12 Woodland creation

Context

12.1 England has approximately 1,127,000 ha of forest or woodland, of which 10% is classified as 'young stands'.[1] Woodlands classified as small (under 2 ha) comprise 14% of the total woodland area. Farm woodlands in England comprise 305,400 ha (27%) of the total woodland area.[2]

12.2 Within the UK, 5.1% of the total forest area is designated Sites of Special Scientific Interest (SSSI); this represents 23% of the total ancient and semi-natural woodland resource.[3] Plantations on sites of ancient woodland comprise 13% of all woodland area.[4]

12.3 The areas quoted for woodland plantation exclude short rotation coppice. See chapter on 'Energy crops - biomass'.

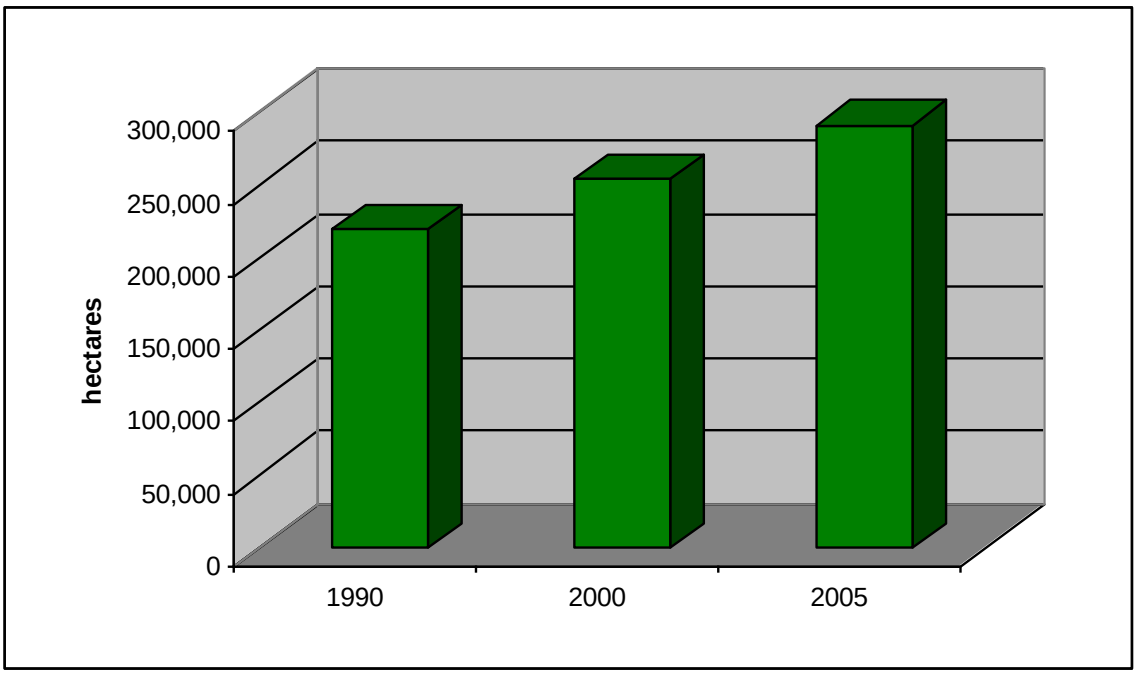
12.4 Current policies and objectives for forestry in England are set out in the Government's strategy for England's Trees, Woods and Forests.[5]

Current practice

12.5 Woodland planting may be carried out to meet a number of specific objectives, for example wood production, game management, biodiversity, recreation, landscape, shelter. These objectives will shape the desired extent, location, structure and composition of the new woodland and, ultimately, its future management. In turn, these factors can influence the likely impact (positive or negative) of the woodland creation on the environment.

