remaining trees (and timber), as well as, habitat and visual amenity. Other management tasks may include coppicing, pest control, or pruning.

Sometimes, woodlands are neglected because of inaccessibility. Building stoned roads costs £30-80 per metre, meaning thousands of pounds. Once constructed, only occasional maintenance is required, but up-front investment is a barrier.

Other reasons for neglect include lack of understanding and expertise, resistance to change, disinterest, or an inability to take a long-term view. Some owners might inherit, or buy, a property where the woodland is incidental, while others might wish to own ‘a little bit of the UK’. A hobby or status woodland may mean little or no management.

Some perceive the best management to be no, or minimum, intervention. Often, this is simply not correct. A study by government countryside agencies in 2005 suggested that lack of management was contributing to the decline of various woodland flora and fauna.

Many owners cease management in response to low timber prices. If the forest gate closes for five years, there is often no long-term harm, but if low timber prices persist, as they did from 1998-2006, for softwood, lack of management can damage wildlife and timber quality and deter re-instating forest management.

While it is perhaps unrealistic to expect that all woodland can be brought into responsible management, mitigating action can be taken, including:

1. Increasing demand for wood products will help to pay for management and encourage owners to think long-term about caring for their woods. Government can encourage greater use of wood.

2. Government should (and currently is) revise regulation to ensure that it does not act as a disincentive. For example, legislation designed to protect wildlife can, perversely, deter owners from managing woodland, for fear of prosecution.

3. Grants and the role of the Forestry Commission should be re-focused. For example, grants should support the mapping of woodland, helping an owner to understand the potential (timber, habitat, landscape and perhaps recreation) and means to bring wood into management. Grants should provide for capital investments in the forest, as the latest Woodland Improvement Grant for woodfuel does.

With rising demand for wood in construction as well as local-scale renewable energy, and well-focused support there is an exciting opportunity to break a cycle of under-management and help many more woods reach their potential, for the benefit of everyone.
4 Biodiversity

Key points

- The history of land-use in the UK means that our woodland resource is generally sparse, fragmented, and ecologically isolated. Many woods, particularly larger areas, are of relatively recent, plantation origin.

- The UK Government has international commitments on biodiversity, expressed through the UK Biodiversity Action Plan. Biodiversity strategy is devolved, and following recent reviews at international level, country strategies are being, or will be, reviewed.

- Forests, woods and trees make a major contribution to biodiversity in the UK. However, many of the targets that were set on maintaining and enhancing woodland biodiversity are not being met, and in some cases, recording methods are not adequate to monitor progress.

- The traditional approach of conserving isolated nature reserves is giving way to understanding of the need for action across whole landscapes.

- There are multiple challenges to overcome if this is to be achieved, from climate change to invasive species, from financial constraints to reviews of protective legislation and policy.

Introduction

The 1992 United Nations Earth Summit in Rio de Janeiro defined biodiversity as:

"the variability among living organisms from all sources, including, inter alia, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems".

This is the closest to a single legally accepted definition of biodiversity, since it is the one adopted by the United Nations Convention on Biological Diversity.

More simply, biodiversity refers to the wide variety of ecosystems and living organisms: animals, plants, their habitats and their genes.

The Convention on Biological Diversity (CBD) provides the context for the UK approach on biodiversity. The Government has international obligations expressed in the UK Biodiversity Action Plan (UKBAP), which contains a programme of action to conserve and enhance biological diversity throughout the UK.

Historical context

The value of our current woodland resource for biodiversity is shaped by several factors, including climate, geology, and history.

Trees re-colonised the British Isles after the last ice age, but since woodland cover reached its peak, it has suffered centuries of loss, largely due to human activity. By the beginning of the 20th century,
woodland cover was below 5 per cent of land area. While subsequent policies of afforestation mean it has now risen to 13 per cent (Forestry Commission, 2011), the UK’s resource of forests, woods and trees is still sparse compared with the average cover, for example, in the rest of Europe. It is also fragmented; 83 per cent of ancient woods in England and Wales, for example, are under 20ha in area (Spencer and Kirby, 1992). The majority of the resource is of quite recent origin. Ancient woods, those continuously present since at least 1600, or 1750 in Scotland, cover only 2 per cent of land area.

The residues of medieval forests and deer parks and other collections of ancient and veteran trees (otherwise known as old growth) are especially rich in the UK; they have largely disappeared from elsewhere in Northern Europe. Where there are significant collections of ancient and veteran trees they are exceptionally valuable for biodiversity as they retain many associations of species found nowhere else in stands of younger trees.

Trends and changes in woodland management over the last 100-150 years have also had an impact. For centuries many woods were managed as coppice or wood pasture, though the continuity of such management would have been dictated by markets and fluctuated considerably in some parts of the country, and this resulted in particular ecological assemblages within woods (Rackham, 1976, Peterken 1981). The decline in coppicing has led to structural changes in broadleaved woodland, particularly in south east Britain, with increased shadiness, reductions in understorey and open space and increases in deadwood (UK NEA, 2011). Low prices have suppressed timber markets and further reduced active management of woods in recent decades, though recent rising prices and growing woodfuel markets may reverse this trend.

Afforestation during the last century led to large-scale plantations of conifer, including some planted on existing open ground habitats, and some created through felling and replanting around a quarter of ancient woods with substantial ecological impacts (Pryor and Smith, 2002, Pryor et al., 2002).

Since the mid-1980s, biodiversity has increasingly been recognised in forestry and other policies. Rates of woodland expansion have fallen, but with a wider range of forest types being planted, including broadleaved and native woodland, and policies have been introduced favouring restoration of ancient woods and other semi-natural habitats planted with conifers. There has been increased interest in continuous cover forestry techniques as opposed to clear-fell silviculture in conifer forests, and maturing conifer forests are now showing increased structural diversity, for example through deliberate restructuring of plantations through smaller felling coupes, and the identification of areas to be kept as open or broadleaved along stream corridors.

Changes over the last century in the wider landscape have also had an impact, including intensification of agriculture, leading to loss of trees in parkland and wood pasture, hedges and semi-natural habitats that has left all semi-natural habitat ecologically isolated, increased use of pesticides and fertilisers, and increased pressure on land for development. Felling of mature and veteran trees of biodiversity value on roadsides and in areas of public access relating to concerns over safety has also occurred more recently.

Current situation

Around a quarter of priority species under the UK BAP are associated with woodland habitats. Habitat action plans were produced for native woodland, and for wood pasture and parkland. Forests, woods and trees make a significant contribution to biodiversity.

Ancient woods are recognised as being of particular value. Owing to their long continuity, they are generally more species-rich than recent woods (Peterken and Game, 1984), and are often important refuges for characteristic woodland specialist species, which have poor powers of dispersal and do not easily colonise new areas. However, further north and west this distinction is less obvious, since there are more semi-natural characteristics in the landscape matrix enabling greater movement of species. The relatively undisturbed soils of ancient woods may be a particularly rich biodiversity resource, though the information we have about them is still relatively limited.
Plantations on ancient woodland sites (PAWS) may retain many features of ancient woodland, such as veteran trees and remnants of specialist flora, and can respond to management seeking to secure and enhance those features.

The contribution of woods of more recent origin to biodiversity should also be recognised. More recent semi-natural woodland may not have acquired the range of species found in ancient woods, especially if isolated from these, but recent wet woodland, for example, is important because it forms a large proportion of a scarce resource and is an important habitat for a number of species, such as invertebrates, that rely on the particular niches this type of woodland provides.

Planted conifer forests have been shown to host a surprisingly high number of some species groups e.g. invertebrates such as hoverflies and beetles, and could be a particularly valuable habitat for rare fungi (Humphrey et al., 2002). Young coniferous plantations may support internationally important numbers of breeding birds in the uplands (e.g. hen harrier, merlin and short-eared owl) and lowlands (nightjar and woodlark) (Natural England, 2008). Conifer plantations also provide habitat for the red squirrel and pine marten. Restructured conifer plantations provide a slowly moving mosaic of sheltered open ground with rough grasses, young thicket stage crops, thinned woodland, mature timber and dead wood (standing and fallen). This variety of habitats is ideal for many species including some rarities.

Individual trees outside woods can have ecological impacts far beyond the proportion of land they occupy, by increasing the permeability and habitat value of the whole landscape (Brown and Fisher, 2009). They provide a distinct microclimate, can increase available soil nutrients by recycling, lead to increased plant species richness, structural complexity and habitat for animals. At a landscape scale, they provide increased connectivity and a focal point for ecological restoration (Manning et al., 2006). In urban areas, trees outside woods contribute to maintaining species richness, and the proportion of tree cover has been found to be correlated with bat activity (Brown and Fisher, 2009).

Ancient and veteran trees more commonly occur outside woods than in them, particularly in wood pasture or parkland sites. These usually have large numbers of veteran trees growing over grassland, heathland, or woodland ground floras, and have been managed through pollarding of trees and grazing of the ground beneath. The UK has a particularly rich heritage of veteran trees (Read, 2000), important in their own right but also as hosts for rich communities of saprotrophic and mycorrhizal fungi, epiphytic lichens and deadwood invertebrates and are the keystone habitat for large numbers of rare and BAP species because of the quality and continuity of the habitat. Wood pasture and parkland is often overlooked as it falls between agricultural and forestry policy and there are few staff trained or knowledgeable about the habitat to advise or encourage owners to manage, expand or create the habitat.
New types of woodland and tree cover (agro-forestry, short rotation forestry and energy crops grown as short rotation coppice) may add new structural patterns to rural landscapes and will have a contribution to make to biodiversity.

Legislation and policy aimed at securing and enhancing biodiversity has developed substantially and includes a range of instruments:

- The UK BAP and national, regional and local plans and strategies cascading from this, which include aims and targets for maintaining the extent of woodland (and specifically native and ancient semi-natural woodland), restoring PAWS, achieving favourable or recovering condition of native woodland, and expanding native woodland. There are similar targets in relation to wood pasture and parkland;
- Statutory designations such as Natura 2000 designations, SSSI, NNR, ASSI (see chapter 1 and 2), though these only cover a representative sample of sites;
- Non-statutory designations such as local wildlife sites;
- The Natural Environment and Rural Communities (NERC) Act: Section 40 of the Act requires all public bodies to have regard to biodiversity conservation when carrying out their functions. This is commonly referred to as the ‘biodiversity duty’;
- This duty extends to all public bodies the biodiversity duty of section 74 of the Countryside and Rights of Way Act 2000 (CROW), which placed a duty on Government and Ministers; the Nature Conservation (Scotland) Act 2004 gives all public bodies a duty to further the conservation of biodiversity;
- Planning policy guidance, which currently includes a level of protection for ancient woodland in all four countries of the UK;
- Country forestry strategies, all of which state biodiversity as an important objective;
- The UK Forestry Standard which sets out requirements for sustainable forest management;
- Grants and incentives including those for increasing woodland cover, bringing woods into active management, and appropriate management and improvement of wood pasture and parkland.

However, there are gaps: most trees outside woods have little protection (see chapter 2) though they may host species such as bats or saproxylic invertebrates which are protected by national and European legislation. Unless they have a separate statutory designation, wood pastures and parkland can fall outside the protective framework that covers woods: they are not the responsibility of a single government department or policy and fall between departmental stools, remaining poorly recorded and poorly protected.

Despite a plethora of measures, biodiversity targets are not being met; sometimes monitoring systems are not adequate to properly assess whether they are. Ancient semi-natural woodland continues to be lost despite a BAP target to maintain current area, albeit the rate of loss is far less than 100 years ago. Campaigning work on development threats showed over 300 ha of ancient woodland were recorded as lost between 2001 and 2011 (Woodland Trust, 2011). Monitoring restoration of PAWS is difficult, especially in the private sector. A recent Parliamentary Question stated that in England, since May 2010, Forestry Commission grant aid had been approved to restore around 2,500ha. Around the country, partnerships have been set up aimed at encouraging landowners to restore PAWS, but it is unlikely the target of 26,880ha by 2010 was met. By 2010, 51,616ha of new woodland had been created as compared with a target of 83,555ha. In England, only 6,789ha was created compared to the target of 26,000ha.

For wood pasture and parkland, the baseline figure in the BAP for area and extent of the resource is widely accepted to be inaccurate making targets meaningless. Recording of priority wood pasture and parkland habitats, and of individual trees, including ancient trees, lags behind that of woodland. There is
no precise figure for the extent of wood pasture and parkland in the UK, though in Northern Ireland, the ancient woodland inventory recorded 1,000ha of this habitat (Woodland Trust, 2007). The Ancient Tree Hunt database has records of 100,000 ancient trees in the UK, and more than 300 high and medium value ‘hotspots’ or concentrations of ancient trees (Butler, 2011), many of which will be wood pasture or parkland sites.