12.6 The total area of forest and woodland in England is increasing at a slow rate, and percentage forest cover is still amongst the lowest in Europe: forest cover for the whole of Europe is 44.3% of land area; the United Kingdom has 11.8% cover. England had 8.6% forest/woodland cover in 2006, compared with 8.4% in 2000.[6]

12.7 In the years up to 2005, recorded farm woodlands increased both in size and extent. The number of holdings with woodland rose from nearly 35,000 in 1990 to nearly 39,500 in 2005 (although some of this may be due to changes in recording). Within that same period, the area of farm woodland has increased, and the proportion of farm area which is woodland has also increased slightly (2.7% in 2000 to 3% in 2005).[7] Figure 8 below illustrates the change in area of farm woodland from 1990 to 2005.



Source: Defra[8]

Figure 8 Area of farm woodland, 1990-2005

Industry trends

12.8 During the afforestation boom of the 1970s, between 20,000 ha and 30,000 ha were being planted each year in the UK. Changes in forestry policies, and to the support for new planting in the 1988 Budget, led to a much reduced rate of planting overall in Great Britain. It also led a shift towards more small-scale woodland planting and more emphasis on the woodland creation in the lowlands, for example in the Community Forests and National Forest.[9] As a result of the changes in policy, UK planting has dropped to about 10,000 ha per year. In England currently, new woodland creation is around 3200 ha (including estimates for natural colonisation and areas planted without grant-aid). More than 95% of this area is broadleaved.[10,11]

12.9 The map at Figure 9 shows the extent of forestry and woodlands in England.

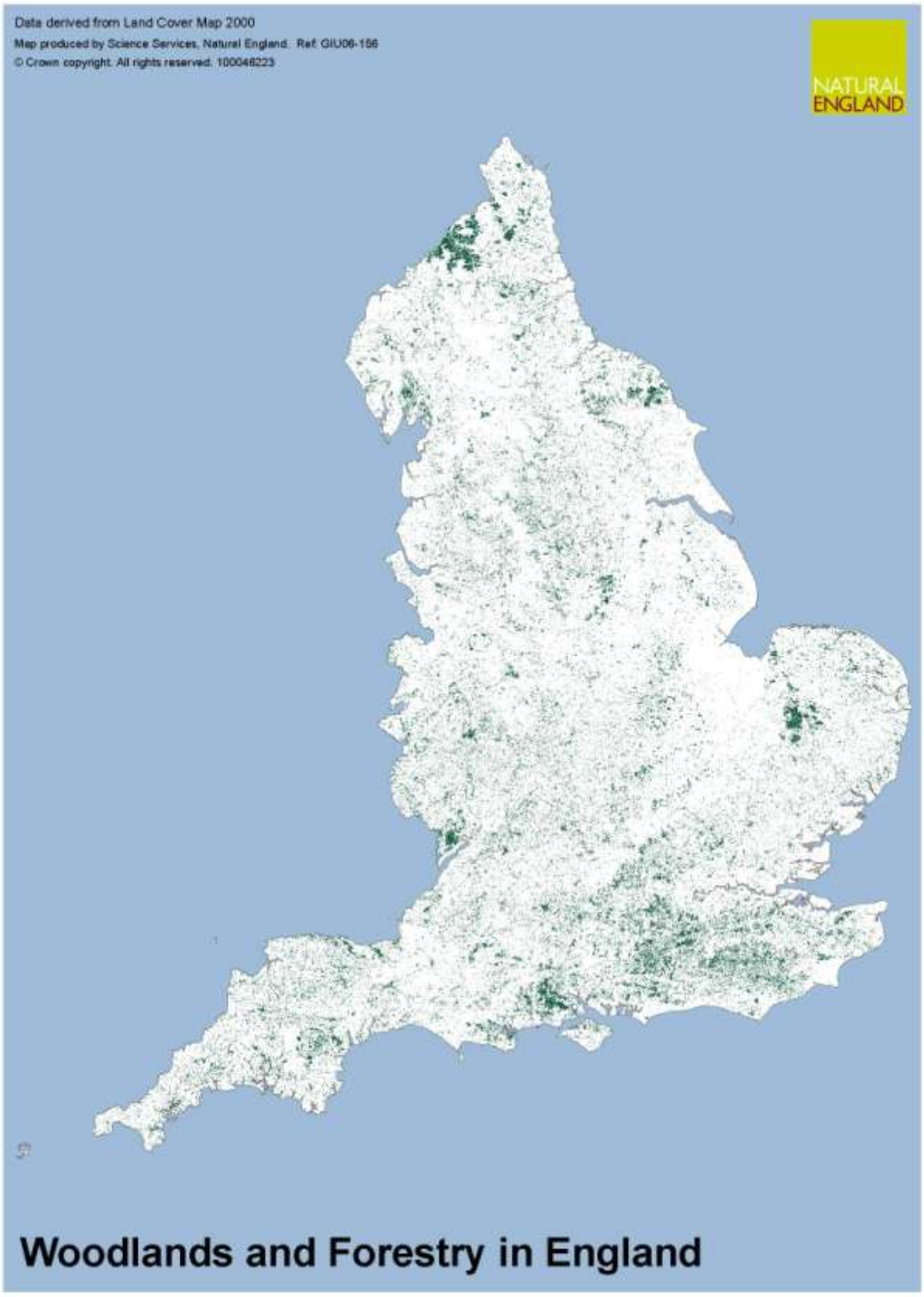


Figure 9 Areas of woodland and forestry in England

12.10 This level of activity is insufficient to meet the current Habitat Action Plan targets,[12] even if it were all focused on biodiversity objectives, let alone other objectives. In that respect, an increase in planting/woodland creation over the next 5-10 years is needed and is supported by the recent Strategy for England's Trees, Woods and Forests.[13]

12.11 Over recent years, there have been further shifts in emphasis arising from a number of concerns and needs:

- Too much of the new planting was as very small (<2 ha) blocks that would not deliver effectively on the objectives in the Strategy for England's Trees, Woods and Forests,[14] in particular because the contribution to future wood production was being ignored.
- The planting should contribute to reducing the impacts of habitat fragmentation, including, for example, as part of climate change adaptation strategies.
- The role of new woodland in carbon sequestration strategies should be explored.
- There should be specific woodland creation targets as part of the woodland habitat action plans under the Biodiversity Action Plan (BAP).
- There is a revival of interest in energy crops as a component of new woodland creation (including both short rotation coppice and short rotation forestry).
- There is interest (but little action to date) in allowing more spread of woodland by natural regeneration.

12.12 For current incentives, advice and regulation for woodland and forest managers, see Annex I to this chapter.

Key impacts

12.13 Some impacts may only develop, or may become more significant, as the new woodland becomes mature. Others, related to activities directly connected to planting, such as removal of grazing from pasture land and soil compaction and disturbance from planting,[15] will be more immediate.

12.14 Many local Habitat Action Plans recognise that woodland creation can encroach on locally important areas of open ground, but it is generally agreed that woodland creation has a positive role to play in the wider landscape. Trees have a number of important functions which are generally beneficial for natural resource management:

- Root systems can penetrate deep into the soil. This is beneficial in terms of soil microbial activity,[16] allowing increased organic matter and thus carbon content, as well as being beneficial in terms of water and flood management, reducing surface flow by allowing increased water infiltration. The transpiration of the leaves can also reduce water levels.[17]
- Root systems also serve to stabilise soils, and can intercept sediment and nutrients from agricultural land. Planted along watercourses, woodlands can make excellent buffer strips against farmland.[18]
- The tree canopy can actively 'scavenge' nutrients and pollutants and particulates from the air, although there is also the possibility that much of this can be washed off the leaves by rainfall and enter the soil or watercourses.[19]

12.15 The Environment Agency has produced a draft report which considers in detail at the effects and interactions of woodlands and water.[20]

12.16 Young plantations generally need to be fenced against livestock and deer. As a result, the understorey can become densely vegetated. Whilst this may be detrimental for open ground species, the increased vegetation can be beneficial in terms of increased organic matter in the soil and increased carbon storage.[21] Trees planted on highly organic soils such as peat are likely to have the opposite effect, as they tend to lower the water table and encourage oxidation of the desiccated organic matter.[22]

12.17 Tree plantation on most soils contributes to carbon sequestration, by locking up carbon in the wood itself and adding to the soil organic matter. Younger trees tend to do this more rapidly, in conjunction with a vigorous understorey due to the more open canopy[23] and the greater annual increase in woody material. In the longer term more carbon is stored in mature woodland.