As of 1 December 2010, 95.8 per cent of all SSSIs in England were in ‘target’ (i.e. favourable or unfavourable recovering) condition. In Scotland, summary reports show that 65 per cent of woodland features on SSSIs are in favourable or recovering condition. These figures reflect considerable effort that has been put into positive management on SSSIs (UK NEA, 2011). A methodology is being developed to monitor condition of woodland sites that fall outside the suite of statutory designation in England and Wales (Lush et al., 2011). The Native Woodland Survey in Scotland will give estimates for condition of non-SSSI sites.

However, the UK NEA (2011) states that while there is increasing appreciation of the value of woodland for biodiversity, there are concerns as to its condition overall. It identifies key threats to semi-natural woodland as overgrazing, habitat fragmentation and isolation, invasive species, unsympathetic forestry practices, lack of appropriate management, air pollution, and new pests and diseases.

Browsing pressure from deer has intensified in many parts of Britain, and in combination with other factors may be driving a reduction in understorey in woods, particularly in parts of lowland England. Increasing deer populations have been implicated in shifting the composition of woods both in the woody and ground flora layers and causing changes in populations of small mammals, invertebrates and birds (Gill and Fuller, 2007).

Decline in traditional management and associated maturing of the broadleaved resource has contributed to a tendency towards greater shadiness, reductions in understorey, and open space, and increases in deadwood. A study of long term ecological change in British woodland (Kirby et al., 2005) concluded that without active intervention broadleaved woods were on average likely to become older and darker in the next 20 years. While this could benefit species of fallen deadwood and shade loving conditions, it could also lead to continuing decline in some ground flora and other groups associated with open space, open crowned trees and young growth.
Woodland, hedgerow and in-field trees surrounded by farmland are exposed to fertiliser and pesticide drift, and ammonia from livestock which can affect herbaceous plants and mycorrhizal fungi. Kirby et al., (2005) found an increase in woods of plants characteristic of greater fertility. Aerial deposition of pollutants is also a problem. Nitrogen pollution affects the epiphytic bryophytes and lichens even in the relatively clean oakwoods of western Britain (Mitchell et al., 2005). It is estimated that 90 per cent of woodland is likely to receive atmospheric nitrogen deposition in excess of critical loads (Sutton et al., 2004).

Climate change is leading to changes in species phenology and the potential competitive advantage of some species (Thackeray et al., 2010) as well as altering species ranges (MONARCH, 2007).

Wood pasture and parkland suffer from conversion of pasture to arable, cessation of management practices such as pollarding, and removal of veteran trees and deadwood for safety and tidiness. This leads to lack of continuity of decaying wood habitat and loss of species dependent on old and hollowing trees, and isolation and fragmentation of remaining wood pasture and parkland sites. Species groups such as fungi, lichens and invertebrates associated with old growth, wood pasture and parkland have become less diverse as the quality and extent of their habitat has declined. There is a ‘generation gap’ with a lack of mature and younger generations to replace veteran trees. Increasing threats from pests and diseases (covered in chapter 6) are also a particular worry for our valuable veteran tree resource.

The picture in relation to individual woodland species is complex. A number of large-scale or long term studies show recent changes and trends, which are summarised by the UK NEA (2011):

- Vascular plants: relatively little change in overall distribution compared with those from other habitats. Within broadleaved woodland various studies indicate a reduction in species richness and shifts towards more competitive species at different scales, thought to be due to factors such as eutrophication, browsing and grazing.
- Lower plants: relatively little is known about recent trends. Apparent changes in distribution and abundance may reflect differences in survey effort rather than real change, though reductions in air pollution especially sulphur may be associated with recovery of some lichens.
- Birds: increase in birds associated with large conifer forests. In broadleaved woods, eight out of 35 species showed large national decline, 11 showed large national increase. Long-distance migrants have declined; factors associated with wintering grounds may also be involved. Common generalist species have fared better than more specialist species. Reasons for changes are complex but changes in woodland structure may be one of a range of possible factors.
- Lepidoptera: decline in some species associated with clearings in woods, but increases in some species associated with high forest canopies. Many moths are declining. May be changes in habitat preferences and distribution in response to climate change among some species.
- Other invertebrates: Increasing proportion of closed canopy forests may benefit some canopy species. Deadwood species should benefit where there are increases in deadwood, but specialist saproxylic species tend to be poor colonists and may be declining where veteran trees under threat.
- Mammals: Increase in deer, especially in southern Britain, grey squirrels and badgers, decrease in red squirrel and dormouse.

Recent monitoring shows increases in several bat species, but this needs to be set against the context of longer term declines (Bat Conservation Trust, 2011)
Issues

Despite recognition of its value, and a plethora of strategies and action plans, the UK has failed to deliver on biodiversity targets related to tree and woodland protection, expansion and restoration. This reflects the global situation on biodiversity targets.

In October 2010, in Nagoya, UN delegates from 190 countries signed up to a new global agreement to take effective and urgent action to halt the loss of habitats and species by 2020. In May 2011, the European Commission adopted a new strategy in line with this, and also set out a vision for 2050. The EU strategy sets a framework for member states to draw up their own plans. In the UK, biodiversity is a devolved responsibility. The new England Biodiversity Strategy was published in 2011, and other countries will be assessing their response to the Nagoya commitment. New targets may be set. There are enormous challenges. Woods have suffered over the centuries from loss, fragmentation and degradation, and now face new threats such as unavoidable climate change and new pests and diseases. Studies show effects of environmental factors such as nitrogen deposition, and land-use factors such as lack of appropriate management are affecting our woods and their wildlife.

Ecological thinking has progressed. The commitment to conserving wildlife in nature reserves must remain but it will be insufficient if a more dynamic view of nature conservation across whole landscapes, integrated with other land uses, goes unrecognised. There has been increased emphasis in recent years on habitat networks, and on trying to ‘join-up’ conservation effort across a variety of land-uses and habitats.

The recently published Natural Environment White Paper in England is the latest government document to recognise the value of landscape-scale ecological thinking, but it remains to be seen how successfully this will be delivered, given the scale of funding proposed for the practical element, Nature Improvement Areas (£7.5m across 12 pilot areas). A landscape connectivity indicator has been developed and applied to Countryside Survey 2007 data for the purposes of biodiversity reporting; preliminary results indicate regional changes, but still low values in connectivity (UK NEA, 2011). Some also express concerns that increasing connectivity can also make the landscape more permeable for invasive species, and for pests and diseases.

Across the UK the drive for economic growth is leading to a strong presumption in favour of development. The draft National Planning Policy Framework in England, for example, retains wording on protection of ancient woodland, but this can be overridden in favour of ‘sustainable economic growth’. In this time of financial austerity, too, there is likely to be less funding available for biodiversity: financial cuts have already led to staff reductions in some of the bodies responsible for biodiversity protection and improvement.

Climate change in particular raises questions over our distinction between ‘native’ and ‘non-native’ – beech, for example, is technically classed as non-native in northern parts of the UK, but may lose its climate space further south (see Chapter 6).
Protecting our assets

Sian Atkinson, Conservation Advisor Woodland Trust

Ancient woods are some of our richest wildlife habitats, home to rare and threatened species, many of which require the stability afforded by continuity of suitable woodland cover. Ancient woods contain old trees and deadwood, important in their own right, and for the bats, insects, fungi and lichens that live on them; specialist woodland flora; and relatively undisturbed soils. They are also a living historical and archaeological record, containing evidence of past land use and management practices. Only around 2 per cent of the UK’s land area is occupied by these sites, and around a third of these have felt the negative impact of felling and replanting with non-native conifers during the last century.

The value of ancient woodland has been increasingly recognised over the last 30 years. It is mapped and recorded in inventories, and now has a degree of protection, for example through planning policy guidance and in forestry policy. There has been progress in securing restoration of sites planted with non-native conifers (PAWS), with targets in the Biodiversity Action Plan, and requirements under UKWAS for securing and enhancing their special ancient woodland characteristics.

But we cannot afford to be complacent. The majority of ancient woods (85 per cent) have no protective statutory designation. Ancient woods still come under threat every year from development. Other valuable habitats such as wood pasture and parkland, and ancient trees, are more poorly recorded and far less well-protected even than ancient woods. Biodiversity strategies, indicators, and targets are up for review. In England, the planning system is undergoing the most significant review in decades, and while the new draft framework retains wording on protection of ancient woods, its overall presumption in favour of development and economic growth signals an increased threat.

For Plantations on Ancient Woodland Sites, there is still an urgency in most cases to begin a process of management that will at the very least secure surviving remnant features of the ancient wood, and at best will restore the site to something like its former glory. But the spectre of Phytophthora ramorum, a pathogen that has begun to infect stands of larch, looms large. There is a danger of large areas of PAWS being clear-felled under plant health orders – necessary, but unfortunately preventing the preferred approach of gradual restoration – and with no requirement to restock.

Ancient woods are biodiversity reservoirs from which the wildlife of the countryside has been maintained, and could in future be restored. They are irreplaceable, the cornerstone to any strategy to build more resilient, robust and wildlife-rich landscapes for the future. Their value has rightly been recognised, but the political landscape is constantly changing, and it is essential that as policies and strategies are reviewed, and new issues arise to be dealt with, we keep our most valuable woodland habitats at the heart of any decisions.
The future of UK woodlands and bats – a vital link
Dr Carol Williams, Woodland Officer Bat Conservation Trust

All 18 species of bat in the UK are dependent in some way on woodland, and some are woodland specialists. Woods are important for:

**Food:** Woods support more invertebrates than any other habitat. Large numbers are associated with native trees and with the complex and varied understory and ground flora, and others seek the sheltered woodland environment. Veteran trees have special importance, as does wet woodland, where the value for foraging increases still further. The breakdown of standing and fallen deadwood by invertebrates is a further source of prey species and in open glades and rides extra light allows different plants and invertebrates to thrive. Dense vegetation is important for the foraging styles of woodland specialist bats.

**Landscape connectivity:** Many UK bat species are reluctant to leave the cover and protection of features such as tree lines, hedges and woodland cover, as they move between their roost and the places in which they forage. Fragmentation of the landscape can be a serious issue for bats.

**Roosts:** Features such as woodpecker holes, rot holes, cracks, loose bark or ivy offer suitable roosting opportunities for our rarest group of bat species. Bats rely on trees for their roosts in which to spend both summer and winter and to mate and to have their young. Many of the features that make trees suitable for bat roosting are found in more mature trees.

**What does the future hold?**

The importance of woodland for providing wider ecosystem services and for biodiversity is now widely recognised – as is the small resource we have at present. Recent policy such as the Natural Environment White Paper in England has recognised this and rallied for an increase in woodland, under the banner of the key message from the Lawton Review of ‘more, bigger, better and joined’.

Woodfuel has been identified as an important potential contribution to meeting renewable energy targets with incentives aimed at bringing existing woodland back into management by measures such as coppicing and thinning as well as new areas planted for this purpose. Management for woodfuel can produce an ideal habitat for a range of woodland species that have had limited opportunities in unmanaged woodland due to their greater requirement for more light reaching the woodland floor.

However, woodland supports an array of species in a range of niches. While some will benefit from light increasing management, others require shady or undisturbed woodland conditions. Among these are some of our rarest woodland reliant species across a number of taxa that are often slow to colonise areas and disperse only over a small distance. This includes our rarest bat species.

More management of existing woodland will benefit biodiversity, so long as the balance does not tip too far, destroying the viability of our ‘mature woodland’ specialists. Those areas of existing woodland that are already of significant biodiversity value need to be recognised and buffered from any adjacent management and not become isolated or fragmented.

We are currently at a crossroads for our woodlands and the signs look positive, but only as long as we recognise that no single form of management fits all. We can accommodate the needs of all woodland biodiversity, and increase productivity, so long as we all keep talking and listening to each other. If we fail to do this then we could be in danger of losing the very wildlife most dependent on our woodland.
The UK has a very rich legacy of ancient trees – nowhere else in Northern Europe is the medieval countryside revealed by the trees so clearly. Often they are the living landmarks of Royal hunting forests (Sherwood Forest, Belvoir Forest in the heart of Belfast), deer parks (Richmond Park), ancient wooded commons (Burnham Beeches) or ancient boundaries and hedges; as small groups and individuals on farms, in village greens, churchyards; some survive within urban development. Individual ancient trees, such as the Rabbie Burns’ Sycamore or the Llangernyw Yew are important in their own right and are irreplaceable records of the nation’s history and culture. Their various species and aesthetic forms such as riparian, pollarded black poplars, upland commons of holly, alder or rowan pollards, large coppiced lime stools of the Derbyshire Dales or granny pines of the Caledonian forests are key elements of distinctive regional landscape character.

Ancient trees provide habitat for a huge array of other organisms, including exceptionally rare and largely unprotected species-rich communities associated with wood decay, the bare surfaces of trunk and boughs, and their roots. Localised concentrations of ancient trees or ‘old-growth’ where there has been a continuity of old trees into the past, are supremely important reservoirs of biodiversity but even isolated trees in old, highly fragmented landscapes can be of high conservation priority for their associated decaying wood habitat. In addition the genetic variability of proven longevity may prove invaluable in the search for disease resistance and adaptability to climate change.

The Woodland Trust’s Ancient Tree Hunt (ATH), in partnership with two charities with minimal resources – the Ancient Tree Forum and the Tree Register of the British Isles has started drawing together a map of ancient and other special trees across the UK found by armies of volunteer recorders. Analysis of the data collected on over 100,000 hand-picked trees has identified concentrations, some of which were previously unknown. The project has helped to raise the profile of these icons of the natural world and captured the imagination and support of the public who recognise their value and their plight.

Ancient wood pastures and parkland may have outstanding collections of ancient trees but are rarely included on inventories of ancient woodland even where historic records show them well before 1600, so they do not receive the level of protection afforded to ancient woods through agricultural and forestry policy and miss out on targeted financial incentives. Some are included in the Registers of historic parks and landscape gardens, but the trees have no specific protection. Unlike other priority habitats, lack of survey information means there is no land-use data against which to measure changes to the extent and quality of the resource and what we see as a continuing catalogue of widespread losses, small in number but cumulatively of increasing significance for sustainability. The ATH has begun to collect the data but it has significant geographical gaps in information which need to be addressed.

It is imperative that stakeholders work together now, led by government, to secure the protection of special trees and old growth habitats. This means promoting the value of this legacy passed to us often by beneficent and foresighted tree owners; protection from damage; guidance on appropriate management; closing of the legal loopholes that allow special trees to fall through the protection and policy net; and that through planting and regeneration appropriate successors are in place to provide for ancient trees for the future.
Protect, enhance and expand for biodiversity

Jonny Hughes, Director of Conservation Scottish Wildlife Trust

As the former climax vegetation community over much of Scotland, woodland and scrub supports more species than any other terrestrial habitat, particularly ancient semi-natural woods, the surviving descendants of our original natural forests. These are irreplaceable reservoirs from which wildlife can begin to spread back into newly restored habitat, thereby helping Scotland’s ecosystems recover from centuries of degradation.

Expanding and improving the native woodland resource will make a major contribution to restoration of degraded ecosystems in both rural and urban areas, benefiting both wildlife and people. This requires identifying key threats, and tackling them, usually at a landscape scale, including habitat fragmentation, habitat compartmentalisation, loss of old growth and veteran trees, climate change, unsustainable forest management practices, non-native invasive and problem species, excessive grazing and browsing by deer and livestock, and loss of woodland to development. In the lowlands of Scotland, increased nitrogen levels are a key threat, modifying and simplifying plant communities and woodland soil chemistry and biodiversity. In the uplands, natural woodland dynamics have been lost, partly due to extinction of keystone predator species such as wolf, lynx and bear, and the beaver, and partly due to centuries of intensive sheep, deer and grouse farming leading to drastic changes in soils. Virtually all montane woodland habitat has been lost in Scotland due principally to overgrazing and burning.

There is an urgent need to give legal protection to remaining areas of ancient semi-natural woodland in Scotland, and there should be a target to bring all degraded ancient woodland, including PAWS, into favourable or improving condition by 2015.

Other native woods and commercial non-native plantations also have a significant role to play in providing quality habitat for wildlife and contributing more widely to habitat networks and ecosystem services. By 2020 the area of woodland covered by forest plans should be doubled, to two-thirds of the resource, and guidance, grant conditions and standards should be further developed to ensure better delivery of multiple benefits and improved protection for biodiversity, for example through reduced emphasis on non-native monoculture planting and clear-felling.

The Scottish Forestry Strategy sets out a target of increasing forest cover from 17 per cent to 25 per cent of land area by 2050. The Scottish Wildlife Trust would like to see an even more ambitious target of 30 per cent, with the majority of this native Scottish species to enhance functional connectivity for woodland species. There may be opportunities for extensive restoration of upland birch and pine woodland in the near future. This need not be at the expense of farming; indeed we would advocate that well-managed wood pasture systems could deliver timber products, sheep and cattle production, recreational benefits and nature-rich habitats simultaneously. This move to multifunctional landscapes is the key to delivering ‘ecosystem health’ and thereby securing those ecosystem services which flow from such a balanced ecology.

There is also a need for greater investment in hardwood timber production, which has potential to deliver high quality sustainable materials, increasingly important in the post-climate change, peak oil era. This will need a fundamental shift from short-termism towards a longer term game which will ultimately bring both ecological and socio-economic benefits to the people of Scotland and the hundreds of thousands of visitors who visit each year.
5 Ecosystem services

Key Issues

• The concept of ‘ecosystem services’ is a relatively recent one but increasingly used in policy and strategy. In particular, it opens up avenues for placing more value, including financial values, on the whole range of benefits provided by forests, woods and trees, and indeed other natural features.

• Demand for ecosystem services will continue to grow in the UK, but a number of factors impact on delivery, including competing land-use pressures, shortage of information on the current resource, and of research and modelling to understand best designs and location.

• Increase in forest and tree cover is essential to delivery of improved ecosystem services but there has been a downward trend in rates of planting over recent years.

• Trees, woods and forests currently provide a wide range of ecosystem services for which owners are not paid. Recognising the true value of these services through remuneration could help provide new sources of finance for woodland expansion and management.

Introduction

While scientists and environmentalists have discussed ecosystem services for decades, these services were popularised and their definitions formalised by the United Nations 2004 Millennium Ecosystem Assessment (MEA), a four-year study involving more than 1,300 scientists worldwide.

This grouped ecosystem services into four main categories:

• Provisioning services – for example timber, wild foods and plant-derived medicines;

• Regulating services – for example filtration of pollutants, climate regulation through carbon storage and water cycling, and pollination;

• Cultural services – for example recreation, spiritual and aesthetic values, education;

• Supporting services – for example soil formation, photosynthesis and nutrient cycling.

The Economics of Ecosystems and Biodiversity (TEEB) report, ‘Mainstreaming the Economics of Nature’, a major international study of the value of ecosystems, has highlighted the vital role trees and forests play in maintaining the stability of global systems and provision of goods and services (TEEB, 2010).

The UK National Ecosystem Assessment (Watson and Albon, 2011) identified the value of ecosystem services benefits which arise from the natural environment. What is clear is that these are both large, and critical to the economy and people’s well-being.

The natural world, its biodiversity and constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in economic analyses and decision making (UK NEA, 2011).
The State of the UK’s Forests, Woods and Trees

Current situation

The UK’s trees and woods make an important contribution to a range of ecosystem services. Two-thirds of the woodland area of the UK is productive forest that is now being diversified. In recent decades forestry policy has promoted ‘multi-purpose’ forestry which provides services in addition to timber, including recreation and biodiversity conservation.

While these benefits have been recognised for some time, recent development in the measurement of ecosystem services have begun to quantify their extent and value.

The social and environmental benefits of woodland in Great Britain were valued in 2002 at more than £1.2 billion per annum (at 2010 prices), with the landscape value of woodland estimated at £185 million (2010), and recreational visits valued at £484 million (2010) (Quine et al, 2011).

Ecosystem services provided by forests, woods and trees include:

- Production of timber
- Renewable energy
- Regulation of climate
- Provision of shade and shelter
- Prevention of soil erosion
- Providing genetic resources
- Wildlife habitat
- Supporting pollination
- Maintenance of soil fertility
- Supporting water quality and water management (flooding)
- Regulation of river flows and groundwater levels
- Improving air quality
- Sources of medicines and other valuable chemicals such as fungicides

There is a significant tree resource outside woods, in the form of small groups of trees, individual trees and hedgerows, providing a range of important ecosystem services. Brown and Fisher (2009) identified the importance of trees outside woods in supporting a range of species often associated with ancient woodland and old growth habitats, and acting as ‘stepping stones’ to the movement of species through the landscape.

The contribution of the urban forest to ecosystem services is worth a particular mention. Individual trees in parks and streets, as well as areas of urban woodland, contribute to specific benefits such as urban cooling, improvements in air quality and urban water management.

The concept of Green Infrastructure (GI) is now recognised as important in creating more coherent ecological networks in towns and cities and delivering across a range of policy objectives for urban adaptation, biodiversity, public health and wellbeing. The Natural Environment White paper in England (DEFRA, 2011), and subsequent establishment of a Green Infrastructure Partnership by Government suggests a commitment to see better coordination of elements of GI. Trees and woodland have a particular role to play in mitigating urban heat island effect, improving air quality, reducing flood risk and creating a sense of place.

The delivery and associated value of some ecosystem services are independent of location; that is, they provide benefit wherever they are supplied e.g. carbon sequestration. Others, however, are locationally
dependent and need to be sited where they can deliver the benefit. For instance, trees and woodland for water management need to be in specific locations in order improve water quality or mitigate flooding. Research and modelling to understand the best locations and design for woodland to deliver a range of benefits is continuing, but incomplete (Quine et al, 2011).

**Biodiversity**

Although the UK has no primary woodland – all remaining woodland has been influenced to a greater or lesser extent by human activities – a quarter of all UK Biodiversity Action Plan priority species are associated with trees and woods. Key drivers affecting change in woodland ecosystems include climate change, pollution, wider land-use, pests and diseases, non-native invasive species and changes in the age structure of woodland, as set out more fully in Chapters 4 and 6.

**Access, recreation and quality of life**

Access to woodland provides recreational value, but is also important for its effect on physical and mental health. Growing evidence supports the assertion that urban greenspace and access to the wider countryside promote physical and mental health, children’s development, and social cohesion.

The UK NEA recognises the importance of contact with nature for securing our long term health and happiness (UK NEA, 2011). The Natural Environment White Paper in England reinforces the importance of green space and access to nature for people’s health and well-being (DEFRA, 2011). Forestry strategies also recognise these values: for example, the Scottish Forestry Strategy (2006) has a key theme of access and health, with one indicator being the proportion of people with access to woodland. Trees and woods can have a restorative and therapeutic effect on the mind (Hartig et al., 2005). Studies have also looked at the beneficial effects of natural surroundings on children with Attention Deficit Hyperactivity Disorder (Faber Taylor et al., 2001).

Benefits per hectare from access are mainly determined by proximity to where people live or travel for leisure, and by the extent of local open space alternatives. People living closer to a wood value it more highly. The recreational value of woodland is estimated to be higher for more accessible woods near to centres of population i.e. in urban and peri-urban areas (UK NEA, 2011).

The value of public access benefits alone of UK woodland is estimated to be £447 million a year (CJC, 2008). While over 80 per cent of people live in urban areas, only around 15 per cent of the population have access to a wood of at least 2ha within 500m of their home (Woodland Trust, 2010). Only 65 per cent of the population has access to woods larger than 20ha within 4km of their home.

Overall, the UK NEA values the health and welfare benefits of greenspace at £30 billion a year, with the value of living with a view of green space at £300 per person per year (Fielden, 2011). Evidence also shows that property values may be higher in areas with trees. The landscape value of woods and treescapes may be recognised in designated areas such as National Parks and Areas of Outstanding Natural Beauty, and also in our historic designed landscapes such as parks and gardens.

**Air quality**

While there has been a decline of sulphur dioxide and black smoke emissions, recent decades have seen growing significance of nitrogen oxides, fine particles (PM10 and PM2.5) and ozone, largely as a result of changes in energy production and increasing vehicle ownership. Trees and woods can reduce levels of these pollutants and improve air quality. However, some tree species emit volatile organic compounds (VOCs) which can lead to poorer air quality. Careful species selection and siting is needed, but the general impact of trees on air quality is overwhelmingly positive (Hewitt, 2005).

There is evidence that urban trees remove large amounts of air pollution and improve urban air quality (Nowak et al., 2006). Columbia University researchers found asthma rates among children aged four
and five fell by a quarter for every additional 343 trees per square kilometre (Lovasi et al., 2008). The UK has one of the world’s highest rates of childhood asthma, with about 15 per cent of children affected and a higher prevalence in lower socio economic groups in urban areas (Townshend, 2007).

The benefits of air pollution absorption by woods of greater than 2ha size have been estimated at around £900,000 per year (Powe and Willis, 2004). However, the health benefits from air pollution absorption within smaller woodland and individual trees are not included and are likely to be much greater. Many of these woods and trees are located closer to urban populations and to sources of pollution.

**Urban adaptation**

Increasing tree cover in urban areas could help mitigate the ‘urban heat island effect’. This occurs in towns and cities as the buildings, concrete and other hard surfaces such as roads act as giant storage heaters, absorbing heat during the day and releasing it at night. On some days there is a difference of as much as 10°C between city centres and surrounding areas (Daily Telegraph online, 2011). Projections for changing climate suggest urban heat island effect will get markedly worse.

Higher temperatures increase ground level ozone, exacerbating the symptoms of chronic respiratory conditions. Prolonged high temperature can precipitate cardiovascular or respiratory failure particularly amongst the elderly, very young or chronically ill (Bhattachary, 2003).