12.18 Apart from providing habitat which is of benefit to woodland specialist species, woodland creation can also be advantageous, to varying degrees, to woodland edge species and those that prosper in habitat mosaics with varied landscape structures.[24] Woodland specialists are likely to benefit most where woodland creation is adjacent to existing ancient woodland and uses natural regeneration of trees and shrubs native to the site.

12.19 During the mid-part of the twentieth century, woodland creation (primarily the establishment of large-scale conifer plantations) was a major cause of damage to wildlife sites and to treasured landscapes such as heaths, moorlands and, in particular, blanket bog.[25,26,27] A new policy framework is being developed to support the restoration of these habitats.[28]

12.20 For further factual background to this section, see Annex II to this chapter.

Summary of impacts

Biodiversity

12.21 The increase or creation of entirely new woodland habitat can serve to consolidate or extend the range of key species.

12.22 In the wrong place, woodland creation can have a direct negative impact on other habitats: developing woodland may also impact adjacent land, for example, by providing a seed source on lowland heaths, lowering the water table on wetlands or creating potential niches for other (potentially invasive) species to colonise. Continued management after the initial planting is important for maintaining or enhancing woodland structure and composition.

Resource Protection

12.23 Water infiltration into the soil is improved as a result of root activity, resulting in increased flood mitigation capability (although planting on peat would, through the same process, lead to soil degradation).

12.24 Largely because of the management required in young woodlands, vegetation cover is usually dense and can act as a buffer against soil and nutrient movement.

12.25 Access and other disturbance during the planting process can give rise to short-term soil compaction, erosion and sedimentation in watercourses.

Greenhouse gases

12.26 Where the woodland is created either by planting or natural regeneration, carbon sequestration takes place; the rate of net sequestration tends to be higher in young, fast-growing crops than in mature/old-growth stands, although the total carbon stored (standing crop) is higher in the latter.

12.27 Air quality may be improved by the ‘scavenging’ effect of tree canopies, although the accumulation of pollutants and particles can affect the soil where these are washed off leaves by rain.

Landscape

12.28 New plantations can enhance the landscape if well designed and well located but can detract from landscape quality if poorly sited.

12.29 Root development can adversely affect historic structures.

12.30 Some of the above impacts (such as landscape effects or root infiltration) may become significant after a period during which the woodland develops, while others (such as carbon sequestration or soil disturbance at establishment) may reduce over time.

Annex I Current incentives, advice and regulation

- Standards and guidelines have been introduced to improve the implementation of planting proposals, supported by Forestry Commission and other grants.[29,30]
- Most planting and much woodland creation by natural regeneration is supported by the Forestry Commission, either directly or else through being covered as part of an approved management plan. It will be expected to comply with the UK Forest Standard and associated guidelines.[31] Where woodland is created under Higher Level Stewardship agreement, similar standards should be applied.
- Proposals for woodland creation above a certain size (5 ha, or 2 ha within sensitive areas) may also be subject to *Environmental Impact Assessment (EIA)*.[32]
- Local planning authorities are consulted on licence applications to the Forestry Commission via a public register of proposals.[33]
- New planting/woodland creation within SSSI (including Special Areas of conservation (SAC) and Special Protection Areas (SPA)) will normally require agreement (assent/consent) from Natural England.
- Planting affecting scheduled ancient monuments would be subject to consultation with English Heritage.
- Planting and management of trees within development sites may be required as conditions of planning consent.
- Other conditions may be required if the planting is associated with woods covered by the UK Woodland Assurance Standard - a voluntary certification scheme.[34]