Research at the University of Manchester using computer modelling has shown how increasing urban green space can mitigate urban heat island effect. Without any increase in green space, by 2050 the temperature in Manchester is projected to rise by 3°C. However, if the amount of green space increases by just 10 per cent then the effects of climate change on increasing surface temperatures could potentially be mitigated. However, reducing tree cover by the same percentage could lead to an increase of 8.2°C under some scenarios (Handley and Carter, 2006).

There is no single reliable source of information on urban tree cover. Nonetheless, there have been attempts to quantify urban tree cover in a number of cities in the UK in order to measure the contribution of urban trees to a number of ecosystem services including public health, management of surface water, air quality, carbon sequestration and climate adaptation.

While no comprehensive comparative assessments of urban tree cover exist in Europe, some indication of both green space and urban tree cover are available. The average of 18.5 per cent for 26 larger European cities cited by Konijnendijk (2001) only includes woodland, not trees in small groups and individual trees outside woods. This compares with the figures from the ‘Trees in Towns II’ report (Britt and Johnston, 2008) which surveyed 147 English towns and cities and found an average of 8.5 per cent canopy cover.

Tree cover as reported by Britt and Johnston (2008) was unevenly spread in towns across England, with towns in the South East (11.8 per cent) and South West (11.1 per cent) highest, and those in the North East (4.0 per cent) lowest. This suggests that many towns and cities in England are below the European average.

**Timber production and non-timber products**

Timber production is an important provisioning service from woodland and is covered in greater detail in Chapter 3. Although around just 20 per cent of wood used in the UK is home grown, timber production contributes to the economy and to timber processing industries, as well as providing financial support for forest management which provides other ecosystems service benefits.

A large proportion of the annual increment of forests in the UK is currently not harvested and could contribute further to both home grown timber and woodfuel for renewable energy.

Non-timber products also make an important contribution to the economy and are covered in Chapter 3.
Carbon

The Centre for Ecology and Hydrology produces estimates of the net amount of carbon sequestered by woodland, and of changes in carbon stored in harvested wood products, for UK reporting under the Kyoto protocol. These show a rise in net carbon sequestration by UK woodland planted after 1921, peaking at 16.3Mt\(\text{CO}_2\) in 2004, before falling back to 12.9Mt\(\text{CO}_2\) in 2009. This rise since 1945 is consistent with afforestation rates from the 1950s to 1980s. Net sequestration rates for 2001 to 2009 have been estimated at around 5.2t \(\text{CO}_2/\text{ha}\) across all UK woodland. Carbon accounting methodology is, however, still evolving, and current models probably underestimate carbon sequestration rates (UK NEA, 2011).

The Read Report suggests an additional 12Mt\(\text{CO}_2\)-15Mt\(\text{CO}_2\) per year could be sequestered in 2060 were a programme of enhanced afforestation of an additional 23,200ha a year adopted. This was based on the use of faster growing conifer species. The report suggests that this would result in savings equivalent to 10 per cent of national greenhouse gas (GHG) emissions at that time; however it also assumes that national GHG reductions targets will be met. Given land availability in the UK, forests can make a contribution to GHG mitigation, but do not avoid difficult choices on GHG emission reduction.

The UK NEA (2011) suggests that the total social value of net carbon sequestered by UK woodland increased from £124 million in 1945 to £680 million in 2009. This implies a mean value per hectare of the carbon sequestered annually by UK woodland of £239/ha, significantly greater than the mean values for conifer and hardwood production. However, as carbon sequestered currently remains largely a public good, there has been little incentive for landowners to plant woodland for carbon.

However, carbon is the most readily monetised ecosystem service. The introduction of the Woodland Carbon Code in 2011 is an attempt to create recognised standards for woodland carbon as a way of providing additional funding for woodland creation, which could provide a range of benefits in addition to carbon. This voluntary code aims to encourage a consistent approach to woodland carbon projects, and offer clarity and transparency to customers about the carbon savings that their contributions may achieve. Projects compliant with the code must be responsibly and sustainably managed, provide reliable estimates of the amount of carbon that will be sequestered or locked up as a result of the tree planting. They must be publicly registered with the Forestry Commission and independently verified, and meet transparent criteria and standards to ensure real carbon benefits are delivered.

Water management

The history of the relationship between water and forest in the UK is mixed. Afforestation in the second half of the last century led to a deterioration in water quality in some areas due to acidification.

However, the positive contribution that trees and woodland might make to water management has been increasingly recognised. Forest Research reported on forestry measures for delivery of the Water Framework Directive (WFD) (Nisbet et al., 2011). This identified the greatest potential benefits are likely to come from means riparian and floodplain woodland to help reduce diffuse pollution, protect river morphology, moderate stream temperature and help flood risk management. The report also recognised the potential for woodland buffers on mid slope and down slope field edges to reduce runoff and sedimentation.

Trees might also make a positive contribution to reducing flood risk in urban areas. The Pitt Review following the 2007 flooding in the UK identified around two thirds of all the flooding was as a result of surface water (The Pitt review, 2008). In towns and cities the increase in hard surfaces, unable to absorb rainfall, often mean drains are overwhelmed. In London it is estimated that 3,200ha of front gardens have been paved, and in Leeds an estimated 75 per cent of the increase in impervious surfaces that has occurred from 1971 to 2004 is a result of the paving of front gardens (Davies, 2011).
Preliminary results from research by the University of Manchester suggests that trees can reduce surface water runoff by up to 60 per cent compared to asphalt (Armson et al, 2011). The reduction in runoff, slowing the rate at which rainfall reaches the ground, increases the possibility of infiltration and the ability of engineered drains to take away any excess water (Gill, 2009). When combined with other measures as part of sustainable urban drainage schemes, trees have an important role to play in consideration of flood risk.

The potential for trees in managing flood risk was recognised in the Natural Environment White Paper for England (DEFRA, 2011). The Water Environment and Water Services (Scotland) Act 2003 includes mitigating the effects of floods and droughts. Whilst research and practical evidence is incomplete in some areas of water management, it is clear that woodland merits much wider attention in the management of water quality and flood risk.

**Issues**

As the UK population grows, demands on ecosystem services will increase, at a time when climate change may be creating further pressures and uncertainty. Competing pressures for land use, and in particular for agricultural production, will have to be met and balanced with maintaining and increasing vital ecosystem services. But people also value beauty and attractive surroundings and will want to live in and demand access to countryside of high quality. Trees and woods can enhance local landscapes if the right tree is established in the right place to enhance a sense of place.

Since the middle of the last century there has been a significant increase in the area of woodland in the UK. The majority of the increase has been as a result of afforestation with largely, non-native conifer species, although the last 20 years has seen a steep decline in conifer planting and an increase in the area of new broadleaved woodland. Much new woodland is not being managed to produce timber, raising questions over how its future management will be paid for.

Since 2000 the general trend has been a decline in new planting in the UK. Forest policy and woodland management have changed over time as different goods and services have been required and incentivised.

Some services are not locationally independent, in particular carbon sequestration and timber. Increase in carbon sequestration is, broadly, dependent on an increase in the area of woodland in the UK and species selection. Increasing timber production could be achieved by increasing the area of existing woodland under management for timber and/or through an increase in the area of new productive woodland.

Other services are locationally dependent. This includes tree and woodland cover for urban adaptation, water management, public access and air quality. Research and modelling to understand the best locations and design for woodland to deliver a range of benefits is continuing, but incomplete, and even where it exists, such as for public access (Woodland Trust, 2010), appropriate incentives and schemes to address the issue may not be available.

There is no single reliable source of information on urban tree cover. As a result it is difficult to assess the contribution of trees to urban adaptation and other services in urban areas, and the extent of need. Tree cover is unevenly spread in towns across England. Many towns and cities in England are likely to be below the European average.

Deprived areas typically fare worse in terms of quantity and quality of green space. During the last three decades of the 20th Century, there was a decline in the condition and accessibility of urban greenspace in the UK (Watson and Albon, 2011).

Evidence from the ‘Trees in Towns II’ (Britt and Johnston, 2008) report prepared for the Department of Communities and Local Government shows a lack of sufficient investment and planning from some local authorities in maintaining and expanding tree cover. The report highlights the need for specialist staff and a clear tree strategy in order to take full advantage of the many benefits trees can bring to people living in urban areas.
Make the most of woods

Alan Carter, Reforesting Scotland

One hundred years ago, Scotland was the most deforested part of the Britain, down to around 5 per cent cover. The reasons for this were complex. Counter-intuitively, the availability of materials other than wood for heating, such as peat and coal, meant that copses and wooded commons were not the essential element of the landscape that they were in England. Land ownership played a large part too: the deforestation of parts of Scotland went hand in hand with its depopulation as the clan system turned into a feudal one and unprofitable tenants were moved off to make way for the two greatest enemies of the Scottish tree: sheep and deer.

Now, Scotland is the most forested part of the UK, but this success has been achieved mostly by mass planting of conifers by the Forestry Commission, now another large landowner in a landscape of large landowners. The result is that we have the forests, but not much increased engagement with woods and trees by the Scottish people.

Reforesting Scotland (RS) was founded to promote a different vision of reforestation, one with a much greater diversity of species, ownership, scale and use.

We have often looked to Scandinavia for our inspiration, where farmers are typically also foresters, with crops and pastures sensibly located in the valley bottoms and forestry and hunting on the hill tops. Much of Scotland is an upside-down landscape, with windswept sheep and stunted deer at agricultural densities struggling to survive on bare ground above the trees.

Scandinavian farm forests support a range of small sawmills and other wood processors. Scottish buildings have quietly gone wooden in their frames, but both building regulations and architectural culture remain much more hostile to openly wooden buildings than in Scandinavia.

Gathering forest products such as mushrooms and berries is a national pastime in Scandinavian countries, enabled by the fact that most Scandinavians have and use access to a small second home or hut in the forest. Reforesting Scotland’s current campaign for a ‘Thousand Huts’ is a recognition of how central this tradition is to Scandinavia’s forest culture. Reforesting Scotland catalysed the creation of the Scottish Wild Harvests Association which campaigns for sustainable harvesting of wild products – an important voice now that foraging seems to have caught the national imagination and mushroom collection is becoming a big business.

Across continental Europe, communities own surrounding woods: in Germany, debates over management of the Gemeindewald can sway local elections. Reforesting Scotland was instrumental in establishing the Community Woodlands Association, and we continue to argue for the transfer of control from large landowners and the Forestry Commission to local communities.

Forests produce so much more than timber and pulp: they yield recreation, adventure, biodiversity, hunting, gathering, fuel, clean air and water, renewal of the heart and connection to the land. There is no reason why Scotland should not aim for or above the European average of forest cover, but to make the most of the benefits of woods, Scots need not only to plant more forests but to take ownership of them, both literally and culturally.
Payment for ecosystem services could underpin sustainable forestry

Mike Seville, Country Land and Business Association

In the UK, with the exception of the tops of some of our highest mountains we have no natural landscape or habitats. All of them are the result of land management practices that have at some time been financially attractive to their owner or occupier.

The reality is that at the end of the day money talks.

History shows us that more woodland is planted and more woodland is productively managed when the products from that management produce a profit, and the greater the profit the greater the incentive to plant and manage woodland. The UK is a relatively small island and the competition for land is intense. Woodland has to compete for space with other land-uses, often some form of agriculture or semi-natural open space, often with a sporting value.

The public forest estate may account for 25 per cent of the UK’s woodland but the greater majority, 75 per cent, is in private or charitable ownership and it is this woodland that offers the greatest potential for change.

Until very recently, over the last two decades we have seen a dramatic increase in the demand for non-market benefits from woodland and at the same time a progressive decrease in the return to the owner from the marketable products. During that time we have also seen a notable increase in the amount of regulation woodland owners are required to comply with. Whilst the requirement for woodland to be managed sustainably can only be welcomed; the implementation of the regulations and the cost and complexity required to demonstrate compliance has been overly complex and expensive. This combination has resulted in a marked decrease in the area of woodland being managed productively and a loss of appetite amongst private owners for significant new woodland planting.

The societal benefits of more woodland creation are well documented; the benefits to the private landowner are still less clear. Whilst the market for some woodland products, especially firewood, are improving, the mechanisms and political will to reward landowners for the ecosystem services and non-market benefits their woodland delivers is still lacking. The price of firewood now means that woodland holdings that are large enough to be worked by a harvester can usually undertake thinning at a profit, however this still leaves the majority of woodlands either unmanaged or costing the owner money. If owners are to be persuaded to undertake significant land-use change to woodland then the primary requirement will be to show that existing woodland ownership is at least as profitable as the current land-use. This will require either a continued rise in the value of timber products or more preferably the provision or access to additional income streams. Paying owners for the provision of non-market ecosystem services would give them an incentive to provide more of these currently underprovided services and would also promote more balanced sustainable forest management.

Woodland in the UK is on the cusp of change but if it is to deliver its full potential to both owner and society then policy makers and forestry professionals will have to be innovative and prepared to adapt to the changing circumstances.
Ecosystem services: Perspectives

Optimising the contribution of our woods: the case for knowledge and understanding

Dr John Jackson, Chief Executive Royal Forestry Society

The true contribution of the UK's woods to the economy is now viewed not just in relation to their timber productivity, but from a new perspective, that of 'ecosystem services'. Sensitive and sustainable modern forestry can generate an enhanced range of positive spin offs for both owners and society by bringing neglected woods back into management.

The National Ecosystem Assessment reveals that nature is worth billions of pounds to the economy. The social value of net carbon sequestration by UK woods is double the market price of wood production. The annual value of environmental benefits of our forests is put at £1.26 billion per year. Yet, a large percentage of smaller woods are neglected or under-managed and not producing optimum conditions for timber, biodiversity or carbon fixing, because it is not economical for the owners to do so.

Policy could concentrate more on bringing existing woods back into optimum condition. Grants to woodland owners lag way behind those paid for environmental enhancement and countryside stewardship to farmers under agri-environment schemes. New woods, often planted at considerable cost to the public purse, need programmed and sustained stewardship, TLC during those early formative years and periodic attention and health checks thereafter. The carrot needs to be larger and juicier to entice reticent woodland owners to nurse neglected woods back into good condition.

But there are two other key aspects that need addressing. Firstly, education is crucial. The UK does not enjoy the forestry tradition of many EU countries, and our generally urban public does not associate paper, boards and timber products with trees. Through the work of organisations like the Royal Forestry Society, people need and deserve to appreciate what makes our woods tick, and how felling trees is part and parcel of best practice in long-term forestry cycles. Forest schools have mushroomed to enthuse future generations about the woods they will inherit.

And secondly, we need to both continue to add to our knowledge base and then to transfer that information better so it is adopted and adapted by the woodland practitioner. Forest research is still the poor relation of UK investigation, yet it is more important than ever that we continue to understand our resource, and the threats and opportunities it faces. Acute Oak Decline, for example, which is spreading and killing off iconic English oaks across the Shire counties, was first spotted ten years ago, but it is only recently that the causal agent has been identified -- and it was completely unknown to science. Large-scale deaths of quintessential English oaks would be a loss both to owners and society as a whole, but this serves to illustrate the fallibility of UK biosecurity and the knowledge base for tree health compared with livestock, horticulture or agriculture.

The woodlands we see, enjoy and value today are the result of centuries of management. If we want to see them continue, expand and flourish, society needs to incentivise sustainable management, understand and protect woodlands from pests and diseases, anticipate climate change, and educate present and future generations of woodland users and custodians about how to manage trees.
Woodlands, forests, scrub, wood pasture, hedgerows and single trees form important multi-functional components of the beautiful landscapes that comprise England’s nine National Parks and the Broads. They provide vital wildlife habitats, like the rare Atlantic oak woods and juniper scrub of the Lake District, and the concentrations of ancient oak and ash woodland of the High Weald in the South Downs. They are also a hugely important resource for recreation and enjoyment, with excellent mountain-biking, horse-riding and camping opportunities at Dalby Forest in the North York Moors, Kielder in Northumberland and across the New Forest.

In recent years the importance of woodland and tree cover in providing essential ‘ecosystem services’ has been confirmed. Water companies like Yorkshire Water and United Utilities are increasing woodland cover in the catchment land they own in National Parks to improve water quality and reduce water treatment costs. There is renewed interest in cropping woods for woodfuel.

National Parks contain over 33 per cent of the existing public forest estate, which comprises a significant proportion of the land cover in some National Parks (e.g. 47 per cent of the New Forest; 16.7 per cent of Northumberland; and 13.2 per cent of the North York Moors). The future ownership and management of all existing and new woodland is critical to the future of National Park landscapes as they adapt to 21st century challenges such as climate change; demographic and social change; and food, water, biodiversity and energy security concerns.

Our vision is for woodlands and forests in National Parks that enhance landscapes, wildlife and ecological networks, and enable their successful adaptation to 21st century challenges. This woodland resource must make a substantial contribution to people’s health and well-being, including through protection and further provision of high quality recreational opportunities and improved delivery of ecosystem services such as flood reduction and water quality improvement.

Achieving our vision will require a substantial increase in woodland cover in the right places and better management of the existing woodland resource. We think that National Parks can be at the forefront of the woodland expansion and restoration agenda, in a way that is well integrated with and delivers on other land management objectives and activity.

Specifically, in National Parks, we want to see:

● Expansion of native woodland and scrub in upland valleys and on bracken covered land, and developing ecological connectivity beyond the boundaries of National Parks;

● Restoration of native ancient woodland sites (and open habitats) that have been converted to conifer plantations in the past (e.g. in the New Forest, and on the North York Moors);

● Managing all ancient semi-natural woodland sites to SSSI standards;

● Protection and extension of access rights and opportunities. For Parks close to major urban areas (especially South Downs, New Forest & Peak District) we would like forests and woods surrounding the Park to deliver high quality recreational opportunities, relieving pressure on sensitive National Park areas;

● Greater involvement of local communities and visitors to National Parks in strategic decisions about woodland and forest planning and management.
Protecting urban trees – the case for tree strategies

Trees and Design Action Group

Urban trees can bring economic benefits, for example increasing property values by 7-15 per cent, reducing heating and cooling costs in buildings, improving health of local people thus reducing healthcare costs, and providing a potential long-term renewable energy resource. They bring social benefits, such as a sense of place and local identity, increasing pride in the local area, improving physical and mental health, and impacting positively on crime reduction. They also bring environmental benefits, reducing urban heat island effect, removing dust and particulates from the air, reducing traffic noise, reducing the effects of flash flooding, and providing food and shelter for wildlife, thus improving biodiversity.

Urban trees have been identified as a key element in any urban climate change strategy, because of their contribution to both mitigation and adaptation to the effects of climate change. It is becoming increasingly understood that they will be an important element in creating successful towns and cities of the future.

Yet recent research shows that all over England urban trees are under threat. Studies have highlighted the loss of street trees in London, for example, and the fact that large species trees are being cut down faster than they are being replaced. This picture is repeated around the country, from streets and estates through to parks and private gardens, with urban trees particularly threatened by built development.

Large urban trees are often perceived as a cause of subsidence, though the perceived risk is greater than the reality. And while national and local policy encourages planting trees in urban areas, the way new development is delivered often makes it impossible to accommodate larger trees.

Local planning authorities do have a range of powers to require trees to be planted, retained, protected and managed, but these are not always fully used or enforced. The importance of local authorities having a comprehensive tree strategy, covering all the trees and woods on public and private land in its area, cannot be over-emphasised, especially with changes to the planning system. They provide the detail, in terms of policy direction and management action plans, that were formerly contained in unitary development plans.

Tree strategies should establish the case for more and better informed provision for trees in new developments, including increased canopy cover, ensuring buildings and infrastructure can accommodate large trees, setting out reference to good practice standards for planting and aftercare, engaging land and property owners and the wider public in supporting tree planting and good tree management, and valuing the local authority’s tree stock in all represented land use forms. They should ideally include a commitment from the local authority and other public owners to plant new trees and maintain existing stock to new standards.
6 Resilience

Key points

● There are a number of drivers of change that affect wooded landscapes. These include climate change, new pests and diseases, pollution, invasive species, grazing and browsing, and wider land-use factors.

● It can be difficult to separate out their individual effects, and this is further complicated by the fact that they can work synergistically.

● There is recognition of all of these issues to some degree in policy, and of the need to act now. There is particularly increased uptake of the idea of integrated action across whole landscapes, to make them more resilient.

● However, there are huge challenges, not least the fact that the actual impacts of the various drivers, and the way they will interact, are difficult to model or predict accurately.

● Meeting the challenges needs joined up thinking and action across a range of policy areas, engaging with a wide variety of stakeholders and provision of sufficient resources.

Introduction

Forests, woods and trees have, over millennia, adapted to change. But the scale and nature of current and predicted change is setting a new level of challenge. The UK National Ecosystem Assessment (UK NEA, 2011) cites the main drivers, (natural or human-induced factors directly or indirectly causing a change) affecting trees and wooded landscapes as climate change, pollution, and land-use practice. In addition, it discusses biotic pressures from herbivores, pests, pathogens and invasive species, and notes that ageing of woodland stock also has an impact. It points out that many drivers act synergistically, and across a range of scales, so that the individual effects can be hard to distinguish.

Current situation

Climate change

There is compelling evidence that the climate has changed over past decades in the UK, with nine of the ten warmest years on record having occurred since 1990 and a shift in the seasonality of rainfall emerging, with drier summers and wetter winters, including more heavy rainfall events in winter.

There is also clear evidence that climate change is having an impact on some aspects of the composition and function of woodland (Broadmeadow et al., 2009). Leafing of oak has advanced by about three weeks since the 1950s, with leafing now consistently earlier than prior to 1990. In theory, this should increase net primary productivity through extending the growing system, but it may also have negative impacts on the wider woodland ecosystem through affecting synchrony between different trophic levels, or through reducing the amount of light available for characteristic woodland flora. Earlier leafing dates also enhance the risk of frost damage to trees, since earlier leafing is not matched by any corresponding trend in the date of the last spring frosts.
Warmer temperatures would be expected to lead to faster growth. Dendrochronology studies focused on conifers have shown increased growth rates in central Europe, but no corresponding response in Britain and north west Europe. The increase elsewhere in Europe has been ascribed to increased nitrogen availability because of pollution deposition and changes in woodland management. More recent studies of broadleaves in southern England have revealed trends that were not apparent earlier, with an increase in tree ring width of 180 year old woodland since the mid-1970s, and a positive impact from mild spring temperatures and above average early summer rainfall, and a negative impact from lower than average July-August rainfall. Availability of moisture is a limiting factor; in very dry summers, serious damage has been caused to tree stands, especially in species that are not well suited to site conditions.

In terms of impacts on woodland flora, Kirby et al (2005), in a study of long-term ecological change in woods, found potential evidence of impacts of climate change, with the frequency of 47 out of 322 plant species showing significant positive relationship with early season temperature change. But it is difficult to separate the effects of climate from other drivers such as ageing of forests, changes in management and other land use, and the effects of nitrogen deposition.

There is clear evidence of changes to emergence and first flight times for some butterflies, moths and hoverflies, and changes in arrival times of migrant bird species. The abundance of moth species has declined between 1966 and 2001 and there is a relationship between this and summer temperature and winter precipitation, though other factors are also likely to be involved. However, observed changes in the distribution of bird species are more difficult to interpret because of the complexity of underlying drivers.

Looking to the future, it is impossible to predict precisely the rate, scale, nature and impacts of future climate change. We do not know how successful our efforts to mitigate climate change will be, though it is accepted that further warming is now inevitable.

Projections suggest all parts of the UK will become warmer. Summers will become drier, with more frequent and severe periods of drought, especially in the south and east, and winters will become milder and wetter, with northern and western areas experiencing a moister and milder climate (UK CIP, 2011). There may also be increased frequency of extreme weather events such as gales, storms and flooding.

Predicting the impacts of climate change is complex, but changes in forests and their ecology are inevitable. Increased frequency and severity of summer drought is likely to represent the greatest threat to woodland from climate change (Broadmeadow et al., 2009), with serious impacts on drought-sensitive tree species on shallow freely draining soils, particularly in southern and eastern Britain. The suitability of species for use in commercial forestry will need to be re-assessed; impacts in the south may be sufficiently severe to require the introduction of new species. Rising carbon dioxide levels would be expected to increase growth rates of trees and therefore productivity, assuming sufficient water and nutrients are available, for example, but this might be countered by increased levels of ozone pollution, damaging foliage and reducing the ability of trees to withstand drought.

If the trend in earlier leafing dates were to continue as seems likely, but with little or no corresponding change in the date of last frost (late spring frosts are unpredictable), this could increase the risk of late spring frost, which affects form and resulting timber quality. Repeated frost damage could significantly reduce productivity.

Warming may also lead to incomplete hardening and more winter cold damage, and species that require winter chilling to break dormancy may be unable to regenerate naturally in projected climates of the future.

Drier and warmer summers will increase the risk of fire. Compared to some Mediterranean countries, the UK suffers relatively little from forest fires, but they do occur, especially in areas where grass pasture, heathland occur in close proximity, or where rides and other non planted areas support inflammable vegetation at certain times of the year. The trend in forest fires has been downwards, though there is some evidence there have been crown fires recently, rare in this country.
Projected changes in rainfall patterns will mean greater fluctuations in the water table, limiting rooting depth and reducing stability on exposed sites. While future projections for wind are uncertain, this reduced stability could increase the risk of windthrow even under current conditions.