Annex II Impacts of woodland creation on environmental sustainability

Table 14 Impacts of woodland creation on environmental sustainability

Habitat quality and diversity	Depending on the composition of the new woodland, there can be creation of woodland priority habitats and species under the UK BAP. Woodland creation may contribute to the following effects: • Expansion of habitat for woodland species more generally. • Changes to the habitat conditions in the land immediately around the woodland, for example by the introduction of a new seed source.[35] • Loss of use of land that could otherwise be open habitats. A number of local Habitat Action Plans recognise this, for example Sussex, where chalk grasslands are an important local feature.[36]
Species abundance and diversity	• Encouragement of predatory species into an area, for example even small blocks of woodland near to important wet grassland sites can harbour foxes and corvids, which may have a detrimental effect on wader nesting success).[37] • Planting to produce structural heterogeneity is important to maintain habitat for the wider breeding bird community.[38] • Increase in potential for movement of many plant and animal species through improved permeability of the landscape.[39]

Table continued...

Water level control	• The extent, composition and location of woodland cover affects water yield from a catchment compared with other types of vegetation cover.[40] • The quantity and quality of run-off may be either increased or decreased by woodland creation, depending on circumstances. In the lowlands, trees often reduce the water table through increased transpiration/interception losses compared with shorter growing crops.[41] • In the uplands, tree cover may encourage greater rainwater infiltration compared with former sheepwalk[42] and slow the rate of run-off in some circumstances. • Appropriately sited woodland can help to alleviate downstream flooding by slowing the rate of water movement.[43] • Water levels may also be affected by changes in field drainage, either those put in to assist woodland creation or as a consequence of changing former agricultural drainage.
Sediment loads in water	• Poorly designed roads or soil preparation for planting can lead to increased soil erosion and sediment loads in streams, particularly on slopes.[44] The Forestry Commission has produced guidelines to minimise this. • Under woodland creation near water courses, there are likely to be changes to the nature of bankside vegetation composition and structure and effects on channel stability. Vegetated cover should lead to greater soil stability.[45] Vegetation abundance is likely to be increased unless heavy shading trees (such as conifers) are used.
Nutrient loads in water	• Water chemistry will be changed as a consequence of changes in water flow patterns and increased scavenging of nutrients and pollutants from the atmosphere. Afforestation was a major contributor to stream acidification during the 1970s and 1980s[46] and this is taken into account in current water guidelines. • Where woodland is planted to replace farmland, there is the likelihood of lower nutrient inputs.[47] • Woodland strips along watercourses may help to buffer streams against agricultural run-off.[48]
Pesticide control in water	• Pesticide use in forests tends to be limited to the immediate period of woodland establishment.
Other impacts	• Reduced water temperature where streams become shaded.[49,50]

Table continued...

Greenhouse gases	• Woodland creation results in increased sequestration in most instances (except where trees are planted on highly organic soils) compared with lower growing vegetation. Sequestration in the tree tends to be highest in relatively young fast growing stands. Carbon build up may also occur in the litter and soil layers.[51]
Air quality: chemical	• Increased scavenging of nutrients and pollutants from the atmosphere.[52]
Air: particulates	• Increased scavenging of particles from the atmosphere.[53]
Soil stability (erosion)	• In the short term, there may be some increased soil disturbance during ground preparation but, in general, soil erosion is reduced and stability tends to be improved under woodland.[54]
Soil structure	• There are likely to be changes in soil-carbon levels (generally increases on mineral soils, and decreases in wet peat soils because of increased peat decomposition).[55] • Where planting is for commercial purposes (entailing felling at maturity), carbon release from the soil may be greatest immediately after felling, due to increased disturbance and reduction of carbon input from litter. In continuous cover systems this is likely to be reduced.[56] • Potentially, there is reduced soil compaction in the longer term and increased water infiltration compared with previously grazed sites.
Landscape character	• New woodland may either strengthen or damage landscape character, depending on the landscape. The principles behind good landscape design and fitting in new woodland are well-documented and set out in the relevant guidelines.[57] • Tree roots can disrupt the historic environment, both by physical displacement and by disrupting pollen records as organic soils become dried out.[58]

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