The suitability of species in different areas, and the range of native species, will change in response to climatic factors. Forestry Commission modelling for suitability, for example, shows a shift in the occurrence of beech as a productive forest species north and westwards. For Sitka spruce, there is a decline in suitability in east Wales and western England, but an increase further north. Analysis for a range of species shows challenges for commercial forestry, especially in southern England where a different approach to silviculture will be required, including use of alternative species. But there could also be opportunities, including increased productivity of some commercial species in the north and west, changes in range of existing commercial species, and opportunities to plant new species and provenances.

Modelling that looks at the effects of climate change on the ‘climate envelopes’ of species (MONARCH, 2007) suggests some native tree species are likely to lose climate space in southern England, though most will maintain climate space in the UK as a whole. There are, however, questions over whether species will be able to disperse and move through the landscape as their climate space moves, assuming suitable habitat is available. For species to stay within appropriate climatic envelopes they will need to migrate ten times faster than they did to reach present distributions after the last ice age.

Native woods are likely to experience changes in species composition, rather than loss of woodland area, as a result of climate change. Climate change is also likely to impact on biodiversity through changes in phenology, leading to loss of synchrony between species, changes in species abundance and distribution, including arrival and loss of species, and changes in community composition and ecosystem processes (Mitchell et al., 2007).

Projections of the responses of individual species (MONARCH, 2007) suggest that some species will benefit, while others will lose out. Higher plants and lichens show a large loss of climate space in contrast to most invertebrates which show large expansion in climate range across England, Scotland and Wales. Terrestrial vertebrates show a range of responses. Some species may no longer be at the edge of their climatic range and pressures on existing populations would decline. Other species will lose all climate space and efforts to maintain them may fail.

Increasingly, the potential impacts of climate change on forests, woods and trees, and the need to act now to aid mitigation and adaptation, are recognised in policy, for example in country forestry strategies, and in the recently revised UK Forestry Standard (UKFS) which includes for the first time a Guideline for Forests and Climate Change. The Read report (Read et al., 2009), summarises the various principles and priorities that have been suggested for climate change adaptation as: creating resistance and promoting resilience to change, monitoring change, and accepting landscape change. It recommends action should start now to change the extent, composition and structure of woodland to avoid future serious limitation of goods and services from forests, and wildlife losses. It suggests:

- An increase in management intervention to modify the biological and ecological response of forests to climate change, even in semi-natural woods, but leaving a proportion of woods as minimum intervention to assess ‘passive adaptation’;
- Changes in woodland management techniques – for example, a shift to continuous cover techniques which may be more wind-firm and show soil lower carbon losses – to create structures that are more resilient and robust;
- Increasing tree and woodland cover to develop new habitat networks;
- Possible introduction of new provenances and species to continue to meet demands for timber, fuel and ecosystem services, though research is needed to establish which would be most appropriate.
It also suggests re-appraisal of woodland and tree conservation is needed, with greater clarity over what we are trying to conserve in a changing climate, and whether past emphasis on native species and local provenances is still valid, or where other species and provenances might provide refuges for rare and threatened species.

Pollution
Aerial deposition of pollutants affects both air quality and rainfall chemistry. Reports from surveys of commercial forests report ‘no widespread forest damage’ from pollution but nitrogen deposition and ozone levels are still above ‘critical loads’ for some habitats – for example, Atlantic oakwoods.

Nitrogen deposition has detrimental effects on lower plants, and on fungal diversity, especially mycorrhizal diversity and activity, which contributes to the drought and disease resistance of trees. It is also thought to be responsible for increases in nitrogen-demanding ground flora and reductions in species diversity in broadleaved woodland.

Cumulative ozone concentrations are reducing forest growth and carbon sequestration across Europe. However, the effects of aerial pollution are hard to measure in forests and woods, and further complicated by interactions with other drivers such as climate change, which makes it difficult to predict effects in the future (UK NEA, 2011).

Land use change
Long term drivers include the loss and fragmentation of semi-natural woodland (covered in previous chapters), which has implications for the resilience of woodland, particularly to climate change (see above). Fragmentation caused by loss of woodland and intensive management of land between areas of semi-natural habitat mean species are less able to move. Even where modelling suggests that the range of a species may change or expand in response to climate change, habitat fragmentation or behavioural factors may prevent this. Also problematic is the fact that many ‘woodland specialist’ species are characterised by poor powers of dispersal, and therefore may not be able to move.

Landscape scale approaches and habitat networks have gained currency in conservation policy, in recognition of the need to reverse fragmentation. The recent Lawton review (Lawton et al., 2010), the findings of which are reflected in the Government’s Natural Environment White Paper in England, highlights the need for ecologically functional landscapes – (*more, bigger, better and joined*). Scotland’s Land Use Strategy talks about the need for ecologically coherent networks (Scottish Government, 2011b). The Welsh Assembly Government’s strategy for a more integrated approach to the environment, A Living Wales, (Welsh Assembly Government, 2011) states that this could mean larger, connected and diverse habitats which allow full ecological functionality and adaptation to climatic change.

Intensification of agriculture, and industrial development, are both linked to pollution (see above). Building and development continue to contribute to woodland loss. Recreation is also increasingly important as a land use driver affecting woods, with an increased range of leisure activities (e.g. mountain biking) available, and development of facilities in woods to cater for these.

Pests and diseases
Global trade in plants and timber provides pathways for pests and diseases to enter the UK, and over the past decade several new pests and diseases have been found. Some have established with serious implications for tree health and economic consequences, and there are currently some major diseases with combined potential to be devastating for both productive commercial forests, and sites of high conservation value, as well as more widely in urban and rural landscapes.
Phytophthora ramorum (sometimes called ‘Sudden Oak Death’ because it has affected large numbers of tan oaks in the USA) is a fungus-like pathogen causing extensive damage and death to trees and other plants in the UK. First found affecting a viburnum plant in a garden centre in 2002, it has affected shrub species such as rhododendron and viburnum, and heathland plants such as bilberry. Until 2009 fewer than 100 trees had been found with the infection, and then usually only on trees standing very close to infected plants, especially Rhododendron ponticum. However, in 2009 the pathogen was found infecting Japanese larch and a small number of other conifer tree species in Forestry Commission and privately owned forestry plantations in south west England and, in 2010, in Wales, Scotland, Northern Ireland. This is the first time it has been recorded infecting a commercially important conifer species anywhere in the world, and represents a significant development in the pathogen’s behaviour. This ability of the pathogen to switch hosts is particularly worrying.

Large numbers of larch trees have died or are dying. Larch foliage produces P. ramorum spores at about five times the level that rhododendron does, and these can be dispersed over considerable distances, possibly tens of kilometres. The pathogen thrives and spreads best in a moist, mild climate, and climate modelling suggests the southern and western seaboards of Britain are more likely to be affected than the drier eastern regions. This has been borne out by the outbreaks confirmed so far.

P. ramorum kills many of the trees that it infects, and could have serious impacts on trees, woodland, the forest industries and the wider environment. The response to Phytophthora ramorum has involved aerial surveys to identify areas of dead trees, followed by inspection and sampling in some areas. Felling of infected stands is required under a Plant Health Notice. The Forestry Commission does not recommend restocking with larch or other susceptible species. Biosecurity measures are required in relation to woodland operations, movement and sale of timber from infected woods.

Acute Oak Decline has been found affecting hundreds of trees across central and south-east England and parts of Wales, and can kill a tree in as little as four or five years. A previously unknown bacterium has now been discovered which is believed to be playing a key role. Symptoms include dark fluid bleeding from splits in the bark on tree trunks, deterioration of the canopy, and ‘dieback’ of the branches. Acute oak decline, if it continues to spread, could have serious consequences for woodland biodiversity, since oaks are such an important component of many semi-natural woods and wood pastures.

There have been increasing reports of a bleeding canker affecting horse chestnut trees, caused by a pathogen Pseudomonas syringae pv aesculi. This kills trees where extensive areas of bark are affected, and the disease has been reported in England, Wales and Scotland.

Red Band Needle Blight, caused by the fungus Dothistroma septosporum, has been found on a range of conifer species, but pines are by far the most common hosts, with Corsican pine, lodgepole pine and Scots pine all now affected. Defoliation occurs, which can continue year on year, weakening the tree, reducing timber yields, and can eventually kill the tree. The disease has been found in England, Scotland and Wales, and while Scots pine was considered to be less susceptible, there has been an increase in distribution and severity of the disease on this species, raising concerns over possible effects on Caledonian pinewoods.

Examples of recently introduced pests include the oak processionary moth, which is also a threat to human health, and potentially pine-tree lappet moth, which causes defoliation of Scots pine – research is ongoing to establish whether a breeding population of this species near Inverness is introduced, or previously undiscovered resident. Asian longhorn beetle and emerald ash borer both pose threats to native broadleaved trees.

The threat posed by pests and diseases could be exacerbated by climate change. Many insect pests affecting UK forestry are likely to benefit from climate change, and the effective range of existing pests and pathogens may change. Drought and other stresses could make trees more vulnerable to
the effects of pest outbreaks. Temperature and moisture are also key factors in development of plant diseases, and, again, trees may also become more susceptible through increased damage from extreme weather events, or from drought stress. Dependence on monocultures and reliance on a few species could compound this; Sitka spruce, for example, is sensitive to drought. Likely increase in large-scale imports of biomass for renewable energy (see chapter 3) also increases the risk of importing pests and diseases.

In response to the increasing threat from tree pests and diseases, the Forestry Commission set up a cross-sector Biosecurity Programme Board which advised on the recent production of a Tree Health Strategy (Forestry Commission, 2011b) for Britain. In October 2011, the Government announced spending of £7 million as it launched the Tree Health and Plant Biosecurity Action Plan (DEFRA, 2011a), containing a range of measures to combat the threat of pests and diseases, including plans for improved biosecurity and a programme of research.

Herbivores
Grazing and browsing by sheep and deer in particular is a major driver of biodiversity change removing tree regeneration, leading to loss and fragmentation or affecting species and structural diversity. Deer browsing alters the composition and structure of vegetation resulting in a more open understorey and increasing dominance of grasses.

Policies and legislation related to wild herbivore control have had little effect to date, but there are moves to provide greater powers to government agencies to cull deer.

Climate change may also affect deer populations, which are already contributing to changes in woodland structure and composition. The exact effects are difficult to predict, and may vary across the county. Climate space for roe deer may be lost in the drier south east, for example, but deer populations could increase elsewhere if carrying capacity of habitats increases with longer growing seasons and greater plant productivity.

However herbivores, primarily traditional breeds of cattle, native roe or red deer and Exmoor ponies are essential for maintaining the quality of wood pasture and parkland habitats. Changes in agricultural incentives such as sheep headage payments have worked perversely in the past to damage habitats and a lack of appropriate incentives is undermining wood pasture and parkland management.

Invasive species
The spread of invasive species such as rhododendron has reduced forest and woodland diversity.

Grey squirrels are limiting the growing of quality broadleaved timber, and the survival of the red squirrel. They may also affect canopy composition by impacting upon thin-barked tree species such as beech (UK NEA, 2011).

The threat caused by a particular species is not determined by its status as native or non-native, but by whether it is negatively impacting on biodiversity, productivity, or other aspects of ecosystem services provided by woodland.

With climate change, and potential shifts in the ecological balance of species, some which are not currently problematic may become invasive.

The Invasive Non-Native Species Framework Strategy (Defra et al., 2008) sets out an agreed approach across Great Britain for tackling invasive non-native species, through increasing awareness of the risks, ensuring shared responsibility is taken by government, land managers and the general public, and setting out a framework for eradication, control, or mitigation of invasive species that threaten sensitive and vulnerable habitats and species.
Issues

Forests, woods and trees are facing environmental change at a scale and rate that is unprecedented. While modelling is a useful tool in trying to assess likely change, it is only as good as the data that can be put in, and always comes with a number of caveats. Predicting the impacts of just one driver, such as climate change, is fraught with complexities, let alone trying to untangle the likely impacts of more than one.

The challenge is to decide what action is appropriate now, given these uncertainties, and the long timescales over which forests and woods operate. However, it is broadly accepted that we need to build resilience, within woods and across whole landscapes, and that this will mean reversing fragmentation, increasing diversity in one form or another, and, where we can, reducing stresses on forests, woods and trees.

There is a certain amount of recognition of these issues in policy, particularly of the need for a ‘whole ecosystems’ and ‘landscape-scale’ approach, but it is questionable whether all the pieces are in place to effect the changes needed, and whether sufficient resources will be available to put policy into practice. For example, funding needs to be available for continued research into new pests and diseases and the suitability of tree species in relation to climate change, to effect changes in the way land-use is planned, and to create landscapes that are more ecologically functional and resilient.
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The challenge of diversification

Forest Policy Group Scotland

The species composition of our forest is the most important factor determining what forests can provide for society and industry. Species choice impacts on a number of policy issues:

- Increasing environmental and social benefits of forests
- Maintaining traditional softwood supplies to timber processors
- Insuring against uncertainties presented by new tree diseases
- Adapting to and mitigating against climate change
- Providing wider diversity of timbers to expand timber markets
- Meeting targets for renewable energy through biomass supply

Generally, more diverse forests provide the best resources for community engagement, conservation, landscape and recreation, and can provide a wider range of economic opportunities. They can also help insure against unforeseen changes such as pests and diseases, climate, economic or social circumstances, so helping to spread risk.

In Scotland, in 1995, Sitka spruce occupied 48 per cent of Scotland’s forest area, nearly twice the area of all native species put together. European larch and Douglas fir occupied just 2 per cent between them. Between 1995 and 2009, there was an overall increase of about 4 per cent of the proportion of broadleaves in the resource and a corresponding decrease in conifers, though the majority of broadleaved planting will be unsuitable for production of quality timber.

Policies to diversify forests have started to address habitats, landscape and ecosystem services, mainly by planting of native species and aided by increasing adoption of alternative silvicultural systems. However, recent diversification shows little prospect of expanding quality timber production options (both conifer and broadleaved), though lower quality broadleaved woods will find a market in emerging biomass markets. Restocking is a far larger area than woodland creation, and here diversification is happening only slowly. The wider picture still shows a resource dominated by conifers, especially spruce.

The challenge is to find a balance between opposing policy imperatives: increasing the area of woodland creation, with productive conifers having a prominent role to smooth future softwood production and lock up carbon, and on the other hand promotion of diversification in future as a means of combating diseases and climate change, and for public benefits.

There is a need for diversification to continue for the foreseeable future, at least at the rate achieved in recent years, though in a way that maintains supplies to the softwood industries. Better coordination is needed between policy areas, with clearer outcomes linked to the reduction of risk, increasing economic opportunities, and public benefits. The timber potential of the non-spruce sector needs to be developed, and the processing sector will need to consider how best to deal with a more diverse array of timbers being available in the longer term. Native woods need to be viewed more widely as a potentially productive resource.
Living Landscapes

Paul Wilkinson, Head of Living Landscapes The Wildlife Trusts

The Wildlife Trusts’ vision for A Living Landscape is a recovery plan for nature. Launched in 2006 it builds upon the landscape-scale approaches being implemented by the 47 Wildlife Trusts across the UK.

The vision takes on board the key elements of an effective adaptation strategy and makes the case for the need to:

- Protect and enhance core wildlife-rich areas, such as nature reserves, Local Wildlife Sites and SSSIs
- Join up these core areas by creating functional networks based on natural corridors and stepping stones
- Improve the ‘permeability’ of the rest of the landscape so that nowhere is devoid of wildlife and healthy, diverse and inspiring landscapes are the norm
- Involve communities in this process through effective outreach, consultation and engagement in delivery.

Using our network of 2,300 nature reserves and based on detailed knowledge of the wildlife of each country and county, The Wildlife Trusts have identified more than 100 Living Landscape schemes across the UK, covering around 1.7 million ha. Each one is restoring, recreating and reconnecting wildlife-rich areas in our towns and countryside to create resilient, multi-functional landscapes. The schemes are delivered in partnership with a huge number of organisations and individuals including landowners, farmers, water companies, land-based industries, local authorities, other NGOs, statutory agencies, local communities and volunteers.

In the Natural Environment White Paper (NEWP), published in June 2011, Government recognised the need for restoration and recovery of the natural environment at a landscape-scale. The Wildlife Trusts believe that if we are to achieve our ambition for nature’s recovery, local delivery of A Living Landscape must be underpinned by legislative change. However, the NEWP does not commit to enshrining its aspirations in law, nor is there the sense of urgency required or sufficient targeted resources.

Within the NEWP one of the 92 commitments calls for the creation of Nature Improvement Areas (NIAs) which is welcomed by The Wildlife Trusts. NIAs are the new name for the Ecological Restoration Zones recommended by the Lawton Review. These will be large areas (between 10,000 and 50,000ha) containing all the components of an ecological network and delivering multiple benefits for people and wildlife. However, the NEWP also commits to piloting the concept in 12 areas for three years before extending the approach. This seriously underestimates the magnitude and extent of restoration required and the urgency with which the approach should be driven forward everywhere across England.

The Wildlife Trusts would like NIAs to be given formal and statutory recognition within the planning system. The right planning system is critical for the protection of important wildlife sites and identification of areas with potential for habitat restoration. The current planning system is the principal means of protection for Local Wildlife Sites (LWS), which are not protected by law. There are at least 40,000 non-statutory LWS across England covering more than 710,000ha. These sites make a significant contribution to England’s ecological network as important sites in their own right and as buffers and stepping stones to other protected areas. However, The Wildlife Trusts are concerned that the proposed planning reforms will leave LWS bereft of protection and undermine the NEWPs good intentions. The Wildlife Trusts will keep up pressure on the Government to deliver against its vision. We will continue to challenge for new policy and legislation, if we feel it is needed, to secure nature’s recovery.
Trees fit for the future

Dr Gabriel Hemery FICFor, Chief Executive Sylva Foundation

Trees are long-lived and woodlands complex ecosystems. Changes made in their management can have profound and lasting impacts. This can lead to difficulties when objectives are too short-term. In the past, much woodland management has been based on policy cycles that have changed with successive governments: there could be as many as 12 different terms of governments in the lifetime of a tree. Thinking and planning in the long term is difficult for these reasons, and of course due to unforeseen challenges and opportunities.

Looking to the future, beyond the current intention to expand our forests, and the still developing interests in carbon management and renewable heat, we need to consider other factors that may impact the planning and management of our trees, woods and forests.

Climate change, particularly pests and diseases, is already emerging as a critical area where more research is required and changes to silviculture would be beneficial. The role of genetics, particularly in species and provenance choice, is likely to increase in importance. In terms of silviculture, uneven-aged and mixed species stands may become the norm, and these may win favour in the public too due to improved landscape aesthetics and wildlife value.

Increasing competition for dwindling land resources, increasing human population, and the need to support food production will inevitably impact forest management and perhaps afforestation too. With agricultural land being required more to produce food than alternative products, such as biofuels, innovation in forest technologies is likely to reveal novel products and markets. Recent developments in manipulating lignin and polymers from wood to produce products ranging from cloths to lipstick, are indicative of such opportunities.

Architectural technologies are already pushing boundaries with 30-storey buildings already in concept using ‘mass timbers’. Wood, as a highly sustainable material, is likely to increase in importance as we strive to reduce our carbon footprint across the world. The greatest challenge will be in meeting the opportunities of producing more wood while conserving and expanding the world’s forest resource.
Discussion

The International Year of Forests presented an opportunity to take stock of forests, woods and trees in the UK; what emerges is that we are at a turning point – as the Country Land and Business Association say in their perspective, ‘woodland in the UK is on the cusp of change.’

This a time of opportunity: the benefits of tree cover have never been clearer. There is a growing consensus that trees, woods and forests have a key role to play in climate change mitigation and adaptation, and in delivery of ecosystem services. At the same time, trees, woods and forests face unprecedented challenges. While all of this is now recognised to a degree in policy, we are still not seeing it translated quickly or effectively enough into practical outcomes. The challenge to all government, and especially any government aspiring to be the ‘greenest government ever’, is to shift up a gear to ensure a robust future for our forests, woods and trees, and to maximise the many benefits they offer.

The last such turning point was perhaps a century ago, when forest cover was at an all-time low in the UK, and industrial development in particular had contributed to a major shift in the nature of our connection with, and management of, forests, woods and trees. World War 1 highlighted the need for change, in order to secure timber supplies, precipitating both creation of the state forestry sector, and an increase in afforestation. Traditional woodland management systems that had been used for centuries all but died out, replaced by modern forestry techniques suited to the new plantations.

The last 50 years has seen a number of smaller shifts. Recognition of the importance of forests and trees, for biodiversity has raised the profile of ancient woods and wooded habitats, native woodland, and veteran and ancient trees, and led to the introduction of a range of measures aimed at protection and restoration of these features. The global movement for sustainable forestry has led to more sympathetic and thoughtful management of our forests. More recently, the value of our forest resource has been increasingly recognised for its ecosystem service benefits. Forests have a role in water management, in mitigating urban heat island effect, helping to improve air quality, supplying sustainably produced timber and renewable energy, and sequestering carbon. In the urban realm trees and woods can play a role both in creating well adapted and resilient town and cities and addressing growing concerns over public health; encouraging active lifestyles and providing secure and healthy environments where we live.

The resource today looks different from 100 years ago. Forest cover has increased by two-and-a-half times. Plantations of fast-growing softwood species make up a larger proportion, many created several decades ago and now mature, but there has also been an increase in the area of native woodland planted in recent years.

We are better informed about the extent, location, and nature of the resource, and can draw on wide research that provides a more sophisticated understanding of the way that it works, and the challenges it faces. More than ever, we understand the need for our forests, woods, and trees to be multi-purpose. And we have high expectations of what they can deliver.

The threats and challenges for the UK’s woods today may seem different from 100 years ago, but they still reflect wider political, social and environmental issues affecting us globally. Man-made climate change, the increasing threat of new pests and diseases, globalisation, increasing competition for natural resources, increasing pressure on land-use, financial and economic crises and constraints: all of these have implications for forests, woods and trees.

The issue of woodland expansion needs to be addressed. Forest cover in the UK has increased to 13 per cent, but planting rates have stagnated in recent years. There is now recognition that it is time to up the game, particularly driven by the need to mitigate and adapt to climate change, but the level of commitment in policy and through specific targets and incentives is variable across the UK.
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While Wales has a target of creating 100,000ha new woodland over the next 20 years and Scotland aims to increase woodland cover to 25 per cent of land area by 2050, England lags behind, with no target for woodland creation.

Even where targets exist, there are considerable challenges. The National Forest demonstrates a model for rapid and sympathetic landscape change, but the National Forest Company cautions that targets alone are not enough to achieve this – incentives and intensity of effort are also required, as well as available land. Mechanisms need to be found to achieve woodland creation, in the face of increasing competition for land use – for example, the need for food security. To make best use of the opportunity, careful thought needs to be given to where new woodland should go, and what it should look like.

The Woodland Trust and others set out the need for more native woodland, to maximise the benefits for biodiversity (which is fundamental to delivery of so many other ecosystem services), and to create resilient landscapes across which wildlife can move. But as the Institute of Chartered Foresters point out, we need to consider carefully the balance between planting and other land-uses and between planting native and non-native forests, given the projected increase in demand for wood under, for example, renewable energy targets. The Woodland Trust suggests we may need to broaden our view of what constitutes woodland cover with a more imaginative approach in some parts of our crowded island. Tree-covered and wooded landscapes may need to be created from small groups, belts and individual trees, both urban and rural, that can be more easily integrated into working landscapes, as much as from larger forested areas. Policies, incentives and mechanisms are needed that reflect this wider understanding.

Tenure of forests still largely follows the pattern set 100 years ago, dominated by private individuals and the state. State ownership and management accounts for more than a quarter of forests. Reaction to the proposals to sell off the public forest estate in England showed the strength of public feeling for state forests. However, perspectives from contributors also call for greater diversity of ownership, including eloquent arguments for communities to have a greater stake in forests, woods and trees. These come strongly from Scotland, where the particular history of land ownership has led in recent years to initiatives around regaining community control of land that extend far beyond woods and forests. For this reason Scotland has led the way, and the many community woodland groups are a testament to public appetite for more involvement in forest governance, but in Wales there is also a growing movement. In England, Small Woods makes the case for properly funded support for communities in England to be more involved in management of local woods, and outlines the benefits this could bring.

The UK has been a world leader in its commitment to principles and implementation of sustainable forest management. Management of most woods and forests is covered by the guiding framework of the UK Forestry Standard, and there is the additional market-based mechanism of certification which covers a significant proportion of forests. The Institute of Chartered Foresters points to the significant shift which has occurred in management of productive forests to deliver a range of social and environmental benefits as well as timber.

Forestry’s contribution to domestic timber is relatively small in the UK – we still import over 80 per cent of our timber and wood products. It is nevertheless important, and has potential to grow. The forest industry faces a number of challenges – for example, competition for raw materials from the burgeoning renewable energy sector, coupled with peaking of supply as many forests reach maturity. But Confor are optimistic that recovery of timber prices will continue, and that this signals a positive opportunity for forestry.

But despite high levels of imports, the UK still harvests less timber than the annual increment, especially of hardwoods. The issue of under-managed or ‘neglected’ woods is raised by a number of contributors. In Wales, Coed Cymru offer an example of how on-the-ground localised action and support can help landowners to derive economic benefit from their woods, while also delivering a range of public goods.
Confor calls for regulation and incentives to be better geared to helping owners of unmanaged woods, often small and previously uneconomic, to bring them back into management. The Sylva Foundation points to the need for a broader shift in public perception, for a re-connection of the public with woods, and particularly with the idea of woodland as a working landscape.

Lack of appropriate management is also one of a number of factors that research has shown to be causing changes in biodiversity. However, the Bat Conservation Trust cautions against a one-size-fits-all approach and assumptions that re-introducing management will automatically benefit biodiversity. While it will benefit wildlife in some woods, especially species that respond to more light, and the change and variety in structure that management can afford, there are other species that benefit from undisturbed, shady conditions.

The factors affecting biodiversity in our woods are complex, and include climate change, pollution, fragmentation and loss, browsing and grazing, and increased intensity of surrounding land-use, as well as changes in the way woods are managed. The UK Biodiversity Action Plan (UK BAP) sets out the need for maintaining, restoring and expanding the woodland resource, with particular emphasis on ancient and native woodland – all of which would help to increase resilience to these issues. But targets set for 2010 were not met. There is a need to redouble efforts but there are significant challenges.

Across the UK there is pressure for planning reform to stimulate economic growth; this must recognise the importance of trees, woods and forests. Protection of our most important assets such as ancient and native woods seems relatively strong, but the Woodland Trust flags up the danger of losing this ground in the face of increasing pressure for development, and current reviews of policy. For some features, such as ancient and veteran trees, and wood pasture and parkland, there is a need to have comprehensive national coverage of recording and effective protection as the Ancient Tree Forum points out. Restoration of PAWS has become more embedded in policy and practice, but could be severely hampered by serious outbreaks of disease like Phytophthora ramorum. The Scottish Wildlife Trust calls for legal protection for ancient woods, targets for restoration of degraded ancient woods, and expansion of native woodland, as part of a strategy to restore degraded ecosystems.

In terms of ecosystem service delivery, the benefits of woods and trees cannot be over-emphasised, and is increasingly recognised. The Campaign for National Parks offers a vision of forests, woods and trees forming critical parts of landscapes that contribute on a whole range of environmental, social and economic fronts, and suggest that National Parks can perhaps provide a model for the rest of the country. The challenge is in embedding this value sufficiently in decision-making processes. Reforesting Scotland point to Scandinavia as a model for realising the full range of non-timber benefits of woods and trees. Financial valuation of ecosystem services, though not without difficulties and pitfalls, might also offer a mechanism. In urban areas, the ‘Trees in Towns II’ report has highlighted that in many places our urban forest is underfunded and in decline. Reforms to planning could help address this deterioration. The Royal Forestry Society points out the wider benefits of bringing more woods into management, but warns of the need for both public education and investment in research to ensure a buoyant future for woods.

The Wildlife Trusts’ vision of ‘A Living Landscape’ includes protecting core areas of habitat, creating functional networks of habitat between them, and improving the permeability of the remaining landscape to wildlife. This type of landscape-scale approach has gained increasing currency, with mapping of forest habitat and other habitat networks, and expression in recent policies in all countries. Creating a landscape that is more ecologically connected and functional will aid wildlife in adapting to climate change, as well as underpinning delivery of better quality ecosystem services.

Drivers of change such as climate change, pests and diseases, invasive species, pollution and grazing impact not only on wildlife, but also on forests as a productive resource. Predicting the effects of change, and the complex interactions of the many drivers, is an imperfect science. Certainly we need to be open to change – to increasing diversity in our forests as Scotland’s Forest Policy Group suggests.
to reviewing our understanding of what is native or non-native, what is suitable or not suitable, for particular parts of the country or particular functions. But at the same time, given the scale of uncertainty, and the long timescales over which forests operate, we need to be cautious.

This report does not set out to give all the answers. Rather, through the background of evidence, and the perspectives of contributors from across the sector, it has drawn out some of the key opportunities and challenges. The question now is how to realise the former and overcome the latter.

Forests, woods and trees moved up the agenda dramatically early in 2011, when the proposed sell-off of the public forest estate in England generated a vociferous public campaign. But over recent years, government has increasingly begun to recognise the multiple benefits of forests, woods and trees. We already have a substantial body of the research and evidence to support expansion of tree cover across the UK, protection and restoration of its most valuable assets, strengthening of the economic forestry sector, delivery of environmental and social benefits, and creation of resilient, functional landscapes. We also have a good deal of the required policy in place, albeit in different forms, and to different degrees, across the UK.

Our challenge is to drive that policy into practice. Three broad themes emerge from the thinking expressed in this report:

First, a recognition of the need for diversity – diversity within the forest resource, but also diversity in our approach to it. We need to think about the forest resource in all its forms, actual and possible, from woods and trees on farms, to the urban forest, to biodiversity-rich ancient semi-natural woods and ancient trees, to productive plantations. We need to assess how all these diverse aspects can be nurtured, expanded, and appropriately used. We should consider diversity in governance, for example where communities may have something to offer in greater involvement in woods and forests, and vice versa. And we need to think about the structure and make-up of our forests, and our wider landscapes, and how diversity can help to make wooded habitats and their wildlife more resilient for the future.

Second, we need joined up thinking. The policies may be there, but they reside with different government departments. We need government to be truly joined up in the way it approaches policy so that the opportunities for forests, woods and trees and for us to benefit from them, are maximised. Forests, woods and trees need to be embedded in all areas of policy, from planning to public health, from agriculture to water. And the woodland and forestry sector must also be joined up. This report demonstrates the variety of objectives, of concerns, and of challenges the different parts of the sector are dealing with, but it also demonstrates a huge amount of common ground. The forest and woodland sector is relatively small, but has potential to be powerful where it can speak with one voice. We need to keep talking and listening to one another. Peter Wilson’s piece in Chapter 3 on the evolution of UKWAS shows how the sector can pull together with determination on issues of importance.

Third, and perhaps most important, a common thread emerges: the need for public support and awareness. While people may not, if asked, rank woods and trees among their critical concerns, this doesn’t mean that they don’t care about them. We know that perceived threats to woods and trees can elicit a strong response – witness the campaign against proposals to sell off the public forest estate in England. In the Forestry Commission’s latest survey of public opinion about forestry (Forestry Commission, 2011c), the majority of people agreed that woods were important for wildlife and recreation, and understood the benefit of trees for climate change mitigation and adaptation. This is a good starting point, but less than 5 per cent of respondents had taken part in voluntary woodland management or planting, or had been involved in consultation on management of local woods. The challenge is to take the broad engagement people have with woodland environments and truly capture the public imagination to deepen it to a real understanding of, and support for, forests, woods and trees as crucial habitats for wildlife and as working landscapes.
References


The State of the UK’s Forests, Woods and Trees


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About the contributors

The Ancient Tree Forum has pioneered the conservation of ancient trees and is the main UK organisation concerned solely with their conservation. The ATF seeks to secure the long-term future of ancient trees through advocacy of no further avoidable loss of ancient trees, good management of ancient trees, the development of a succession of future ancient trees, and seeking to raise awareness and understanding of the value and importance of ancient trees.

www.ancient-tree-forum.org.uk

Bat Conservation Trust (BCT) is the only UK-wide registered charity devoted to the conservation of bats and their habitats. Our mission is to secure the future of bats in a changing world. Our work spans discovering more about bats and how they use the landscape, through our monitoring and conservation research programmes; taking practical, evidence-based conservation action and influencing policy to secure bat populations, working with partners to protect key habitats and enhance the landscape for bats and other biodiversity; and inspiring people to enjoy and engage with bat conservation.

www.bats.org.uk

Coed Cymru is a long standing partnership of public sector bodies in Wales that have an interest in woodlands. It has very strong links to private and voluntary sectors and to academia. It is funded by the partners to provide free and impartial advice to woodland owners and wood users. Coed Cymru’s principal asset is its staff of 18 Woodland Officers who have extensive experience of managing broadleaf woodlands using continuous cover principles and restoring plantations to native woodland cover. Research into timber products and the impacts of woodlands on the wider environment is coordinated from the central office in Tregynon.

www.coedcymru.org.uk

The Community Woodlands Association was established in 2003 as the direct representative body of Scotland’s community woodland groups. It helps community woodland groups across the country achieve their aspirations and potential, providing advice, assistance and information, facilitating networking and training, and representing and promoting community woodlands to the wider world.

www.communitywoods.org

Confor: promoting forestry and wood is, first and foremost, a members’ organisation, funded by and accountable to people and businesses who own forests and who work in forestry or with wood and forest products. The aim is to support sustainable forestry and low-carbon businesses through promotion of markets for forest products and helping improve members’ competitiveness. Confor’s remit covers all parts of the wood supply chain, from nurseries through to forest owners, agents, contractors, harvesters, sawmills and other users of wood. Confor is here to provide the sector with a strong voice in the market place and in all levels of government – international, UK and local.

www.confor.org.uk

The Campaign for National Parks (CNP) is the independent charity that inspires everyone to enjoy and look after National Parks.

www.cnp.org.uk

The Country Land and Business Association (CLA) is a membership organisation that represents the interests of rural landowners and businesses. Its members own or manage 50 per cent of the rural land, including woodland in England and Wales.

www.cla.org.uk

The Forest Policy Group seeks to further the development of sustainable forestry in Scotland, contributing informed inputs to the policy debate by providing an independent forum for analysing policy and producing policy-related research and developing policy proposals.

www.forestpolicygroup.org
The Forest Stewardship Council (FSC) is an international, non-governmental organisation dedicated to promoting responsible management of the world’s forests. It was founded in 1993 in response to public concern about deforestation and demand for a trustworthy wood-labelling scheme. There are national working groups more than 50 countries including the UK. FSC UK is a registered charity.

www.fsc-uk.org

The Institute of Chartered Foresters is the Royal Chartered body for forestry and arboriculture professionals in the UK. We provide support to members, guidance and information to the public, as well as training and educational advice to students and professionals developing their career. We also regulate the standards of entry to the profession and offer examinations for professional qualifications.

www.charteredforesters.org

The National Forest Company is a small NDPB and Company, core funded by Defra and charged with creating The National Forest across 200 square miles of the centre of England. It has trebled woodland cover, created other habitats and accelerated the social and economic regeneration of an area previously despoiled through extractive industries.

www.nationalforest.org

Reforesting Scotland is a network of people involved or interested in restoring Scotland’s forest cover and culture.

www.reforestingscotland.org

The Royal Forestry Society or RFS is an educational charity covering England, Wales and Northern Ireland, promoting the wise sustainable management of trees and woodlands, and to increasing people’s understanding of forestry.

www.rfs.org.uk

The Scottish Wildlife Trust is a membership-based charity, with over 36,000 members throughout Scotland. The Trust’s vision is of a network of healthy, resilient ecosystems supporting expanding communities of native species across large areas of Scotland’s land, water and seas. This can be achieved through protecting valuable habitats from further loss, restoring and enhancing degraded habitats, promoting large-scale, wildlife-rich landscapes, and inspiring and engaging people in wildlife and conservation.

www.scottishwildlifetrust.org.uk

Small Woods is a UK-wide charity based in Shropshire, which works to conserve small woods. Small Woods’ activities include the delivery of capacity building services to woodland practitioners and enthusiasts; projects supporting woodland initiatives, the coppice sector and the management of ancient woodland; accredited training and apprenticeships in coppicing, woodland products and crafts. In Telford and the Marches we work with disadvantaged and alienated groups, providing opportunities to improve their health and well-being within a woodland environment.

www.smallwoods.org.uk

The Sylva Foundation is a tree and forestry charity working to ensure that Britain’s woodland thrives economically and environmentally for the benefit of everyone.

www.sylva.org.uk

The Trees and Design Action Group is a pioneering group of individuals, professionals and organisations from both the private and public sectors that have come together to increase awareness of the role of trees in the built environment.

www.tdag.org.uk
United Kingdom Woodland Assurance Standard (UKWAS): The UKWAS standard is an independent certification standard for verifying sustainable woodland management in the United Kingdom; it is not a certification scheme but, uniquely, it is designed as a single national certification standard for common use by international forest certification schemes operating in the UK. The UKWAS standard is currently the central component of the UK forest certification programmes of the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification schemes (PEFC). It is managed by a multi-stakeholder partnership working on the basis of consensus.

www.ukwas.org.uk

The Wildlife Trusts: There are 47 individual Wildlife Trusts covering the whole of the UK, the Isle of Man and Alderney. Together, The Wildlife Trusts are the largest UK voluntary organisation dedicated to protecting wildlife and wild places everywhere – at land and sea – and we are supported by more than 800,000 members. Our vision is ‘an environment rich in wildlife for everyone’.

www.wildlifetrusts.org

The Woodland Trust is the UK’s foremost woodland conservation charity. Its vision is of a UK rich in native woods and trees, enjoyed and valued by everyone. Its core aims are to enable creation of more native woods and places rich in trees, to protect native woods and their wildlife for the future, and to inspire everyone to enjoy and value woods and trees.

www.woodlandtrust.org.uk
Report edited, designed and printed by the Woodland Trust

Contributing organisations: