

NFI 2011 woodland map England

National Forest Inventory Report

Summary

The National Forest Inventory provides a record of the size and distribution of forests and woodlands in Great Britain and information on key forest attributes. This report summarises the results of the mapping of woodland area for England that have arisen from the 2011 National Forest Inventory (NFI) woodland map update. It then looks at the changes between the initial 2010 NFI woodland map release and the 2011 woodland map. The report also analyses the differences between the National Inventory of Woodland and Trees (NIWT) woodland map published in 1998 and the NFI woodland map published in 2011.

- The total area of mapped woodland of 0.5 hectare and over on the 2011 NFI woodland map in England is 1,292,372 hectares. This represents 10% of the land area. A further 24,885 hectares of open space within woodland has been mapped as interpreted open areas. (See Appendix B for a summary of interpreted forest types (IFTs) and interpreted open areas (IOAs).) The total area of mapping including both IFTs and IOAs for England, is 1,317,256 hectares. (Table 1)
- A total of 213,372 hectares or 17% of the total mapped woodland in England is owned by or leased to the Forestry Commission, with 1,079,000 hectares or 83% in other ownerships, based on the Forestry Commission legal boundary as at 31 March 2011. (Table 2)
- The largest interpreted forest type across England is broadleaved, representing 61% of all mapped woodland. Conifer interpreted forest type represents 24%. (Table 3)
- NFI mapped a total of 1,145,717 hectares of woodland with an extent of 2 hectares and over in England. 146,654 hectares of the woodland mapped in England was less than 2 hectares in extent. (Table 4)
- 59% of Forestry Commission mapped woodland in England is conifer interpreted forest type and 20% is broadleaved. 69% of woodland in other ownerships in England is broadleaved and 18% is conifer. (Table 5)
- The area in woodlands of 100 hectares or more in extent in England represents 31% of the total woodland area. (Table 7)
- There are 234,263 woods over 0.5 hectare in England, with a mean wood area of 6 hectares. There are 151,717 woods between 0.5 and 2 hectares in England, with a mean wood area of 1 hectare. (Table 7)
- 68% of open areas within woodland in England were interpreted as grass. (Table 8)
- NFI has mapped 115,587 hectares more woodland of 2 hectares and over compared to NIWT, representing an overall increase of 11%. This represents 9% of the total land area as opposed to 8% represented by the NIWT estimate. (Table 14). Most of this increase is identified as being due to improved detection techniques (as explained under '2010 Woodland map revision method') rather than a genuine expansion of woodland since the NIWT mapping exercise.

The National Inventory of Woodland and Trees (NIWT) was the forerunner of the current National Forest Inventory, and was carried out between 1995 and 1999. The results, available as a series of inventory reports at a national and regional levels, can be downloaded at www.forestry.gov.uk/inventory.

Introduction

The National Forest Inventory is composed of two elements: a woodland map and a field survey. The woodland map covers all forests and woodlands over 0.5 hectare with a minimum of 20% canopy cover (or the potential to achieve it), including new planting, clearfelled sites and restocked sites. It is based upon 25 cm resolution colour aerial photography for England and Scotland and 40 cm resolution colour aerial photography for Wales. Field survey work is used to refine the map-based estimates of woodland and clearfelled areas and to measure detailed aspects of the forest. Field surveys are being carried out between 2009 and 2014 to estimate standing volume, stocked areas, numbers of trees and other forest metrics. This involves the ground surveying of one-hectare sample squares that are partially or entirely covered by forest, including clearfelled areas and areas of assumed woodland, according to the 2010 NFI woodland map.

Further details of the mapping work and the derivation of forested areas can be found in the 2010 Woodland area reports at www.forestry.gov.uk/inventory.

2010 woodland map revision method

Since the published 2010 woodland area estimate (reference date 31 March 2010, published 26 May 2011) and 2010 woodland map launch, further work has been undertaken to improve that estimate. This has been achieved through incorporating further revisions arising from:

- a comparison exercise between the NIWT woodland map and the NFI woodland map;
- the addition of clearfell polygons identified from remote sensing analysis of 2006 and 2009 satellite imagery;
- a revision and update of the smaller assumed woodlands associated with recent woodland grant schemes.

The NIWT 1998 and NFI 2011 woodland maps were created using different methodologies and mapping standards (see appendix A for a summary of differences in mapping and methodology). The main objective of the comparison exercise is to define and explain any substantive differences in area estimates between NIWT and NFI. In order to identify those differences a symmetrical difference of the two sets of spatial data has been computed. The resultant potential woodland change areas have been categorised as 'Mapped in NIWT but not in NFI' (NFI unmapped) and 'Mapped in NFI but not included in NIWT' (NIWT unmapped). Analysis of the potential woodland change areas considers temporal, spatial, methodological and physical change, which account for many of the differences.

Temporal differences include:

- Time of year and time of day of photography. Angle of incidence of light can affect interpretation; shadows are more pronounced at different times of day and consequently may hide detail, and affect the tone of the image, which can make interpretation more difficult.
- Seasonal variation in the tree canopy can hinder interpretation.

NFI 2011 woodland map

Spatial differences include:

- Scale of photography. The woodland map features for NIWT were derived from 1:25,000 scale photography. Stereo pairs of the photos were evaluated by stereoscopic photogrammetry. This introduced a third dimension of depth conception. Because the image scale was small, the stereo element helped larger trees to stand out from surrounding vegetation and improved the visible texture of the woodland type. However, the scale resulted in indistinct woodland boundaries and, for example, led to difficulties in defining boundaries along natural gradients in vegetation where broadleaved woodland became shrub.
- Digital orthorectified imagery does not have a set scale but has a set size of pixel, which determines the quality and legibility of the image at different zoom scales. For example, 25 cm resolution imagery has a pixel size that represents 25 cm on the ground. This allows the interpreter to zoom to 1:1,000 and beyond, but the image becomes less distinguishable at higher zoom rates.
- Digital orthorectified imagery also allows for 'heads up' digitising where the operator digitises the woodland boundaries directly into the GIS system.
- Geographic registration of the digital images will in places result in improved spatial accuracy and, as a result, some of the NIWT data may seem displaced against the latest images.

Methodological differences include:

- Changes in the definition of woodland such as change in the minimum width of woodland from 50 metres to 20 metres.
- Change in the minimum size of division between interpreted forest types.
- The use of OS MasterMap® in determining both external woodland boundaries and internal divisions between interpreted forest types.

Physical differences include:

- Land-use change, where irreversible change has occurred between the two surveys resulting in deforestation
- New planting which took place during or between the two surveys. Very young trees would have been difficult to interpret from the available imagery.

Data sources used in the update process

- The potential woodland change areas resulting from the comparison exercise. All potential woodland change areas greater than 5 hectares in extent have been analysed and input to the 2011 woodland map update, either as additions or deletions as explained in Tables 11 and 12
- NFI unmapped. Where further investigation of the latest images shows evidence of woodland or transition stage, such areas are mapped as additions. Where further analysis of the latest images verifies no woodland presence then the areas are attributed as NIWT error.
- NIWT unmapped. Where further investigation of the latest images shows no evidence of valid woodland, then such areas are attributed as NFI error and omitted from the woodland area calculation.

NFI 2011 woodland map

- Assumed woodland. These are derived from areas of new planting or natural regeneration under grant schemes and areas of Forestry Commission first rotation planting. The assumed woodland areas are identified by a geoprocessing function that removes the areas of new planting already included in the NFI woodland map, resulting in an output of the balance of the unmapped features or parts of features. This process has resulted in some invalid features, which will be verified and cleaned as part of the 2012 woodland map update process.
- Assumed woodland derived from unmapped Forestry Commission new planting has been identified and added to the data. This source was not included in the 2010 woodland map.
- Some of the assumed woodland included in the 2010 woodland map has been validated, cleaned and mapped to the NFI mapping rules, around the areas where other update operations were being carried out. This has resulted in the reshape or deletion of several woodland areas.
- Remote sensing potential change areas. These are the result of a change detection analysis based on 2006 and 2009 satellite imagery. The analysis highlights areas of clearfell, extended felling, land-use change and sparse woodland which previously met the NFI woodland criteria.
 - The clearfell and extended felling areas are validated and used to update the base map features, originally mapped as mature trees.
 - The land-use change polygons are attributed as no longer woodland and are removed from the woodland area calculations.
 - The sparse areas are validated and changed from woodland to low density woodland.

In addition to the above, some corrections and improvements have been made around the areas where other update operations were being carried out, based on the latest available aerial photography. IOAs have been created or deleted based on the updates made, in accordance with the NFI mapping conventions.

There are three main woodland type attributes:

- Mapped woodland. These are the NFI base map features and have been attributed as 'woodland' or 'non woodland'. The woodland polygons represent the extent of woodlands equal to or greater than 0.5 hectare and are differentiated by interpreted forest type (IFT). The non woodland polygons represent open areas completely enclosed by woodland and are differentiated by interpreted open area (IOA).
- Assumed woodland. There are two types of assumed woodland polygons. Those with the Woodland_source attribute 'supplied grant schemes' are the balance of areas under woodland grant schemes that showed no evidence of trees or ground disturbance during the mapping aerial photography interpretation. Those with the Woodland_source attribute 'supplied FC new planting' are the balance of Forestry Commission new planting polygons extracted from the Forestry Commission's sub-compartment database that showed no evidence of trees or ground disturbance during the mapping aerial photography interpretation. Both types include areas of greater than 0.1 hectare which adjoin existing woodland. These areas have been included for future monitoring. Assumed woodland polygons have not been mapped according to the NFI mapping rules and are not differentiated by IFT.

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- Low density polygons were mapped as woodland by NIWT but were not originally mapped as NFI woodland. They were included after an investigation of the archive images proved that a higher density of woodland existed at the time of NIWT mapping than at present. This was done on the assumption that such sites may have included seed tree sites, or group felling, and that they may revert to the threshold canopy occupancy for woodland within a short period of time. If future monitoring proves this not to be the case they will be removed from the map.

Statistics derived from NFI may be used in the process of policy-making, and differences in woodland area between the two surveys therefore need to be clearly explained. Understanding and interpreting the differences between the two surveys is an important issue for future use of the data and will help to ensure that the data are not misinterpreted.

Summary of differences between NIWT (1998) and NFI (2011) woodland maps for England

An important aspect of the NFI woodland map is the ability to provide the basis of reporting on changes that have occurred in both the extent and distribution of GB woodlands in the intervening period between NIWT and NFI. The combination of the woodland map resource and the field survey results towards the end of the current NFI cycle will provide a more accurate view of those changes.

The NIWT 1998 and NFI 2011 woodland maps were created using different methodologies and mapping standards (see appendix A for a summary of differences in mapping and methodology). A consequence of these changes is the inclusion of woodland that existed at the time of NIWT mapping but was not mapped and the exclusion of area that was mapped by NIWT but not included in NFI due to:

- Methodology restricting minimum width of NIWT woodlands;
- larger minimum gap between woodlands which as a consequence included more non woodland area in NIWT
- resolution of the aerial imagery which resulted in less distinct woodland edge and misinterpretation of woodland;

In England, NIWT mapped a total of 1,030 thousand hectares of woodlands with an extent of 2 hectares and over. The total mapped woodland with an extent of 2 hectares and over included in the NFI 2011 woodland map for England is 1,1418 thousand hectares, a net difference in woodland area of 118 thousand hectares. This difference is the result of the inclusion of 240 thousand hectares of woodland not mapped by NIWT and the exclusion of 126 thousand hectares of NIWT mapped area. (Tables 16-18). These areas have been identified by computation of a symmetrical difference of the two datasets and further analysis of these potential woodland change areas, which is currently underway, will help to explain the substantive difference in woodland area between the two maps and should result in a more accurate estimate of actual increase in woodland area. Results of the comparison analysis completed to date for England for the additional area have estimated that 20% are due to

methodology, 67% are due to afforestation and 13% are due to NIWT mapping errors. Similar results for the excluded areas have estimated 75% to be due to methodological differences, 3% due to land use change, 4% were mapped as young trees by NIWT but latest available imagery shows no sign of planting or other woodland transition stage and the remaining 18% were due to NIWT error or are not discernible from the current aerial photography. These estimates should be treated with caution until the conclusion of the comparison analysis exercise.

Understanding the differences between map-based and fieldwork estimates

Many of the reported areas presented in this report are based upon interpreted forest types. These are derived from desk-based interpretation of aerial photography. Mapped interpreted forest types (IFT) provide spatial information on the differentiation of total forested area into broad categories of woodland types that can be assessed from the interpretation of remote images and administrative information. As such, they provide a good indication of the spatial distribution of these different categories of mapped woodland. Summation of areas of IFT, as shown for example in Table 3, will give a broad indication of the absolute and relative extent of these categories across the country. However, they are of limited applicability with regard to the question of the breakdown of woodland areas into tree species, and in particular on the differentiation of total woodland area into that occupied by conifers or broadleaves. This is because the IFT categories used do not equate exactly with areas purely composed of either conifers or broadleaves.

Taking conifer area as an example:

- The 'conifer' IFT category represents areas of woodland assessed by photographic interpretation to be composed of at least 80% conifer species, and therefore includes woodland areas that are not pure conifer stands.
- Conifers, on the other hand, can occur in other IFT categories of high forest:
 - Between 50 and 80% within the 'mixed mainly conifer' IFT category.
 - Between 20 and 50% within the 'mixed mainly broadleaved' IFT category.
 - Between zero and 20% within the 'broadleaves' IFT category.
- A number of non-high forest IFT categories, such as the 'young trees' IFT, can also contain conifer species.

In addition to this indeterminacy of IFT categories with regard to the split into conifer or broadleaved species, the determination of IFT areas using mainly photographic interpretation will result in some degree of misclassification. Factors contributing to this relate to the quality of the images, which may be affected by the resolution of the photography, the time of year or time of day that the image was recorded, and obscuring of the image by cloud or shadow.

A more reliable estimation of the split of total forested area into that occupied by conifers or broadleaves is obtained with the use of information from the NFI field sample operation or, for Forestry Commission areas of woodland from the Forestry Commission's sub-compartment database (SCDB).

Field survey will identify areas and woodland type more accurately than interpretation of aerial photography for a specific area. However, as field survey is expensive to perform, only a small sample of woodlands have been assessed in this manner. The NFI uses statistical techniques to integrate the results arising from mapping and fieldwork to derive improved final estimates of woodland composition. It is important to note the difference between these alternative assessments. For example, the conifer and broadleaved breakout reported in the main body of this report is map-based, and as such will differ from that of the combined estimate using field survey results. The combined estimates are published in other NFI reports such as the *Standing timber volume for coniferous trees in Britain* and *Preliminary estimates of quantities of broadleaved species in British woodlands, with special focus on ash* reports both of which are available for download from <http://www.forestry.gov.uk/inventory>. Section 4 explores such differences in more detail.

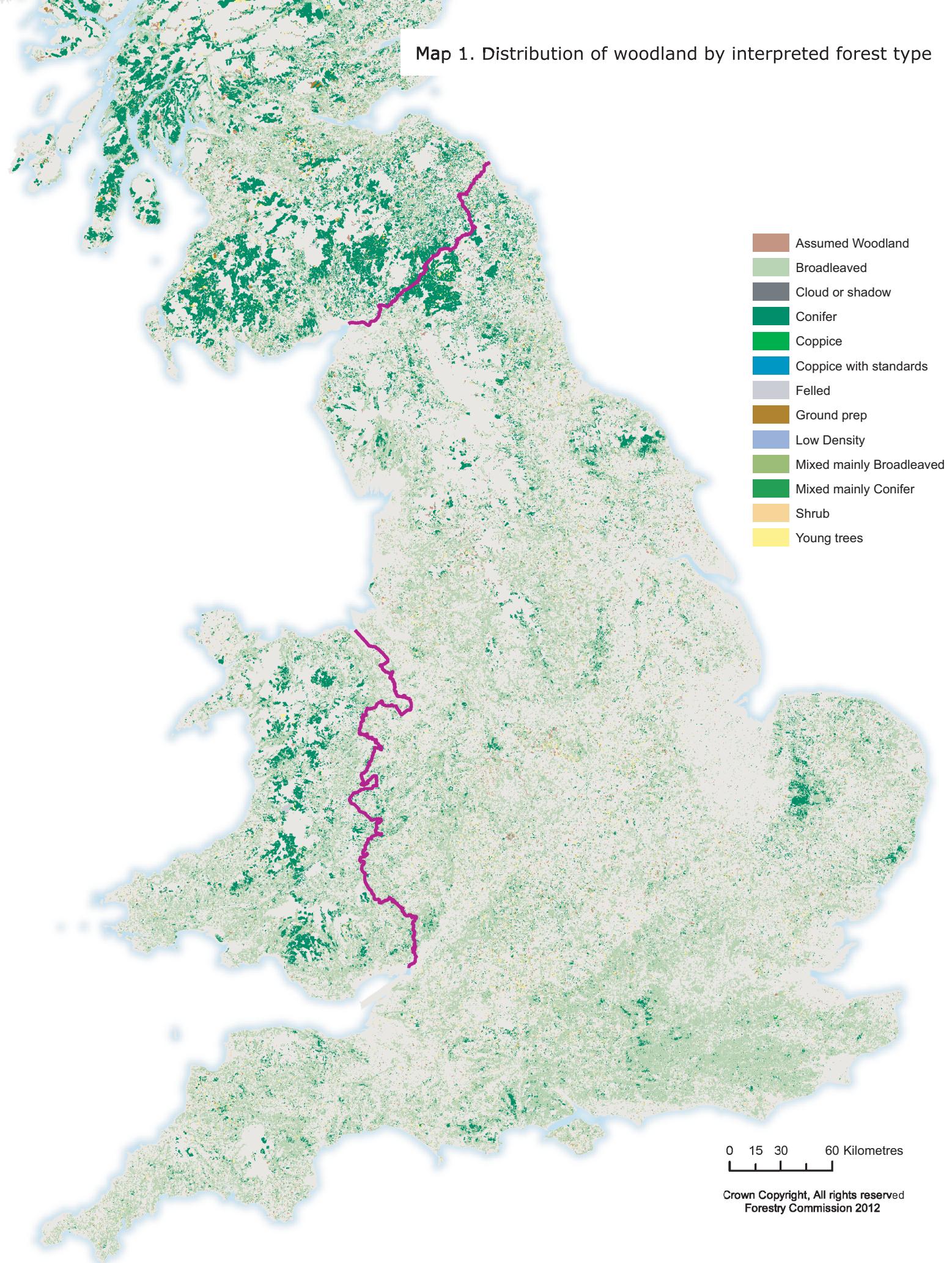
Results

Section 1 - Summary of woodland area from the NFI 2011 digital woodland map for England

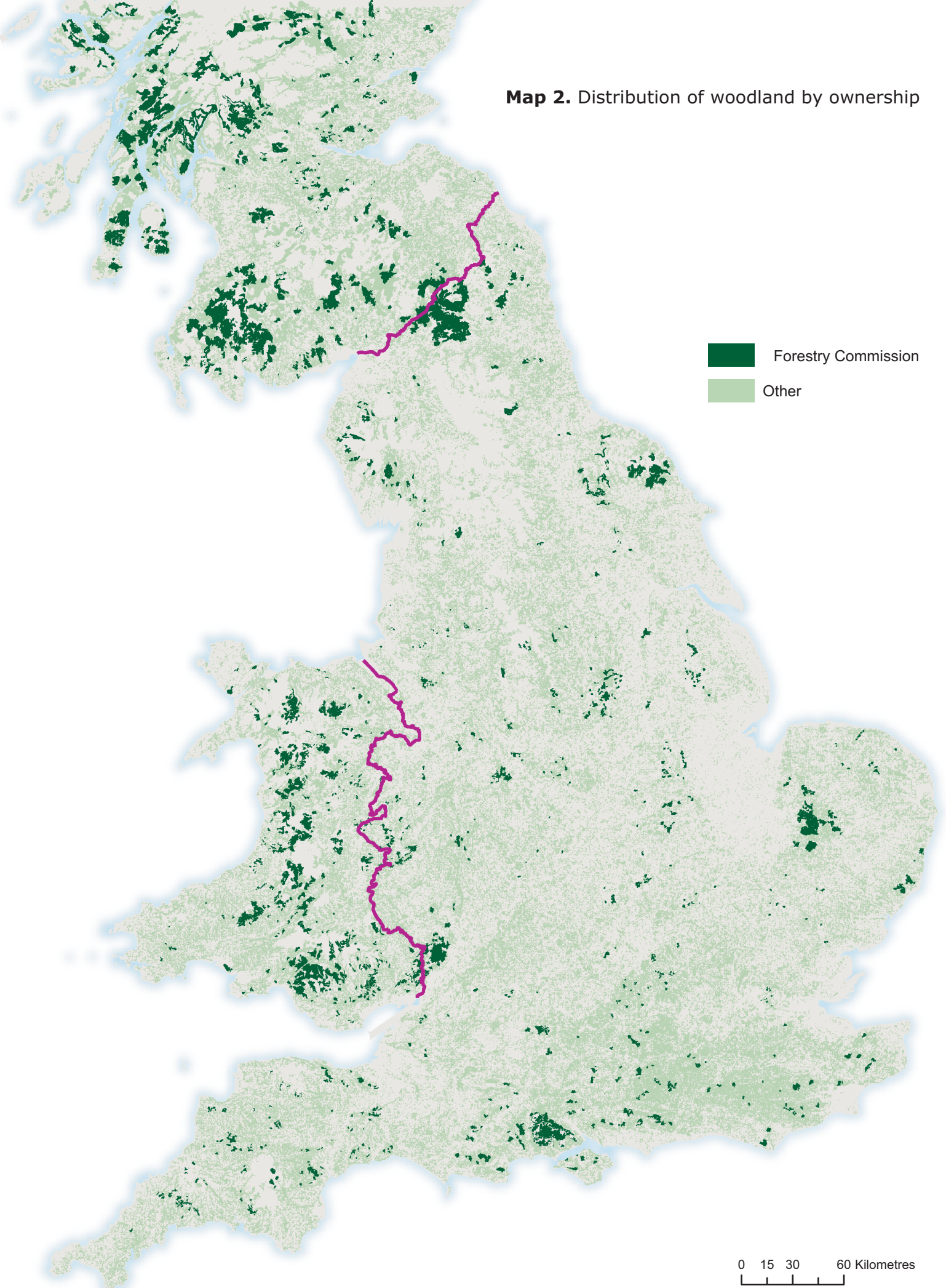
Tables 1 to 8, Figures 1 to 7, and Maps 1 to 3 summarise the sizes of woodland areas from the NFI 2011 digital woodland map for England. Note that the figures in some tables may not add to the totals due to rounding.

A total of 1,255,655 hectares were mapped as base data and an additional 34,664 hectares of assumed woodland and 2,053 hectares of low density woodland have since been included.

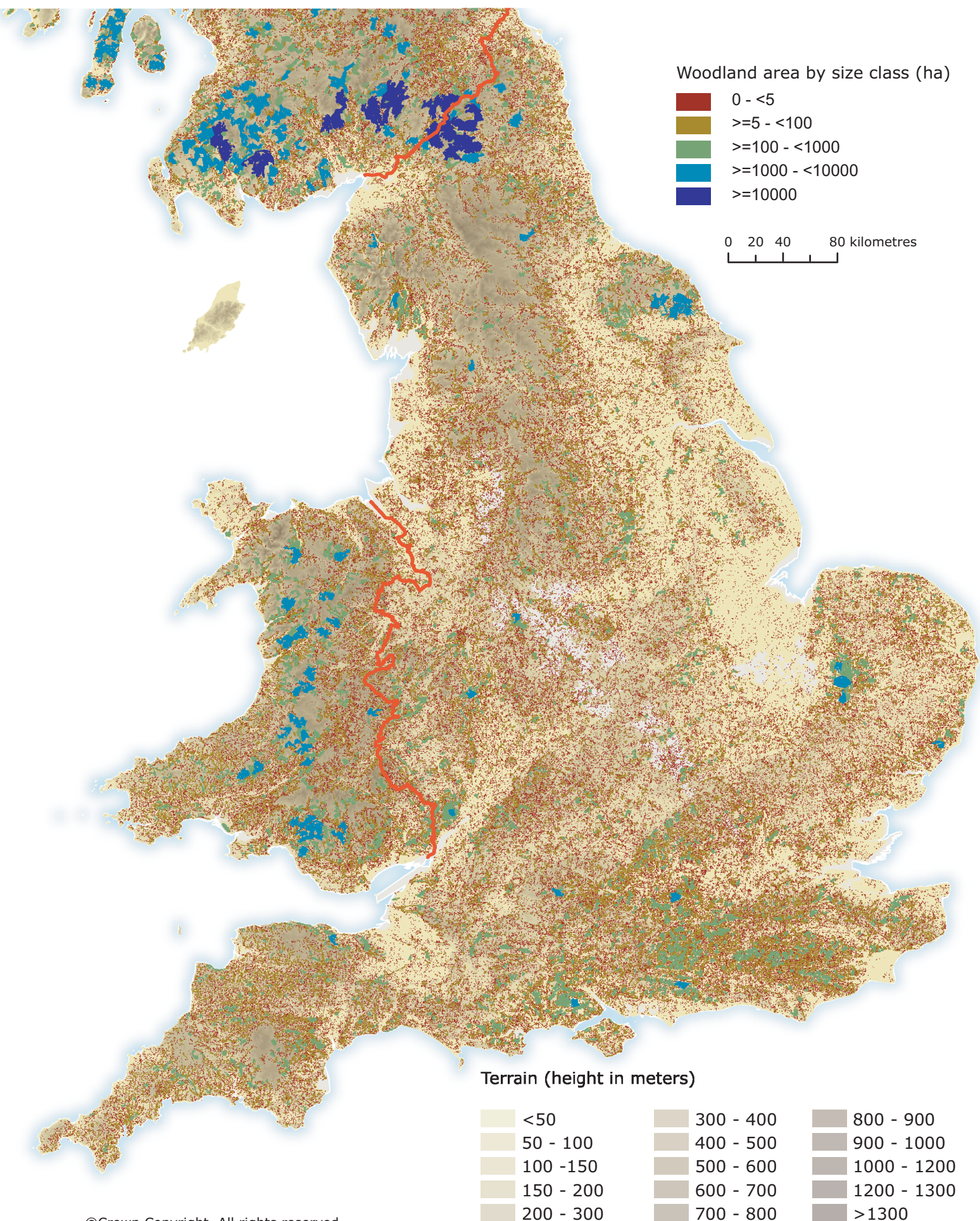
Map 1. Distribution of woodland by interpreted forest type



Map 2. Distribution of woodland by ownership



Map 3. Distribution of woodland by woodland size



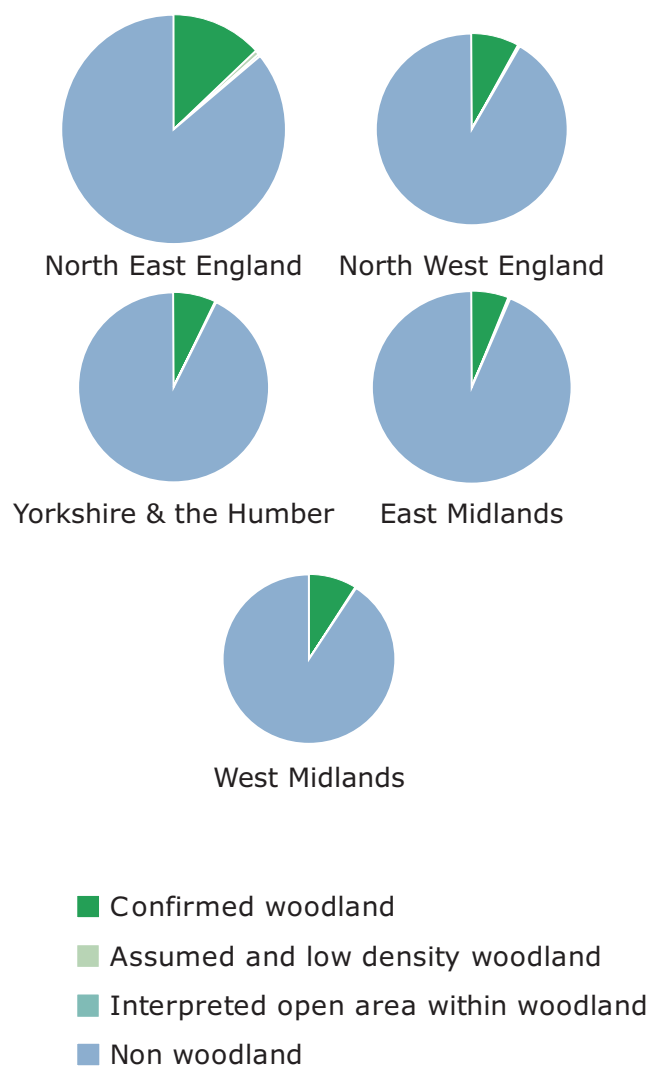
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NFI 2011 woodland map

Table 1. Mapped area by woodland type and non woodland

Mapped area	Area (ha)	%
North East England		
Woodland	111,658	97%
Assumed woodland	3,890	3%
Low density	112	0%
Total mapped woodland	115,660	100%
% woodland land cover		13%
Mapped non woodland	3,101	
Total mapped area	118,760	
North West England		
Woodland	111,743	96%
Assumed woodland	4,926	4%
Low density	227	0%
Total mapped woodland	116,896	100%
% woodland land cover		8%
Mapped non woodland	1,942	
Total mapped area	118,838	
Yorkshire & the Humber		
Woodland	109,958	96%
Assumed woodland	4,930	4%
Low density	114	0%
Total mapped woodland	115,002	100%
% woodland land cover		7%
Mapped non woodland	2,021	
Total mapped area	117,022	
East Midlands		
Woodland	94,882	95%
Assumed woodland	4,571	5%
Low density	68	0%
Total mapped woodland	99,520	100%
% woodland land cover		6%
Mapped non woodland	1,213	
Total mapped area	100,734	
West Midlands		
Woodland	113,917	97%
Assumed woodland	3,703	3%
Low density	99	0%
Total mapped woodland	117,719	100%
% woodland land cover		9%
Mapped non woodland	1,509	
Total mapped area	119,228	

Figure 1. Summary of woodland area as part of total land area by woodland type (size relative to total area of England)



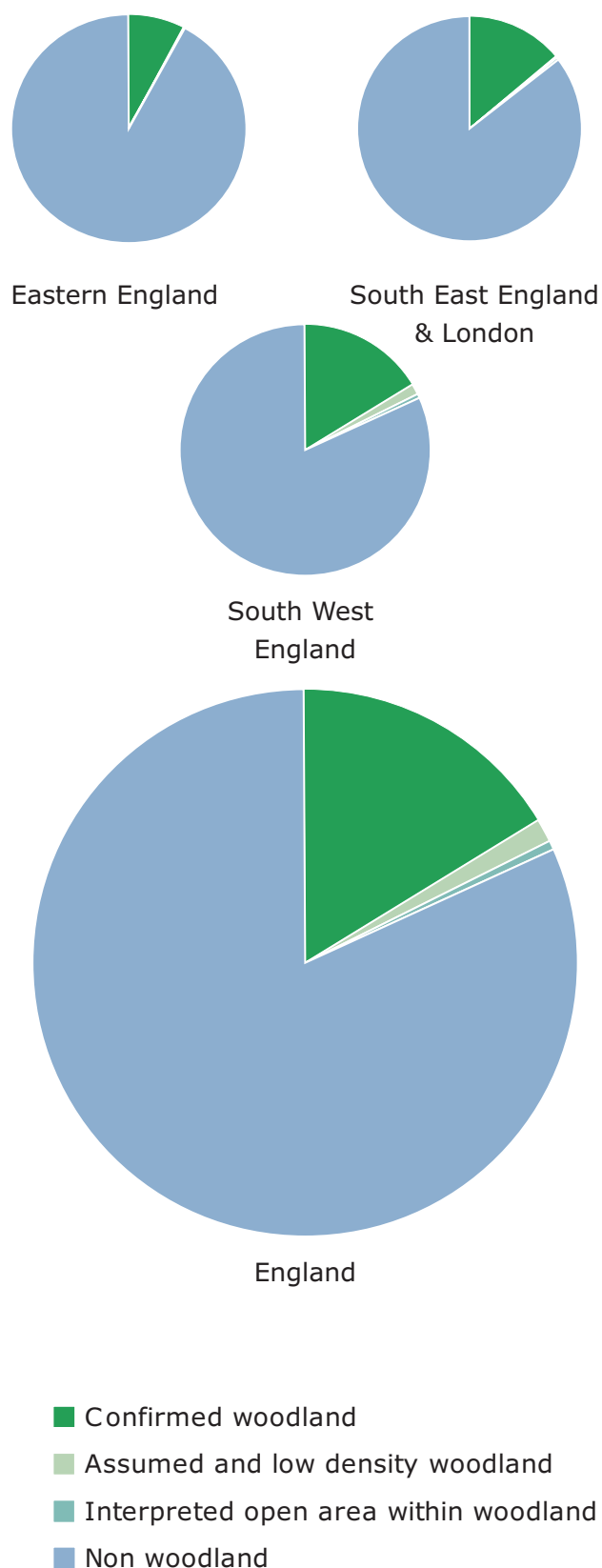
Note for table 1. The area of England, excluding inland water, is 13,027,867 hectares. Source: UK Standard Area Measurements, Office for National Statistics. % woodland land cover is based on mapped woodland only. Mapped open areas are not included in the calculation.

NFI 2011 woodland map

Table 1. Continued

Mapped area	Area (ha)	%
Eastern England		
Woodland	149,333	98%
Assumed woodland	3,273	2%
Low density	647	0%
Total mapped woodland	153,254	100%
% woodland land cover		8%
Mapped non woodland	2,826	
Total mapped area	156,079	
South East England & London		
Woodland	318,626	99%
Assumed woodland	3,576	1%
Low density	479	0%
Total mapped woodland	322,682	100%
% woodland land cover		17%
Mapped non woodland	8,544	
Total mapped area	331,226	
South West England		
Woodland	245,537	98%
Assumed woodland	5,796	2%
Low density	307	0%
Total mapped woodland	251,639	100%
% woodland land cover		11%
Mapped non woodland	3,729	
Total mapped area	255,369	
England		
Woodland	1,255,655	97%
Assumed woodland	34,664	3%
Low density	2,053	0%
Total mapped woodland	1,292,372	100%
% woodland land cover		10%
Mapped non woodland	24,885	
Total mapped area	1,317,256	

Figure 1. Continued



NFI 2011 woodland map

Table 2. Woodland area by ownership

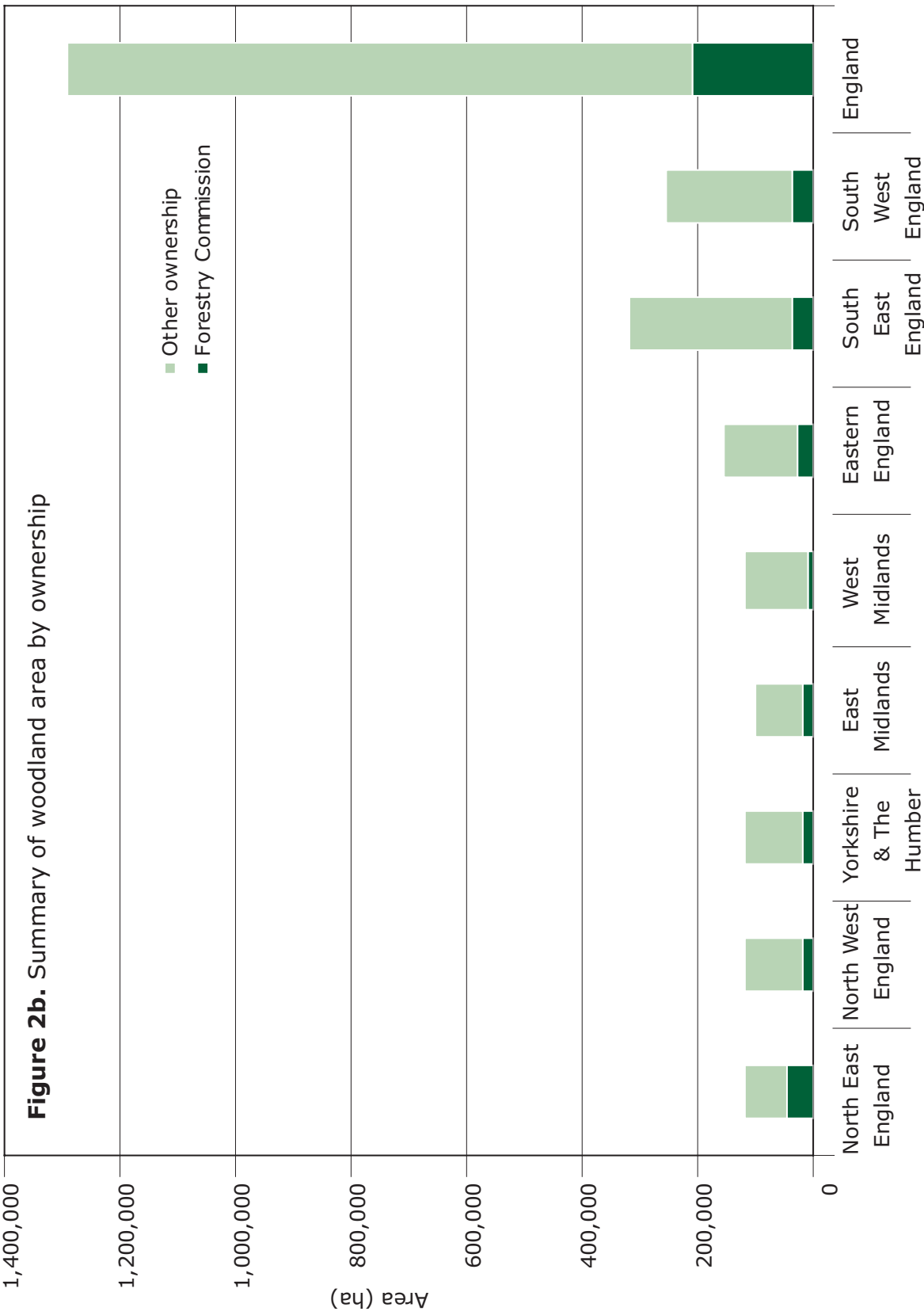
Ownership	Area (ha)	% woodland
North East England		
Forestry Commission	49,862	43%
Other ownership	65,797	57%
Total area of woodland	115,660	100%
North West England		
Forestry Commission	22,083	19%
Other ownership	94,813	81%
Total area of woodland	116,896	100%
Yorkshire & The Humber		
Forestry Commission	19,089	17%
Other ownership	95,912	83%
Total area of woodland	115,002	100%
East Midlands		
Forestry Commission	17,423	18%
Other ownership	82,097	82%
Total area of woodland	99,520	100%
West Midlands		
Forestry Commission	12,972	11%
Other ownership	104,747	89%
Total area of woodland	117,719	100%

Ownership	Area (ha)	% woodland
Eastern England		
Forestry Commission	24,282	16%
Other ownership	128,971	84%
Total area of woodland	153,254	100%
South East England & London		
Forestry Commission	33,974	11%
Other ownership	288,708	89%
Total area of woodland	322,682	100%
South West England		
Forestry Commission	33,687	13%
Other ownership	217,953	87%
Total area of woodland	251,639	100%
England		
Forestry Commission	213,372	17%
Other ownership	1,079,000	83%
Total area of woodland	1,292,372	100%

Figure 2a. Summary of woodland area by ownership (size relative to total woodland area of England)



Note for Table 2. Based on Forestry Commission legal boundary dated 31 March 2011. Other ownership encompasses all woodland not owned by or leased to the Forestry Commission.



NFI 2011 woodland map

Table 3. Woodland area by interpreted forest type

Forest type	Total area (ha)	% of total area
North East England		
Broadleaved	24,930	22%
Conifer	60,386	52%
Felled	4,883	4%
Ground prep	1,345	1%
Mixed mainly broadleaved	1,708	1%
Mixed mainly conifer	2,048	2%
Young trees	16,176	14%
Coppice	12	0%
Coppice with standards	0	0%
Shrub	169	0%
Assumed woodland	3,890	3%
Low density	112	0%
Cloud/shadow/uncertain	0	0%
Totals	115,660	100%
North West England		
Broadleaved	58,912	50%
Conifer	34,906	30%
Felled	3,999	3%
Ground prep	1,123	1%
Mixed mainly broadleaved	2,702	2%
Mixed mainly conifer	2,846	2%
Young trees	6,833	6%
Coppice	25	0%
Coppice with standards	0	0%
Shrub	397	0%
Assumed woodland	4,926	4%
Low density	227	0%
Cloud/shadow/uncertain	0	0%
Totals	116,896	100%
Yorkshire & The Humber		
Broadleaved	59,670	52%
Conifer	34,997	30%
Felled	3,138	3%
Ground prep	1,135	1%
Mixed mainly broadleaved	1,993	2%
Mixed mainly conifer	2,667	2%
Young trees	5,701	5%
Coppice	106	0%
Coppice with standards	0	0%
Shrub	551	0%
Assumed woodland	4,930	4%
Low density	114	0%
Cloud/shadow/uncertain	0	0%
Totals	115,002	100%

Forest type	Total area (ha)	% of total area
East Midlands		
Broadleaved	63,526	64%
Conifer	20,060	20%
Felled	1,093	1%
Ground prep	886	1%
Mixed mainly broadleaved	1,208	1%
Mixed mainly conifer	1,744	2%
Young trees	6,060	6%
Coppice	22	0%
Coppice with standards	0	0%
Shrub	280	0%
Assumed woodland	4,571	5%
Low density	68	0%
Cloud/shadow/uncertain	4	0%
Totals	99,520	100%
West Midlands		
Broadleaved	73,970	63%
Conifer	23,965	20%
Felled	1,281	1%
Ground prep	357	0%
Mixed mainly broadleaved	3,466	3%
Mixed mainly conifer	4,067	3%
Young trees	6,459	5%
Coppice	14	0%
Coppice with standards	0	0%
Shrub	338	0%
Assumed woodland	3,703	3%
Low density	99	0%
Cloud/shadow/uncertain	0	0%
Totals	117,719	100%
Eastern England		
Broadleaved	101,300	66%
Conifer	36,370	24%
Felled	1,279	1%
Ground prep	1,506	1%
Mixed mainly broadleaved	1,185	1%
Mixed mainly conifer	1,728	1%
Young trees	5,567	4%
Coppice	142	0%
Coppice with standards	9	0%
Shrub	242	0%
Assumed woodland	3,273	2%
Low density	647	0%
Cloud/shadow/uncertain	4	0%
Totals	153,254	100%

NFI 2011 woodland map

Table 3. Continued

Forest type	Total area (ha)	% of total area
South East England & London		
Broadleaved	242,360	75%
Conifer	52,050	16%
Felled	1,860	1%
Ground prep	981	0%
Mixed mainly broadleaved	3,835	1%
Mixed mainly conifer	6,039	2%
Young trees	8,804	3%
Coppice	1,624	1%
Coppice with standards	103	0%
Shrub	970	0%
Assumed woodland	3,576	1%
Low density	479	0%
Cloud/shadow/uncertain	0	0%
Totals	322,682	100%
South West England		
Broadleaved	160,191	64%
Conifer	53,199	21%
Felled	2,453	1%
Ground prep	1,351	1%
Mixed mainly broadleaved	5,745	2%
Mixed mainly conifer	7,018	3%
Young trees	13,694	5%
Coppice	85	0%
Coppice with standards	13	0%
Shrub	1,784	1%
Assumed woodland	5,796	2%
Low density	307	0%
Cloud/shadow/uncertain	5	0%
Totals	251,639	100%
England		
Broadleaved	784,858	61%
Conifer	315,933	24%
Felled	19,987	2%
Ground prep	8,683	1%
Mixed mainly broadleaved	21,842	2%
Mixed mainly conifer	28,156	2%
Young trees	69,295	5%
Coppice	2,030	0%
Coppice with standards	125	0%
Shrub	4,732	0%
Assumed woodland	34,663	3%
Low density	2,053	0%
Cloud/shadow/uncertain	13	0%
Totals	1,292,372	100%

Figure 3. Summary of woodland area by interpreted forest type (size relative to total woodland area of England)



NFI 2011 woodland map

Table 4. Woodland area by interpreted forest type and woodland size

Forest type	Woodland size		Total area (ha)
	2 ha and over	0.5 - < 2 ha	
North East England			
Broadleaved	21,251	3,680	24,930
Conifer	58,529	1,857	60,386
Felled	4,852	31	4,883
Ground prep	1,313	32	1,345
Mixed mainly broadleaved	1,347	361	1,708
Mixed mainly conifer	1,630	418	2,048
Young trees	15,633	543	16,176
Coppice	11	1	12
Coppice with standards	0	0	0
Shrub	119	50	169
Assumed woodland	3,215	675	3,890
Low density	111	1	112
Cloud/shadow/uncertain	0	0	0
Totals	108,011	7,649	115,660
North West England			
Broadleaved	48,359	10,552	58,911
Conifer	33,650	1,256	34,906
Felled	3,972	27	3,999
Ground prep	1,114	8	1,123
Mixed mainly broadleaved	2,045	657	2,702
Mixed mainly conifer	2,326	521	2,846
Young trees	6,262	571	6,833
Coppice	25	0	25
Coppice with standards	0	0	0
Shrub	225	172	397
Assumed woodland	3,939	987	4,926
Low density	216	11	227
Cloud/shadow/uncertain	0	0	0
Totals	102,133	14,763	116,896
Yorkshire & The Humber			
Broadleaved	50,547	9,123	59,670
Conifer	33,630	1,367	34,997
Felled	3,105	34	3,138
Ground prep	1,097	38	1,135
Mixed mainly broadleaved	1,521	473	1,993
Mixed mainly conifer	2,154	513	2,667
Young trees	4,868	833	5,701
Coppice	103	3	106
Coppice with standards	0	0	0
Shrub	449	102	551
Assumed woodland	3,844	1,085	4,930
Low density	110	3	114
Cloud/shadow/uncertain	0	0	0
Totals	101,429	13,573	115,002

NFI 2011 woodland map

Table 4. Continued

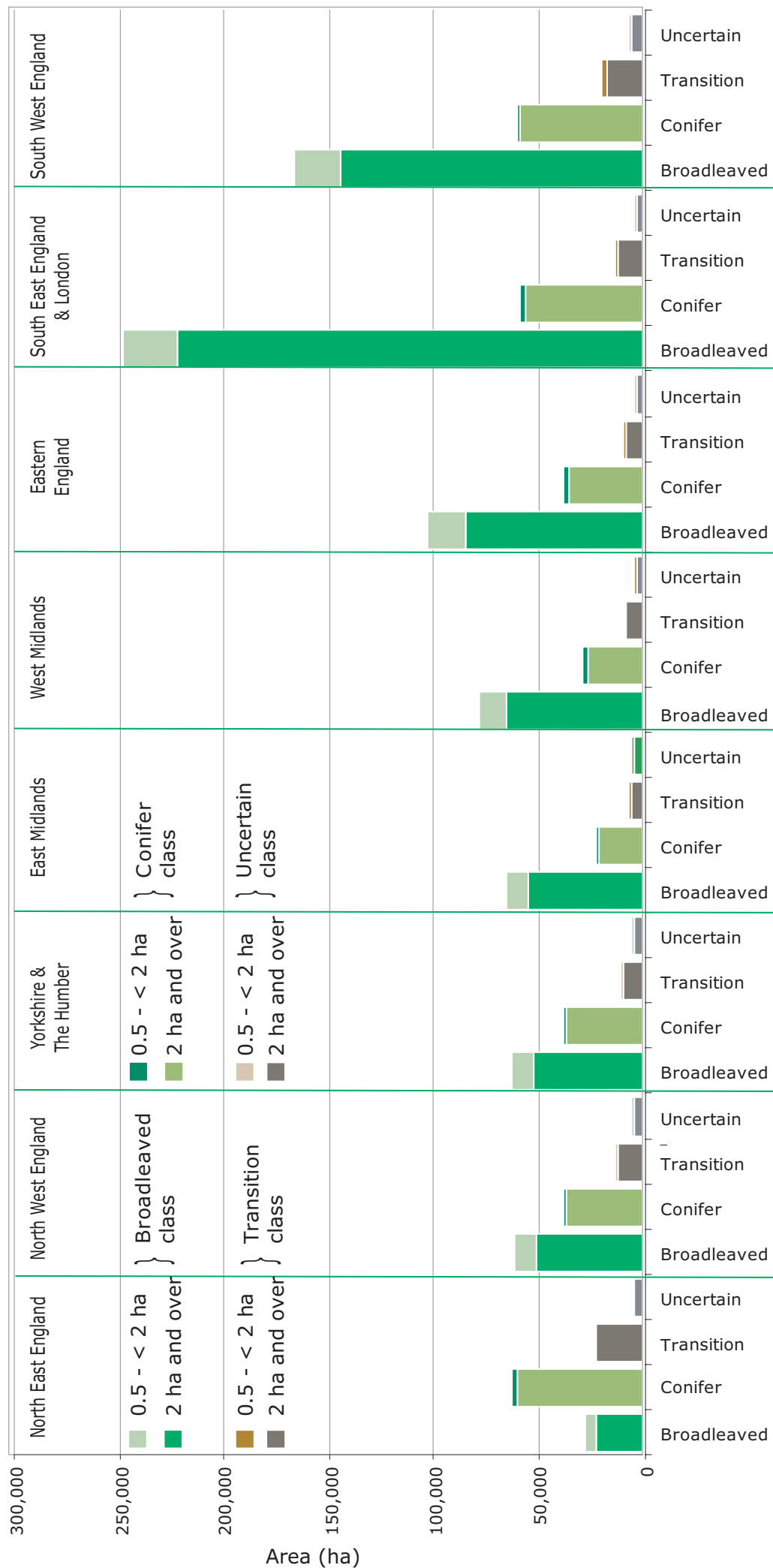
Forest type	Woodland size		Total area (ha)
	2 ha and over	0.5 - < 2 ha	
East Midlands			
Broadleaved	53,153	10,373	63,526
Conifer	18,864	1,195	20,059
Felled	1,071	23	1,094
Ground prep	816	70	885
Mixed mainly broadleaved	867	341	1,207
Mixed mainly conifer	1,406	337	1,744
Young trees	5,071	989	6,060
Coppice	18	4	22
Coppice with standards	0	0	0
Shrub	186	94	280
Assumed woodland	3,661	910	4,571
Low density	67	0	68
Cloud/shadow/uncertain	4	0	4
Totals	85,184	14,337	99,520
West Midlands			
Broadleaved	61,821	12,148	73,970
Conifer	23,065	900	23,965
Felled	1,260	21	1,281
Ground prep	336	21	357
Mixed mainly broadleaved	2,730	736	3,466
Mixed mainly conifer	3,407	660	4,067
Young trees	5,506	953	6,459
Coppice	13	1	14
Coppice with standards	0	0	0
Shrub	233	105	338
Assumed woodland	2,686	1,018	3,703
Low density	93	6	99
Cloud/shadow/uncertain	0	0	0
Totals	101,149	16,569	117,719
Eastern England			
Broadleaved	83,886	17,414	101,300
Conifer	34,136	2,234	36,370
Felled	1,258	21	1,279
Ground prep	1,435	71	1,506
Mixed mainly broadleaved	857	328	1,185
Mixed mainly conifer	1,249	479	1,728
Young trees	4,511	1,057	5,567
Coppice	134	8	142
Coppice with standards	9	0	9
Shrub	161	81	242
Assumed woodland	2,209	1,064	3,273
Low density	638	9	647
Cloud/shadow/uncertain	4	0	4
Totals	130,489	22,765	153,254

NFI 2011 woodland map

Table 4. Continued

Forest type	Woodland size		Total area (ha)
	2 ha and over	0.5 - < 2 ha	
South East England & London			
Broadleaved	217,547	24,812	242,359
Conifer	50,766	1,285	52,050
Felled	1,833	27	1,860
Ground prep	924	56	981
Mixed mainly broadleaved	3,218	617	3,835
Mixed mainly conifer	5,365	674	6,039
Young trees	7,683	1,121	8,804
Coppice	1,610	14	1,624
Coppice with standards	100	3	103
Shrub	768	202	970
Assumed woodland	2,664	912	3,576
Low density	471	8	479
Cloud/shadow/uncertain	0	0	0
Totals	292,949	29,732	322,682
South West England			
Broadleaved	139,516	20,675	160,191
Conifer	51,872	1,328	53,199
Felled	2,425	28	2,453
Ground prep	1,298	53	1,351
Mixed mainly broadleaved	4,686	1,059	5,745
Mixed mainly conifer	6,153	865	7,018
Young trees	12,274	1,420	13,694
Coppice	83	2	85
Coppice with standards	12	1	13
Shrub	1,183	601	1,784
Assumed woodland	4,570	1,226	5,796
Low density	297	10	307
Cloud/shadow/uncertain	5	0	5
Totals	224,374	27,265	251,639
England			
Broadleaved	676,081	108,776	784,857
Conifer	304,511	11,422	315,933
Felled	19,776	212	19,988
Ground prep	8,335	348	8,683
Mixed mainly broadleaved	17,271	4,571	21,842
Mixed mainly conifer	23,689	4,467	28,156
Young trees	61,808	7,487	69,294
Coppice	1,997	33	2,030
Coppice with standards	120	4	125
Shrub	3,324	1,408	4,732
Assumed woodland	26,788	7,876	34,664
Low density	2,004	49	2,053
Cloud/shadow/uncertain	13	0	13
Totals	1,145,717	146,654	1,292,372

Figure 4. Summary of woodland area by woodland class (groupings of similar IFTs) and woodland size



Note for Figure 4.

- Broadleaved class includes broadleaved, mixed mainly broadleaved, coppice & coppice with standards.
- Conifer class includes conifer & mixed mainly conifer.
- Transition class includes felled, ground prep, young trees & shrub.

NFI 2011 woodland map

Table 5. Woodland area by interpreted forest type and ownership

Forest type	Forestry Commission		Other ownership	
	Area (ha)	% of total area	Area (ha)	% of total area
North East England				
Broadleaved	476	1%	24,454	37%
Conifer	34,660	70%	25,726	39%
Felled	2,995	6%	1,888	3%
Ground prep	774	2%	571	1%
Mixed mainly broadleaved	98	0%	1,610	2%
Mixed mainly conifer	64	0%	1,984	3%
Young trees	10,451	21%	5,725	9%
Coppice	0	0%	12	0%
Coppice with standards	0	0%	0	0%
Shrub	6	0%	163	0%
Assumed woodland	255	1%	3,635	6%
Low density	83	0%	29	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	49,863	100%	65,797	100%
North West England				
Broadleaved	1,602	7%	57,310	60%
Conifer	14,158	64%	20,748	22%
Felled	2,006	9%	1,993	2%
Ground prep	617	3%	506	1%
Mixed mainly broadleaved	158	1%	2,544	3%
Mixed mainly conifer	265	1%	2,581	3%
Young trees	2,915	13%	3,918	4%
Coppice	0	0%	25	0%
Coppice with standards	0	0%	0	0%
Shrub	3	0%	394	0%
Assumed woodland	335	2%	4,591	5%
Low density	24	0%	203	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	22,083	100%	94,813	100%
Yorkshire & The Humber				
Broadleaved	2,071	11%	57,599	60%
Conifer	13,142	69%	21,855	23%
Felled	1,931	10%	1,207	1%
Ground prep	458	2%	677	1%
Mixed mainly broadleaved	132	1%	1,860	2%
Mixed mainly conifer	151	1%	2,515	3%
Young trees	1,124	6%	4,576	5%
Coppice	0	0%	106	0%
Coppice with standards	0	0%	3	0%
Shrub	9	0%	542	1%
Assumed woodland	70	0%	4,860	5%
Low density	0	0%	113	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	19,089	100%	95,913	100%

NFI 2011 woodland map

Table 5. Continued

Forest type	Forestry Commission		Other ownership	
	Area (ha)	% of total area	Area (ha)	% of total area
East Midlands				
Broadleaved	6,344	36%	57,182	70%
Conifer	8,644	50%	11,415	14%
Felled	671	4%	423	1%
Ground prep	235	1%	651	1%
Mixed mainly broadleaved	117	1%	1,091	1%
Mixed mainly conifer	144	1%	1,599	2%
Young trees	975	6%	5,085	6%
Coppice	3	0%	19	0%
Coppice with standards	0	0%	0	0%
Shrub	14	0%	266	0%
Assumed woodland	262	2%	4,309	5%
Low density	14	0%	53	0%
Cloud/shadow/uncertain	0	0%	4	0%
TOTALS	17,423	100%	82,097	100%
West Midlands				
Broadleaved	2,556	20%	71,413	68%
Conifer	8,099	62%	15,866	15%
Felled	537	4%	745	1%
Ground prep	57	0%	299	0%
Mixed mainly broadleaved	200	2%	3,266	3%
Mixed mainly conifer	361	3%	3,706	4%
Young trees	1,114	9%	5,344	5%
Coppice	0	0%	14	0%
Coppice with standards	0	0%	0	0%
Shrub	9	0%	329	0%
Assumed woodland	39	0%	3,664	3%
Low density	0	0%	99	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	12,972	100%	104,747	100%
Eastern England				
Broadleaved	3,273	13%	98,027	76%
Conifer	17,320	71%	19,050	15%
Felled	881	4%	398	0%
Ground prep	881	4%	625	0%
Mixed mainly broadleaved	88	0%	1,098	1%
Mixed mainly conifer	72	0%	1,656	1%
Young trees	1,405	6%	4,162	3%
Coppice	3	0%	139	0%
Coppice with standards	0	0%	9	0%
Shrub	5	0%	237	0%
Assumed woodland	124	1%	3,149	2%
Low density	230	1%	417	0%
Cloud/shadow/uncertain	0	0%	4	0%
TOTALS	24,282	100%	128,971	100%

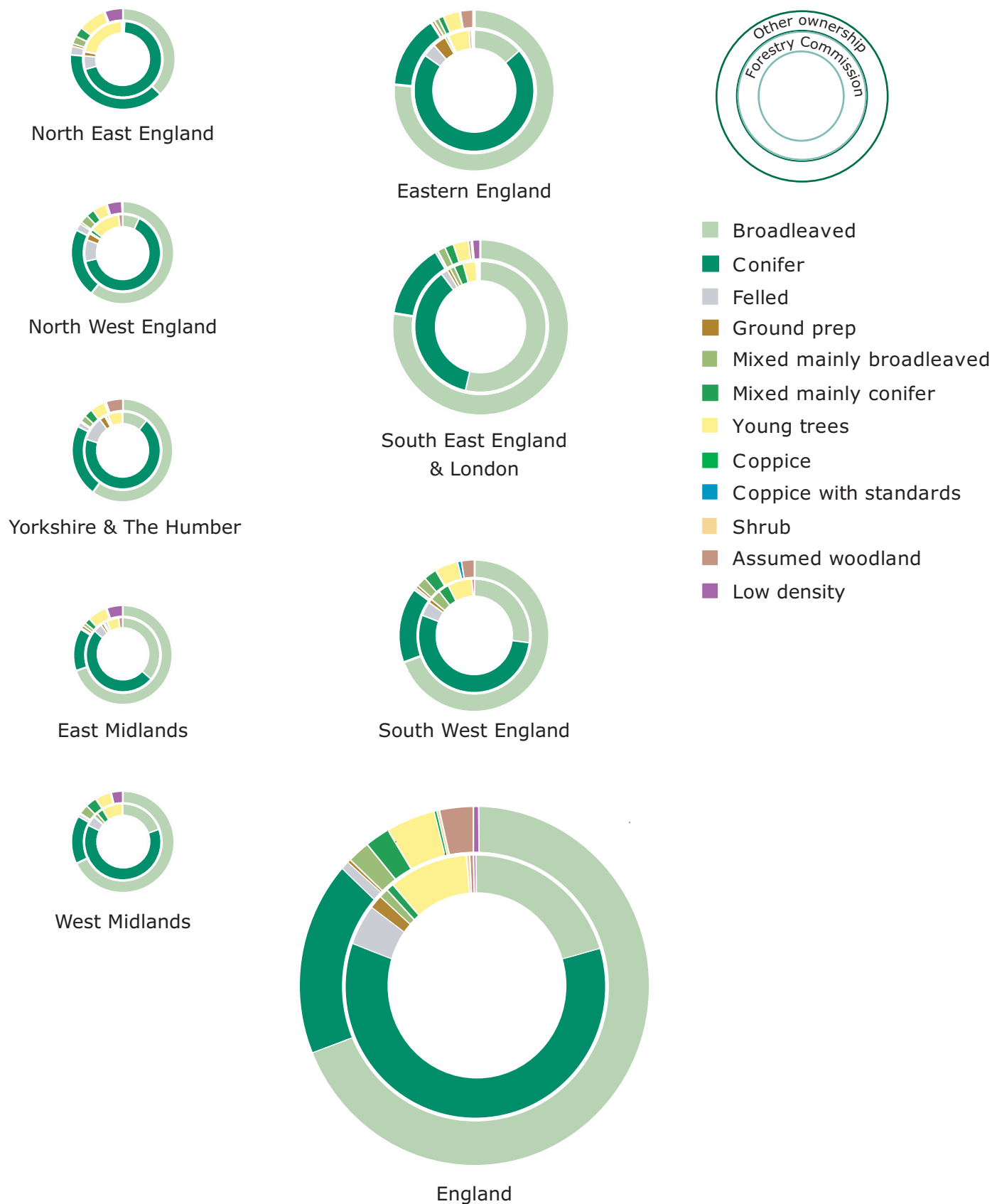
NFI 2011 woodland map

Table 5. Continued

Forest type	Forestry Commission		Other ownership	
	Area (ha)	% of total area	Area (ha)	% of total area
South East England & London				
Broadleaved	18,220	54%	224,139	78%
Conifer	12,322	36%	39,729	14%
Felled	602	2%	1,257	0%
Ground prep	296	1%	684	0%
Mixed mainly broadleaved	406	1%	3,429	1%
Mixed mainly conifer	674	2%	5,365	2%
Young trees	1,030	3%	7,774	3%
Coppice	142	0%	1,482	1%
Coppice with standards	6	0%	98	0%
Shrub	43	0%	927	0%
Assumed woodland	137	0%	3,439	1%
Low density	95	0%	385	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	33,974	100%	288,708	100%
South West England				
Broadleaved	9,102	27%	151,089	69%
Conifer	18,144	54%	35,055	16%
Felled	1,363	4%	1,090	0%
Ground prep	441	1%	910	0%
Mixed mainly broadleaved	972	3%	4,773	2%
Mixed mainly conifer	1,027	3%	5,991	3%
Young trees	2,419	7%	11,275	5%
Coppice	12	0%	73	0%
Coppice with standards	0	0%	13	0%
Shrub	27	0%	1,757	1%
Assumed woodland	145	0%	5,651	3%
Low density	34	0%	272	0%
Cloud/shadow/uncertain	0	0%	5	0%
TOTALS	33,687	100%	217,953	100%
England				
Broadleaved	43,644	20%	741,214	69%
Conifer	126,489	59%	189,444	18%
Felled	10,987	5%	9,001	1%
Ground prep	3,760	2%	4,924	0%
Mixed mainly broadleaved	2,171	1%	19,671	2%
Mixed mainly conifer	2,758	1%	25,398	2%
Young trees	21,435	10%	47,860	4%
Coppice	159	0%	1,870	0%
Coppice with standards	6	0%	119	0%
Shrub	116	0%	4,616	0%
Assumed woodland	1,367	1%	33,297	3%
Low density	481	0%	1,572	0%
Cloud/shadow/uncertain	0	0%	13	0%
TOTALS	213,372	100%	1,079,000	100%

NFI 2011 woodland map

Figure 5. Summary of woodland area by interpreted forest type and ownership
(size relative to total woodland area of England)



NFI 2011 woodland map

Table 6. Woodland area by ownership, interpreted forest type and size

Forest type	2 ha and over		0.5 - < 2 ha		Total area (ha)
	Forestry Commission	Other ownership	Forestry Commiss	Other ownership	
North East England					
Broadleaved	471	20,780	5	3,675	24,931
Conifer	34,654	23,875	6	1,851	60,386
Felled	2,995	1,857	0	31	4,883
Ground prep	772	541	2	30	1,346
Mixed mainly broadleaved	98	1,249	0	361	1,708
Mixed mainly conifer	63	1,567	1	417	2,048
Young trees	10,448	5,185	3	540	16,176
Coppice	0	11	0	1	12
Coppice with standards	0	0	0	0	0
Shrub	6	113	0	50	169
Assumed Woodland	236	2,979	19	656	3,890
Low Density	83	28	0	0	111
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	49,827	58,184	36	7,612	115,660
North West England					
Broadleaved	1,581	46,778	20	10,532	58,912
Conifer	14,152	19,498	6	1,250	34,906
Felled	2,005	1,967	1	27	3,999
Ground prep	617	497	0	8	1,123
Mixed mainly broadleaved	158	1,887	0	657	2,702
Mixed mainly conifer	265	2,061	1	520	2,846
Young trees	2,883	3,379	32	539	6,833
Coppice	0	25	0	0	25
Coppice with standards	0	0	0	0	0
Shrub	1	225	2	170	397
Assumed woodland	292	3,647	44	943	4,926
Low density	24	192	0	11	227
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	21,977	80,156	106	14,657	116,897
Yorkshire & The Humber					
Broadleaved	2,067	48,481	5	9,118	59,670
Conifer	13,141	20,489	1	1,366	34,997
Felled	1,931	1,174	0	34	3,138
Ground prep	458	639	0	38	1,135
Mixed mainly broadleaved	131	1,389	1	471	1,993
Mixed mainly conifer	151	2,003	0	513	2,667
Young trees	1,124	3,744	0	833	5,701
Coppice	0	103	0	3	106
Coppice with standards	0	0	0	0	0
Shrub	9	440	0	102	551
Assumed woodland	70	3,775	0	1,085	4,930
Low density	0	110	0	3	114
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	19,082	82,347	7	13,566	115,002

Note for Table 6.
Some woods may consist of both Forestry Commission and other ownership. Dividing woods by ownership can generate part woods of less than 2 hectares, where the whole wood without the division may be greater than 2 hectares in extent. Such part woods are classified in Table 6 according to the size of the entire woodland.

NFI 2011 woodland map

Table 6. Continued

Forest type	2 ha and over		0.5 - < 2 ha		Total area (ha)
	Forestry Commission	Other ownership	Forestry Commission	Other ownership	
East Midlands					
Broadleaved	6,339	46,813	5	10,368	63,526
Conifer	8,643	10,222	2	1,194	20,060
Felled	670	400	0	23	1,094
Ground prep	235	581	0	70	886
Mixed mainly broadleaved	116	751	1	340	1,208
Mixed mainly conifer	144	1,262	0	337	1,744
Young trees	975	4,096	0	989	6,060
Coppice	3	15	0	4	22
Coppice with standards	0	0	0	0	0
Shrub	14	172	0	94	280
Assumed woodland	252	3,409	10	900	4,571
Low density	14	53	0	0	68
Cloud/shadow/uncertain	0	4	0	0	4
TOTALS	17,406	67,778	18	14,319	99,520
West Midlands					
Broadleaved	2,553	59,268	3	12,145	73,970
Conifer	8,099	14,966	0	900	23,965
Felled	537	723	0	21	1,281
Ground prep	57	279	0	21	357
Mixed mainly broadleaved	200	2,530	0	736	3,466
Mixed mainly conifer	359	3,048	2	658	4,067
Young trees	1114	4,391	0	953	6,458
Coppice	0	13	0	1	14
Coppice with standards	0	0	0	0	0
Shrub	8	225	1	104	338
Assumed woodland	36	2,649	2	1,015	3,703
Low density	0	93	0	6	99
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	12,963	88,186	8	16,561	117,718
Eastern England					
Broadleaved	3,271	80,615	2	17,412	101,300
Conifer	17,317	16,819	3	2,231	36,370
Felled	881	377	0	21	1,279
Ground prep	881	555	0	71	1,506
Mixed mainly broadleaved	88	770	0	328	1,185
Mixed mainly conifer	72	1,177	0	479	1,728
Young trees	1,405	3,106	0	1,057	5,567
Coppice	3	132	0	8	142
Coppice with standards	0	9	0	0	9
Shrub	5	156	0	81	242
Assumed woodland	123	2,086	1	1,063	3,273
Low density	230	408	1	9	647
Cloud/shadow/uncertain	0	4	0	0	4
TOTALS	24,276	106,213	6	22,759	153,254

NFI 2011 woodland map

Table 6. Continued

Forest type	2 ha and over		0.5 - < 2 ha		Total area (ha)
	Forestry Commission	Other ownership	Forestry Commission	Other ownership	
South East England & London					
Broadleaved	18,091	199,456	129	24,683	242,360
Conifer	12,299	38,467	22	1,262	52,050
Felled	602	1,230	0	27	1,860
Ground prep	296	628	0	56	98
Mixed mainly broadleaved	402	2,816	4	613	3,835
Mixed mainly conifer	665	4,700	9	665	6,039
Young trees	1,022	6,661	8	1,113	8,804
Coppice	142	1,467	0	14	1,624
Coppice with standards	6	95	0	3	103
Shrub	39	729	4	198	970
Assumed woodland	123	2,541	14	898	3,576
Low density	95	377	0	8	479
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	33,783	259,167	191	29,542	322,682
South West England					
Broadleaved	9,061	130,455	41	20,633	160,191
Conifer	18,137	33,735	8	1,320	53,199
Felled	1,361	1,064	2	26	2,453
Ground prep	439	859	2	51	1,351
Mixed mainly broadleaved	970	3,716	2	1,057	5,745
Mixed mainly conifer	1,024	5,129	3	862	7,018
Young trees	2,415	9,859	4	1,416	13,694
Coppice	12	71	0	2	85
Coppice with standards	0	12	0	1	13
Shrub	27	1,156	0	601	1,784
Assumed woodland	143	4,427	2	1,224	5,796
Low density	34	263	0	10	307
Cloud/shadow/uncertain	0	5	0		5
TOTALS	33,623	190,751	64	27,202	251,639
England					
Broadleaved	43,433	632,648	211	108,566	784,858
Conifer	126,441	178,070	48	11,374	315,933
Felled	10,983	8,792	3	209	19,987
Ground prep	3,756	4,579	3	345	8,683
Mixed mainly broadleaved	2,163	15,108	8	4,563	21,842
Mixed mainly conifer	2,743	20,947	15	4,452	28,156
Young trees	21,388	40,420	47	7,440	69,294
Coppice	159	1,838	0	33	2,030
Coppice with standards	6	115	0	4	125
Shrub	108	3,215	7	1,401	4,732
Assumed woodland	1,275	25,512	91	7,785	34,664
Low density	480	1,524	1	48	2,053
Cloud/shadow/uncertain	0	13	0	0	13
TOTALS	212,937	932,780	435	146,219	1,292,372

NFI 2011 woodland map

Table 7. Woodland area by size class distribution

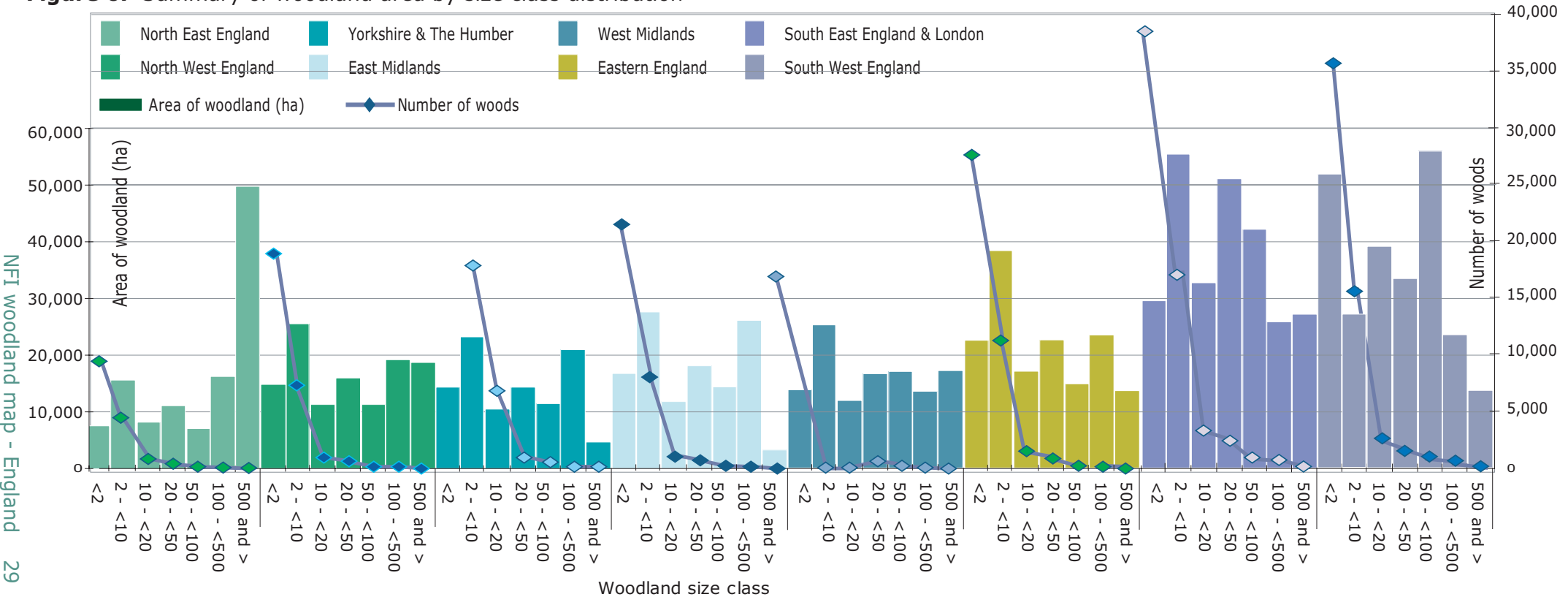
Size class (ha)	Total area (ha)	Number of woods	% of total area	Mean wood area (ha)	Size class (ha)	Total area (ha)	Number of woods	% of total area	Mean wood area (ha)
North East England					Eastern England				
<2	7,649	7,862	7%	1	<2	22,765	23,060	15%	1
2 - <10	15,616	3,720	14%	4	2 - <10	38,355	9,395	25%	4
10 - <20	8,246	593	7%	14	10 - <20	17,239	1,248	11%	14
20 - <50	11,073	367	10%	30	20 - <50	22,607	750	15%	30
50 - <100	7,134	104	6%	69	50 - <100	15,141	227	10%	67
100 - <500	16,272	86	14%	189	100 - <500	23,613	134	15%	176
500 and >	49,670	17	43%	2,922	500 and >	13,534	14	9%	967
All woods	115,660	12,749	100%	9	All woods	153,254	34,828	100%	4
North West England					South East England & London				
<2	14,763	15,809	13%	1	<2	29,733	30,231	9%	1
2 - <10	25,546	6,115	22%	4	2 - <10	55,795	13,345	17%	4
10 - <20	11,266	810	10%	14	10 - <20	32,951	2,352	10%	14
20 - <50	16,035	542	14%	30	20 - <50	51,003	1,667	16%	31
50 - <100	11,364	167	10%	68	50 - <100	42,471	624	13%	68
100 - <500	19,203	105	16%	183	100 - <500	84,975	472	26%	180
500 and >	18,720	15	16%	1,248	500 and >	25,753	36	8%	715
All woods	116,896	23,563	100%	5	All woods	322,682	48,727	100%	7
East Midlands					South West England				
<2	14,337	14,910	14%	1	<2	27,266	28,137	11%	1
2 - <10	23,267	5,723	23%	4	2 - <10	52,147	12,420	21%	4
10 - <20	10,500	775	11%	14	10 - <20	27,253	1,958	11%	14
20 - <50	14,314	477	14%	30	20 - <50	39,200	1,292	16%	30
50 - <100	11,407	168	11%	68	50 - <100	33,576	490	13%	69
100 - <500	21,019	123	21%	171	100 - <500	56,404	299	22%	189
500 and >	4,676	7	5%	668	500 and >	15,793	23	6%	687
All woods	99,520	22,183	100%	4	All woods	251,639	44,619	100%	6
West Midlands					England				
<2	16,569	17,961	14%	1	<2	146,655	151,717	11%	1
2 - <10	27,531	6,742	23%	4	2 - <10	263,526	63,267	20%	4
10 - <20	11,821	876	10%	13	10 - <20	131,162	9,410	10%	14
20 - <50	18,064	606	15%	30	20 - <50	188,922	6,166	15%	31
50 - <100	14,537	219	12%	66	50 - <100	149,188	2,157	12%	69
100 - <500	26,061	148	22%	176	100 - <500	264,421	1,423	20%	186
500 and >	3,136	4	3%	784	500 and >	148,497	123	11%	1,207
All woods	117,719	26,556	100%	4	All woods	1,292,372	234,263	100%	6
Yorkshire & The Humber									
<2	13,573	14,131	12%	1					
2 - <10	25,270	96	22%	263					
10 - <20	11,886	96	10%	124					
20 - <50	16,626	553	14%	30					
50 - <100	13,558	204	12%	66					
100 - <500	16,875	96	15%	176					
500 and >	17,215	13	15%	1,324					
All woods	115,002	15,189	100%	8					

NFI 2011 woodland map

Table 7a. Summary of conifer and broadleaved woodland area by size class distribution

Size class (ha)	Broadleaved woodland class	% Area	Number of woods	Conifer woodland class	% Area	Number of woods
England						
<2	113,385	14%	116,681	15,889	5%	16,165
2 - <10	199,567	25%	58,308	35,149	10%	15,834
10 - <20	97,490	12%	12,325	20,870	6%	6,097
20 - <50	132,843	16%	11,747	39,122	11%	8,367
50 - <100	95,774	12%	7,227	41,229	12%	6,426
100 - <500	137,881	17%	10,780	102,403	30%	9,925
500 and >	31,914	4%	2,998	89,429	26%	2,627
All woods	808,855	100%	220,066	344,090	100%	65,441

Figure 6. Summary of woodland area by size class distribution



NFI 2011 woodland map

Table 8. Open areas in woodland by land-use type

Interpreted open area	Total area (ha)	% of total area	Interpreted open area	Total area (ha)	% of total area
North East England			West Midlands		
Agricultural	171	6%	Agricultural	44	3%
Bare area	872	28%	Bare area	118	8%
Grass	1,590	51%	Grass	1,130	75%
Power line	1	0%	Power line	1	0%
Quarry	20	1%	Quarry	44	3%
River	4	0%	River	1	0%
Road	59	2%	Road	0	0%
Urban	25	1%	Urban	37	2%
Other vegetation	311	10%	Other vegetation	35	2%
Open water	48	2%	Open water	99	7%
TOTALS	3,101	100%	TOTALS	1,509	100%
North West England			Yorkshire & The Humber		
Agricultural	10	1%	Agricultural	346	17%
Bare area	425	22%	Bare area	152	8%
Grass	1,041	54%	Grass	1,352	67%
Power line	0	0%	Power line	1	0%
Quarry	7	0%	Quarry	5	0%
River	2	0%	River	4	0%
Road	63	3%	Road	13	1%
Urban	98	5%	Urban	35	2%
Other vegetation	95	5%	Other vegetation	31	2%
Open water	200	10%	Open water	82	4%
TOTALS	1,942	100%	TOTALS	2,021	100%
East Midlands			Eastern England		
Agricultural	130	11%	Agricultural	459	16%
Bare area	111	9%	Bare area	105	4%
Grass	781	64%	Grass	1,913	68%
Power line	0	0%	Power line	0	0%
Quarry	12	1%	Quarry	7	0%
River	0	0%	River	0	0%
Road	2	0%	Road	1	0%
Urban	85	7%	Urban	48	2%
Other vegetation	30	2%	Other vegetation	87	3%
Open water	62	5%	Open water	205	7%
TOTALS	1,213	100%	TOTALS	2,826	100%

NFI 2011 woodland map

Table 8. Continued

Interpreted open area	Total area (ha)	% of total area
South East England & London		
Agricultural	683	8%
Bare area	588	7%
Grass	6,181	72%
Power line	11	0%
Quarry	85	1%
River	1	0%
Road	3	0%
Urban	402	5%
Other vegetation	267	3%
Open water	321	4%
TOTALS	8,544	100%
South West England		
Agricultural	347	9%
Bare area	159	4%
Grass	2,867	77%
Power line	11	0%
Quarry	40	1%
River	4	0%
Road	2	0%
Urban	88	2%
Other vegetation	98	3%
Open water	113	3%
TOTALS	3,729	100%
England		
Agricultural	2,191	9%
Bare area	2,533	10%
Grass	16,856	68%
Power line	25	0%
Quarry	219	1%
River	15	0%
Road	144	1%
Urban	818	3%
Other vegetation	955	4%
Open water	1,130	5%
TOTALS	24,885	100%

Figure 7. Summary of open areas in woodland by land-use type (size relative to total mapped open area of England)

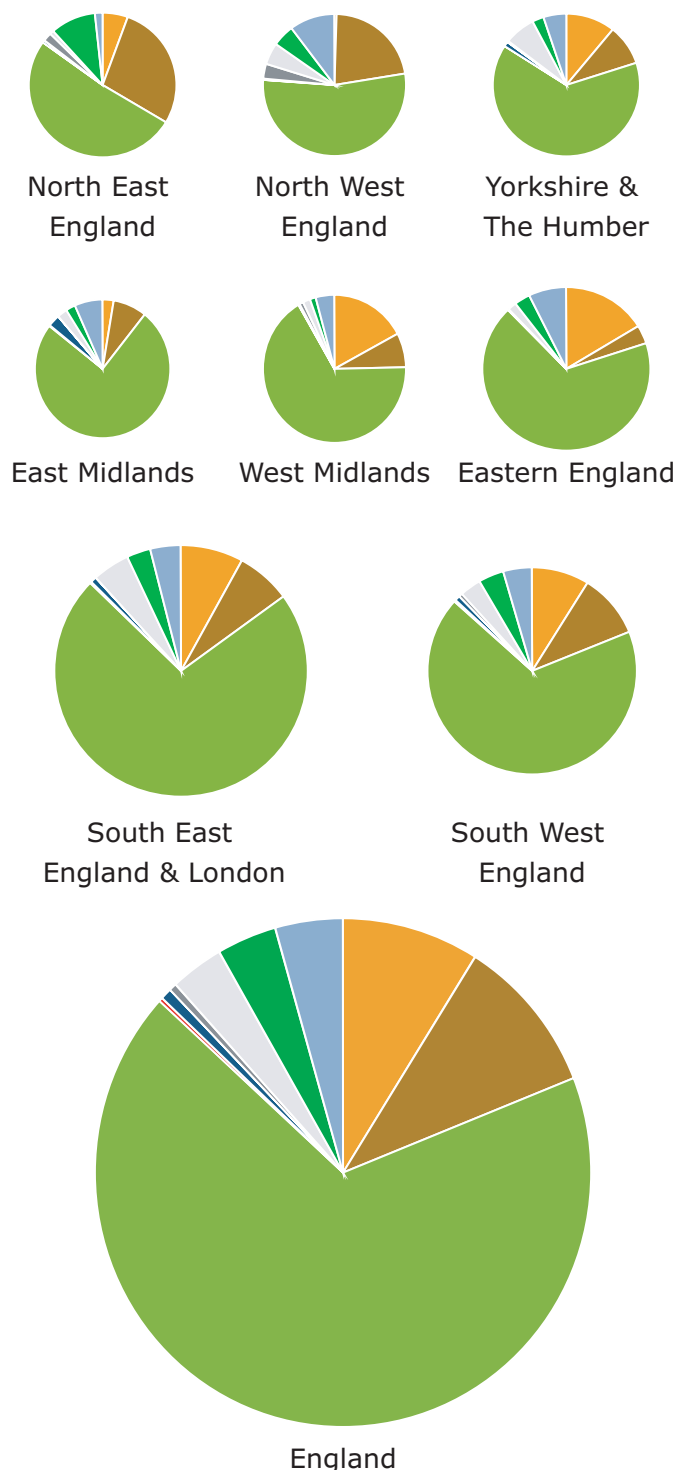


Figure 7. Legend



Section 2 - Summary of differences between NFI 2010 and NFI 2011 woodland areas for England

The total woodland area on the 2011 NFI woodland map of England is 1,292,372 hectares. The published NFI woodland area for England for 2010 (National Forest Inventory Woodland Area Statistics: England, NFI, 26 May 2011) was 1,293,800 hectares. After further correction and processing, the published 2010 woodland map contained a total woodland area of 1,292,265 hectares. The change in mapped woodland area from the 2010 to the 2011 woodland maps was 107 hectares. Some of this change is attributable to real change in the intervening period and other to corrections and improvements made to the map. Tables 9 and 10 provide an overall summary of these differences, and Tables 11, 12 and 13 provide more detail on the comparison of areas in the 2010 and 2011 versions of the NFI woodland maps. 2010 and 2011 versions of the NFI woodland maps.

Table 9. Comparison between 2010 and 2011 NFI woodland maps

Woodland type	2010		2011		Difference
	Area (ha)	%	Area (ha)	%	
England					
Woodland	1,257,245	95%	1,255,654	95%	-1,590
Assumed woodland	33,766	3%	34,664	3%	898
Low density	1,254	0%	2,053	0%	799
Mapped non woodland	24,599	2%	24,885	2%	286
Total mapped area	1,316,864	100%	1,317,256	100%	392
% woodland land cover		10%		10%	

Note for Table 9. The net area of the woodland category removed from the 2010 map as part of the 2011 map update is 2,376 hectares. Of that area 117 hectares were due to land use change, 14 hectares was cleaned from the assumed woodland and the remaining 2,245 hectares were due to NFI error identified by the remote sensing and NIWT comparison analysis. The remaining balance of the difference in the woodland category is due to woodland being reclassified between the other categories based upon the remote sensing work, comparison analysis and the aerial photography update work. The net differences are summarised in tables 11 to 13.

Table 10. Differences in woodland area between NFI 2010 and NFI 2011 woodland map published areas

Type of change	2010 area (ha)	2011 area (ha)	Difference
England			
Published woodland area (26th May 2011)	1,293,800		
Removal of duplicate polygons	-1,535		
Mapped woodland	1,292,265	1,292,372	107
Mapped non woodland (IOA's)	24,599	24,885	286
Total mapped area	1,316,864	1,317,256	392

NFI 2011 woodland map

Table 11. Summary of area removed from the 2010 woodland map for England

Source	Source area (hectares)	Woodland type	Type area (hectares)
England			
Base map corrections	1,471	Non-woodland	23
		Woodland	1,448
NIWT comparison validation	914	Low density	523
		Woodland	391
Validated grant schemes	14	Assumed woodland	14
Total	2,399		2,399

Table 12. Summary of area added to the 2010 woodland map for England

	Source area (ha)	Woodland type	Type area (ha)
England			
Remote sensing	4	Woodland	2
		Low density	2
Aerial photography update	783	Woodland	535
		Low density	147
		Non woodland	101
NIWT comparison validation	716	Woodland	261
		Low density	350
		Non woodland	104
Validated grant schemes	1,284	Assumed Woodland	1,284
Base map corrections	5	Woodland	4
		Low density	0
		Non woodland	0
Total	2,791		2,791

Table 13. Summary of changes between NFI 2011 and NFI 2010

	NFI 2010	NFI 2011
England		
Total mapped area 2010	1,316,864	2,791
Deducted from NFI 2010	2,399	
Added to NFI 2010		
Total mapped area 2011		1,317,256

Section 3 Summary of differences between NIWT 1998 and NFI 2011 woodland maps for England

NIWT did not differentiate between 'mixed mainly conifer' and 'mixed mainly broadleaved' forest types and therefore in the following tables both NFI forest types have been included as 'mixed'. NFI 'assumed woodland' has been included with NFI 'young trees' and NFI 'low density' has been included with NFI 'shrub'. Tables 14 to 18 and Figures 8 and 9 summarise the differences based on interpreted forest type. Tables 16 to 18 and figure 10 provide an overall summary of the changes in area between the two maps.

NFI 2011 woodland map

Note for Tables 14-18 and Figures 8 to 10. The reference dates for NIWT at country level are; 1995 for Scotland, 1997 for Wales and 1998 for England. The range of dates of photography used for mapping are explained in Appendix A and illustrated in Appendix C.

Tables 14 and 15 compare the woodland area breakdown derived from the NIWT woodland map of 2 hectares and over, and the 2 hectares and over element of the NFI woodland map. The woodland maps, which are based upon interpreted forest type, are derived from interpretation of aerial photography. Mapped interpreted forest types provide the location, scale and distribution of woodland types; however, this process results in a different distribution of woodland types and open areas to that derived from the ground assessments. The more precise ground survey identifies areas, woodland type and species more accurately than interpretation of aerial photography for a specific area. Statistical techniques are used to integrate the results arising from mapping and fieldwork to derive improved final estimates of woodland composition. This results in a more accurate breakdown of woodland area distribution.

Forest type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference NFI-NIWT
	Area (ha)	%	Area (ha)	%	
North East England					
Broadleaved	17,376	17%	21,251	20%	3,875
Conifer	64,780	64%	58,529	54%	-6,250
Felled	4,515	4%	4,852	4%	338
Ground prep	2,015	2%	1,313	1%	-702
Mixed	6,522	6%	2,977	3%	-3,545
Young trees	6,180	6%	18,848	17%	12,668
Coppice	0	0%	11	0%	11
Coppice with standards	0	0%	0	0%	0
Shrub	281	0%	230	0%	-51
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	101,668	100%	108,011	100%	6,343
% of land area	12%		13%		
North West England					
Broadleaved	35,427	39%	48,359	47%	12,932
Conifer	35,627	39%	33,650	33%	-1,978
Felled	4,547	5%	3,972	4%	-575
Ground prep	160	0%	1,114	1%	954
Mixed	10,090	11%	4,370	4%	-5,720
Young trees	5,178	6%	10,201	10%	5,023
Coppice	33	0%	25	0%	-8
Coppice with standards	1	0%	0	0%	-1
Shrub	615	1%	442	0%	-173
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	91,678	100%	102,133	100%	10,455
% of land area	6%		7%		
Yorkshire & The Humber					
Broadleaved	38,117	42%	50,547	50%	12,431
Conifer	33,777	37%	33,630	33%	-147
Felled	1,598	2%	3,105	3%	1,507
Ground prep	0	0%	1,097	1%	1,097
Mixed	13,165	15%	3,675	4%	-9,490
Young trees	3,467	4%	8,713	9%	5,246
Coppice	0	0%	103	0%	103
Coppice with standards	0	0%	0	0%	0
Shrub	521	1%	559	1%	38
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	90,644	100%	101,429	100%	10,785
% of land area	6%		7%		

Table 14. Differences in woodland area by interpreted forest type between NIWT 1998 release and NFI 2011 (based on woodlands 2 hectares and over)

NFI 2011 woodland map

Table 14. Continued

Forest Type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference
	Area (ha)	%	Area (ha)	%	NFI-NIWT
East Midlands					
Broadleaved	38,094	54%	53,153	62%	15,059
Conifer	16,812	24%	18,864	22%	2,052
Felled	1,702	2%	1,071	1%	-632
Ground prep	23	0%	816	1%	792
Mixed	10,733	15%	2,273	3%	-8,460
Young trees	2,516	4%	8,732	10%	6,216
Coppice	0	0%	18	0%	18
Coppice with standards	0	0%	0	0%	0
Shrub	403	1%	253	0%	-149
Cloud/shadow/uncertain	0	0%	4	0%	4
Total	70,282	100%	85,184	100%	14,901
% of land area	5%		5%		
West Midlands					
Broadleaved	43,012	50%	61,821	61%	18,809
Conifer	26,555	31%	23,065	23%	-3,490
Felled	1,543	2%	1,260	1%	-282
Ground prep	16	0%	336	0%	321
Mixed	11,354	13%	6,137	6%	-5,217
Young trees	2,808	3%	8,191	8%	5,384
Coppice	11	0%	13	0%	2
Coppice with standards	0	0%	0	0%	0
Shrub	650	1%	326	0%	-324
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	85,947	100%	101,149	100%	15,202
% of land area	7%		8%		
Eastern England					
Broadleaved	48,596	43%	83,886	64%	35,290
Conifer	34,109	30%	34,136	26%	27
Felled	3,987	4%	1,258	1%	-2,729
Ground prep	1,247	1%	1,435	1%	188
Mixed	18,591	16%	2,106	2%	-16,485
Young trees	4,687	4%	6,720	5%	2,033
Coppice	544	0%	134	0%	-410
Coppice with standards	103	0%	9	0%	-95
Shrub	1,888	2%	799	1%	-1,089
Cloud/shadow/uncertain	0	0%	4	0%	4
Total	113,753	100%	130,489	100%	16,736
% of land area	6%		7%		

NFI 2011 woodland map

Table 14. Continued

Forest Type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference NFI-NIWT
	Area (ha)	%	Area (ha)	%	
South East England & London					
Broadleaved	141,964	53%	217,547	74%	75,583
Conifer	37,428	14%	50,766	17%	13,338
Felled	13,759	5%	1,833	1%	-11,926
Ground prep	585	0%	924	0%	339
Mixed	50,453	19%	8,583	3%	-41,870
Young trees	7,844	3%	10,347	4%	2,503
Coppice	9,812	4%	1,610	1%	-8,202
Coppice with standards	2,051	1%	100	0%	-1,951
Shrub	5,650	2%	1,239	0%	-4,411
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	269,547	100%	292,949	100%	23,402
% of land area	14%		15%		
South West England					
Broadleaved	119,094	58%	139,516	62%	20,423
Conifer	51,961	25%	51,872	23%	-90
Felled	6,049	3%	2,425	1%	-3,624
Ground prep	8	0%	1,298	1%	1,290
Mixed	18,509	9%	10,839	5%	-7,670
Young trees	5,773	3%	16,844	8%	11,071
Coppice	256	0%	83	0%	-173
Coppice with standards	151	0%	12	0%	-139
Shrub	4,809	2%	1,480	1%	-3,329
Cloud/shadow/uncertain	0	0%	5	0%	5
Total	206,609	100%	224,374	100%	17,765
% of land area	9%		9%		
England					
Broadleaved	481,680	47%	676,081	59%	194,401
Conifer	301,049	29%	304,511	27%	3,462
Felled	37,700	4%	19,775	2%	-17,925
Ground prep	4,055	0%	8,335	1%	4,280
Mixed	139,417	14%	40,960	4%	-98,456
Young trees	38,452	4%	88,595	8%	50,143
Coppice	10,656	1%	1,997	0%	-8,659
Coppice with standards	2,305	0%	120	0%	-2,185
Shrub	14,816	1%	5,328	0%	-9,488
Cloud/shadow/uncertain	0	0%	13	0%	13
Total	1,030,130	100%	1,145,717	100%	115,587
% of land area	8%		9%		

NFI 2011 woodland map

Figure 8. Summary of differences in woodland area by interpreted forest type and ownership between NIWT (1998) release and NFI 2011 (based on woodlands 2 hectares and over)



NFI 2011 woodland map

Table 15. Differences in woodland area by interpreted forest type and ownership between NIWT (1998) release and NFI 2011 (based on woodlands 2 hectares and over)

Forest type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference NIWT to NFI	
	FC	Other	FC	Other	FC	Other
North East England						
Broadleaved	297	17,079	471	20,780	174	3,701
Conifer	41,844	22,936	34,654	23,875	-7,190	939
Felled	3,080	1,435	2,995	1,857	-85	423
Ground prep	1,969	46	772	541	-1,197	495
Mixed	320	6,202	161	2,816	-159	-3,386
Young trees	4,137	2,043	10,684	8,164	6,547	6,121
Coppice	0	0	0	11	0	11
Coppice with standards	0	0	0	0	0	0
Shrub	0	281	89	140	89	-140
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	51,648	50,021	49,827	58,184	-1,821	8,163
% of land cover	6%	6%	6%	7%		
North West England						
Broadleaved	571	34,856	1,581	46,778	1,010	11,922
Conifer	16,552	19,075	14,152	19,498	-2,400	423
Felled	1,968	2,579	2,005	1,967	37	-612
Ground prep	108	52	617	497	509	445
Mixed	1,055	9,035	423	3,948	-633	-5,087
Young trees	2,986	2,192	3,175	7,027	188	4,835
Coppice	0	33	0	25	0	-8
Coppice with standards	0	1	0	0	0	-1
Shrub	0	615	25	417	25	-198
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	23,240	68,437	21,977	80,156	-1,264	11,719
% of land cover	2%	5%	2%	6%		
Yorkshire & The Humber						
Broadleaved	1,001	37,115	2,067	48,481	1,065	11,365
Conifer	16,085	17,692	13,141	20,489	-2,944	2,797
Felled	292	1,305	1,931	1,174	1,639	-132
Ground prep	0	0	458	639	458	639
Mixed	889	12,276	282	3,392	-606	-8,884
Young trees	1,580	1,887	1,194	7,518	-385	5,631
Coppice	0	0	0	103	0	103
Coppice with standards	0	0	0	0	0	0
Shrub	0	521	9	550	9	29
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	19,847	70,797	19,082	82,347	-765	11,550
% of land cover	1%	5%	1%	5%		

NFI 2011 woodland map

Table 15. Continued

Forest type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference NIWT to NFI	
	FC	Other	FC	Other	FC	Other
East Midlands						
Broadleaved	3,972	34,122	6,339	46,813	2,367	12,692
Conifer	9,588	7,223	8,643	10,222	-946	2,998
Felled	756	946	670	400	-86	-546
Ground prep	5	18	235	581	230	563
Mixed	2,028	8,705	260	2,013	-1,768	-6,692
Young trees	836	1,680	1,227	7,505	391	5,825
Coppice	0	0	3	15	3	15
Coppice with standards	0	0	0	0	0	0
Shrub	22	381	29	225	7	-156
Cloud/shadow/uncertain	0	0	0	4	0	4
Total	17,208	53,074	17,406	67,778	197	14,704
% of land cover	1%	3%	1%	4%		
West Midlands						
Broadleaved	1,527	41,485	2,553	59,268	1,026	17,783
Conifer	10,228	16,327	8,099	14,966	-2,129	-1,361
Felled	442	1,101	537	723	95	-378
Ground prep	15	1	57	279	43	277
Mixed	871	10,483	559	5,578	-312	-4,905
Young trees	720	2,087	1,150	7,040	430	4,953
Coppice	0	11	0	13	0	2
Coppice with standards	0	0	0	0	0	0
Shrub	60	590	8	318	-53	-272
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	13,863	72,085	12,963	88,186	-900	16,100
% of land cover	1%	6%	1%	7%		
Eastern England						
Broadleaved	922	47,674	3,271	80,615	2,349	32,942
Conifer	18,632	15,477	17,317	16,819	-1,315	1,342
Felled	1,024	2,963	881	377	-142	-2,587
Ground prep	1,139	109	881	555	-258	446
Mixed	1,511	17,079	159	1,947	-1,352	-15,133
Young trees	2,575	2,112	1,529	5,191	-1,046	3,080
Coppice	0	544	3	132	3	-413
Coppice with standards	1	102	0	9	-1	-94
Shrub	43	1,845	235	564	192	-1,280
Cloud/shadow/uncertain	0	0	0	4	0	4
Total	25,847	87,905	24,276	106,213	-1,571	18,307
% of land cover	1%	5%	1%	6%		

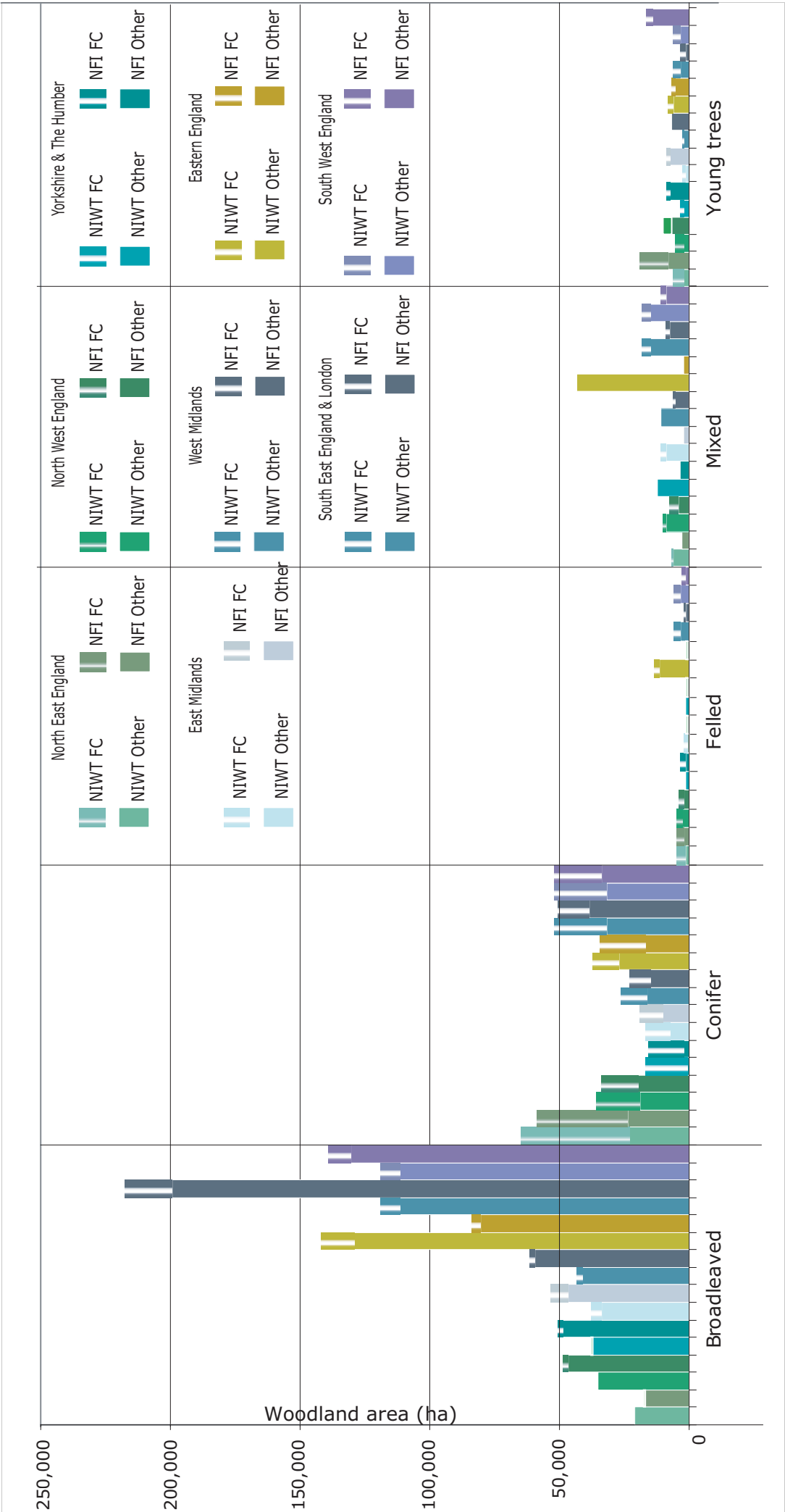
NFI 2011 woodland map

Table 15. Continued

Forest type	NIWT - 1998 Inventory		NFI - 2011 Inventory		Difference NIWT to NFI	
	FC	Other	FC	Other	FC	Other
South East England & London						
Broadleaved	13,044	128,921	18,091	199,456	5,047	70,535
Conifer	10,626	26,802	12,299	38,467	1,673	11,665
Felled	2,215	11,545	602	1,230	-1,612	-10,314
Ground prep	315	270	296	628	-19	358
Mixed	6,940	43,513	1,067	7,516	-5,872	-35,997
Young trees	1,433	6,411	1,145	9,202	-288	2,791
Coppice	846	8,966	142	1,467	-704	-7,499
Coppice with standards	34	2,017	6	95	-28	-1,922
Shrub	225	5,426	134	1,105	-91	-4,321
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	35,677	233,870	33,783	259,167	-1,894	25,296
% of land cover	2%	12%	2%	13%		
South West England						
Broadleaved	7,575	111,518	9,061	130,455	1,486	18,937
Conifer	20,242	31,720	18,137	33,735	-2,105	2,015
Felled	2,426	3,622	1,361	1,064	-1,065	-2,558
Ground prep	0	8	439	859	439	851
Mixed	3,389	15,120	1,994	8,845	-1,395	-6,274
Young trees	2,109	3,663	2,558	14,285	449	10,622
Coppice	25	231	12	71	-13	-160
Coppice with standards	2	148	0	12	-2	-137
Shrub	133	4,676	61	1,419	-72	-3,257
Cloud/shadow/uncertain	0	0	0	5	0	5
Total	35,902	170,707	33,623	190,751	-2,279	20,044
% of land cover	2%	7%	1%	8%		
England						
Broadleaved	28,910	452,770	43,433	632,648	14,524	179,878
Conifer	143,798	157,252	126,441	178,070	-17,356	20,818
Felled	12,203	25,497	10,983	8,792	-1,220	-16,704
Ground prep	3,550	504	3,756	4,579	206	4,074
Mixed	17,004	122,413	4,906	36,054	-12,098	-86,358
Young trees	16,377	22,075	22,663	65,932	6,286	43,858
Coppice	871	9,786	159	1,838	-711	-7,948
Coppice with standards	37	2,268	6	115	-32	-2,153
Shrub	483	14,333	589	4,739	106	-9,594
Cloud/shadow/uncertain	0	0	0	13	0	13
Total	223,233	806,898	212,937	932,780	-10,296	125,883
% of land cover	2%	6%	2%	7%		

NFI 2011 woodland map

Figure 9. Summary of differences in woodland area by interpreted forest type and ownership between NIWT (1998) release and NFI 2011 (based on woodlands 2 hectares and over)



NFI 2011 woodland map

Table 16. Additions: Post NIWT afforestation and existing woodland not identified in NIWT (based on woodlands 2 ha and over)

Source of change	source area (ha)	Woodland type	Type area (ha)	IFT/IOA	IFT/IOA area (ha)
Remote sensing	233	Woodland	196	Broadleaved	5
				Conifer	0
				Felled	171
				Mixed (B)	0
				Mixed (C)	0
				Young trees	20
Aerial photography update	489	Woodland	366	Low density	36
				Broadleaved	147
				Conifer	6
				Felled	13
				Ground prep	5
				Mixed (B)	6
				Mixed (C)	6
				Young trees	162
				Shrub	22
		Low density	123	Low density	123
Validated potential change polygons	957	Woodland	516	Broadleaved	89
				Conifer	1
				Felled	360
				Ground prep	3
				Mixed (B)	3
				Mixed (C)	1
				Young trees	44
				Shrub	13
Assumed woodland	24,413	Assumed woodland	24,413	Low Density	441
				Assumed woodland	24,413
Additional woodland mapped as NFI but not identified in NIWT	215,448	Woodland	215,448	Broadleaved	146,662
				Conifer	24,469
				Cloud/shadow/uncertain	12
				Felled	805
				Ground prep	3,499
				Mixed (B)	3,691
				Mixed (C)	4,728
				Young trees	29,085
				Coppice	300
				Coppice with standards	17
				Shrub	2,180
TOTALS	241,540		241,540		241,540

NFI 2011 woodland map

Table 17. Deletions: Areas mapped as woodland in NIWT but not identified as woodland by NFI
(based on woodlands 2 ha and over)

NIWT IFT	Area (hectares)
England	
Broadleaved	74,316
Conifer	19,029
Coppice	624.62
Coppice with standards	104.73
Felled	6,440
Ground prep	280.412
Mixed	15,260
Shrub	4,996
Young trees	4,903
Total	125,953

Table 18. Summary of change between NIWT 1998 and NFI 2011

	NIWT 1998	NFI 2011
England		
Total woodland area	1,030,130	
Deducted from NIWT 1998	125,953	
Added post NIWT		241,540
Total		1,145,717

Figure 10. Summary of net changes from NIWT to NFI

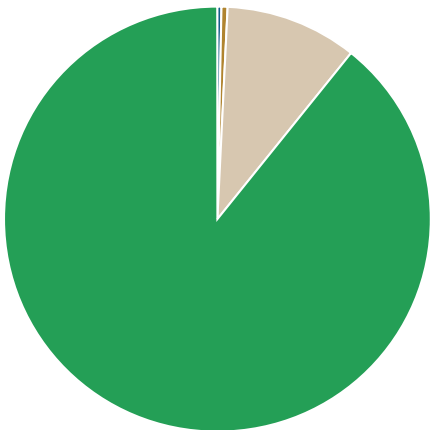


Table 16 (additions)
categorised by source of update

- Remote sensing
- Aerial photography update
- Validated potential change polygons
- Assumed woodland
- Additional woodland mapped as NFI but not identified in NIWT

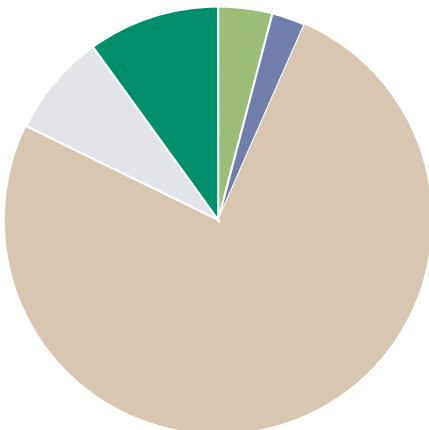


Table 17 (deletions)
categorised by type of change

- Grant schemes (no visible trees)
- Land-use change
- Methodology differences
- Not yet categorised
- NIWT error

Section 4- Interpreted forest types and stocked areas

The recently published *Standing timber volume for coniferous trees in Britain* report includes estimates of stocked areas of principal conifer species and of all conifers in GB in Table 1 of the document. This is reproduced here for England in Table 19 and summarised in Table 11. The Forestry Commission stocked areas have been derived from information in the sub-compartment database, while those for other woodlands have been determined from results of the NFI field sample to date combined with information from the 2011 NFI woodland map. In the latter case, since they are based on a sample of woodland, the estimates are shown with associated sampling standard errors. The *Standing timber volume for coniferous trees in Britain* report also provides details of the methods used in the derivation of these estimates, which, in the case of 'other' woodland, has used the combined information within the NFI field sample and the NFI map, as described in that document. More information on the details of the NFI field sample operation and the use of the data from this in the derivation of country or regional estimates can be found at www.forestry.gov.uk/inventory

Table 19. Stocked area by principal conifer species for England

Principal species	FC area (000 ha)	Other area (000 ha)	SE%	Total area (000 ha)	Principal species	FC area (000 ha)	Other area (000 ha)	SE%	Total area (000 ha)
North East England					East Midlands				
All conifers	37.3	22.0	7	59.3	All conifers	7.6	10.4	12	18.1
Sitka spruce	28.4	8.4	17	36.8	Sitka spruce	0.2	0.0	110	0.2
Scots pine	1.9	6.4	17	8.3	Scots pine	2.0	4.5	18	6.5
Corsican pine	0.3	0.0	76	0.3	Corsican pine	4.0	2.1	31	6.1
Norway spruce	2.7	1.7	32	4.4	Norway spruce	0.3	1.6	40	1.9
Larches	1.2	3.6	22	4.7	Larches	0.3	1.5	29	1.8
Douglas fir	0.3	0.7	67	1.0	Douglas fir	0.1	0.4	87	0.5
Lodgepole pine	2.1	1.0	42	3.2	Lodgepole pine	0.4	0.0	0	0.4
Other conifers	0.5	0.5	52	0.9	Other conifers	0.3	0.3	49	0.6
North West England					West Midlands				
All conifers	14.0	21.2	7	35.1	All conifers	7.9	17.8	9	25.7
Sitka spruce	9.7	9.0	13	18.7	Sitka spruce	0.5	1.6	61	2.1
Scots pine	0.7	2.9	21	3.7	Scots pine	1.2	4.3	23	5.5
Corsican pine	0.4	0.2	82	0.5	Corsican pine	1.8	1.5	30	3.3
Norway spruce	0.6	2.3	24	2.9	Norway spruce	0.4	3.7	26	4.1
Larches	1.4	5.2	16	6.7	Larches	1.3	3.0	22	4.3
Douglas fir	0.3	0.1	70	0.4	Douglas fir	2.2	1.3	33	3.5
Lodgepole pine	0.7	0.8	41	1.5	Lodgepole pine	0.1	0.3	83	0.5
Other conifers	0.2	0.7	49	1.0	Other conifers	0.4	2.1	28	2.5

NFI 2011 woodland map

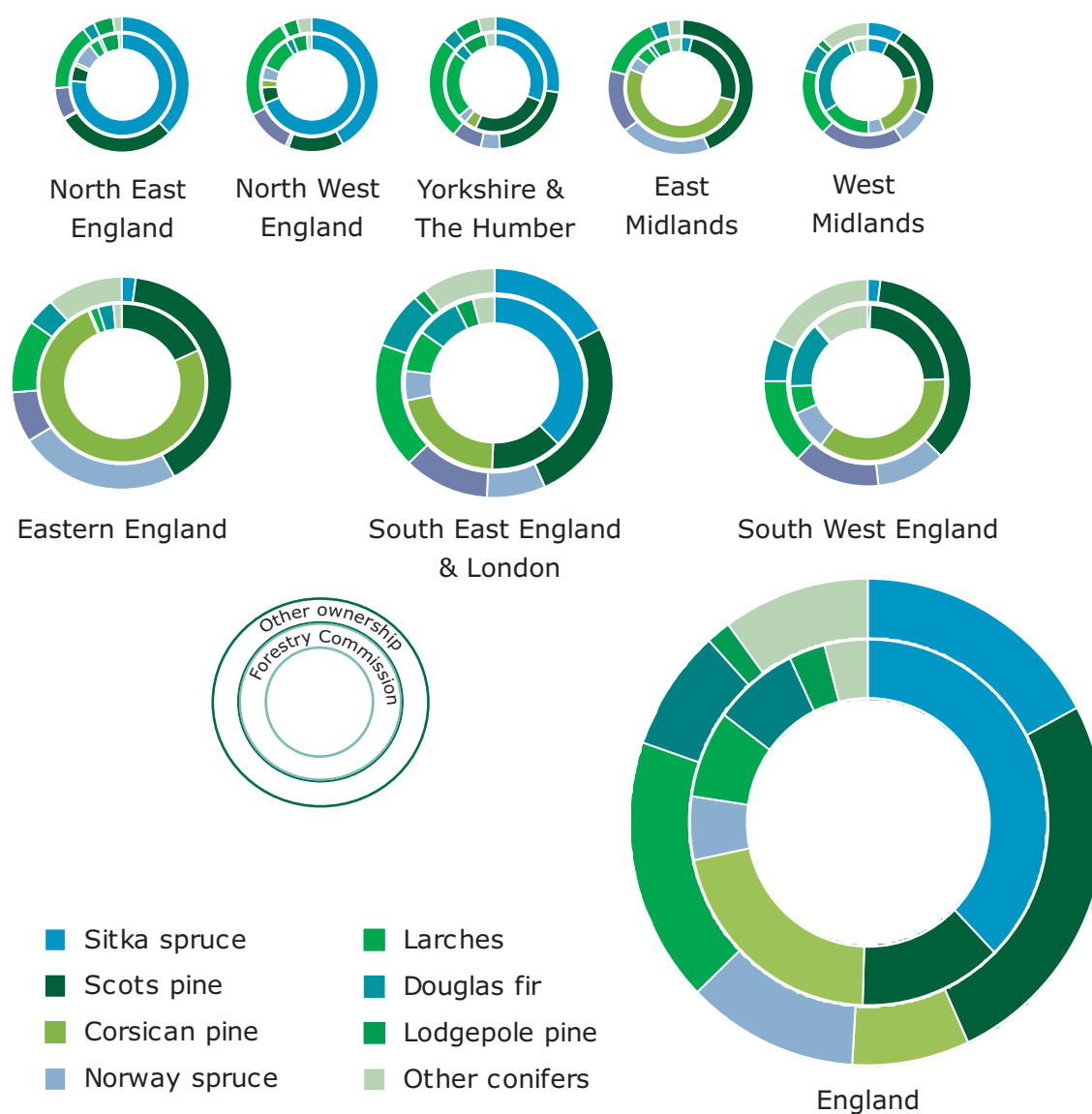
Table 19. Continued

Principal species	FC area (000 ha)	Other area (000 ha)	SE%	Total area (000 ha)	Principal species	FC area (000 ha)	Other area (000 ha)	SE%	Total area (000 ha)
York and Humber					East England				
All conifers	13.1	21.2	5	34.3	All conifers	17.6	20.4	9	38.0
Sitka spruce	4.0	5.8	14	9.9	Sitka spruce	0.0	0.4	71	0.4
Scots pine	3.3	4.6	12	7.9	Scots pine	3.2	8.3	17	11.5
Corsican pine	0.5	1.0	27	1.5	Corsican pine	13.2	4.8	22	18.0
Norway spruce	0.4	1.6	19	2.0	Norway spruce	0.1	1.6	29	1.7
Larches	2.9	5.3	10	8.2	Larches	0.3	2.3	23	2.6
Douglas fir	0.5	0.8	22	1.3	Douglas fir	0.5	0.8	33	1.3
Lodgepole pine	1.0	1.4	27	2.3	Lodgepole pine	0.0	0.0	0	0.0
Other conifers	0.4	0.9	30	1.3	Other conifers	0.3	2.3	30	2.6
South East England and London					South West England				
All conifers	11.8	39.0	5	50.8	All conifers	18.3	40.5	5	58.8
Sitka spruce	0.0	0.8	43	0.8	Sitka spruce	4.9	7.5	17	12.3
Scots pine	2.8	13.9	12	16.7	Scots pine	1.5	5.1	18	6.6
Corsican pine	4.2	4.2	19	8.5	Corsican pine	2.8	1.9	30	4.7
Norway spruce	1.0	5.2	15	6.2	Norway spruce	1.5	4.4	16	5.9
Larches	0.7	5.3	14	6.0	Larches	2.0	7.7	13	9.7
Douglas fir	1.6	2.6	23	4.2	Douglas fir	4.2	9.0	13	13.2
Lodgepole pine	0.0	0.0	107	0.1	Lodgepole pine	0.1	0.0	105	0.2
Other conifers	1.4	7.0	14	8.4	Other conifers	1.3	5.3	16	6.6
England									
All conifers	127.5	192.6	2	320.1					
Sitka spruce	47.8	33.5	8	81.3					
Scots pine	16.6	49.9	6	66.5					
Corsican pine	27.1	15.8	11	42.9					
Norway spruce	6.9	22.1	8	29.0					
Larches	10.1	33.9	6	44.0					
Douglas fir	9.8	15.6	10	25.4					
Lodgepole pine	4.5	3.6	20	8.1					
Other conifers	4.8	19.2	9	23.9					

NFI 2011 woodland map

The total stocked area of conifer in England according to table 19 is 320,100 hectares. This compares to the total area of conifer IFT on the 2011 NFI map of 315,133 hectares. The two estimates are reasonably close because the incidence of conifer species is predominantly to be found within the areas identified as conifer woodland in the aerial photography interpretation used for the construction of the NFI IFT map. However, it is not expected that these areas would be identical since there are important differences in what these estimates represent. In the case of the area of conifer IFT, the differences from the area occupied by conifer species alone are noted in the introduction section 'Understanding the differences between map-based and fieldwork estimates'. In the case of stocked areas, the estimate represents the area occupied by conifer species at the time of the NFI field survey, excluding from the total forest area that occupied by broadleaved species and that which is currently felled with no evidence of a newly planted crop.

Figure 11. Summary of stocked area by principal conifer species for England (size relative to total stocked area of conifer)



NFI 2011 woodland map

The recently published *Preliminary estimates of quantities of broadleaved species in British woodlands, with special focus on ash* report includes estimates of stocked areas of principal broadleaved species and of all broadleaves in GB in Table 4 of the document. This is reproduced here for England in Table 20 and summarised in Figure 12.

Table 20. Stocked area by principal broadleaved species for England

Principal species	FC	Other		Total	Principal species	FC	Other		Total
	Area (000 ha)	Area (000 ha)	SE%	Area (000 ha)		Area (000 ha)	Area (000 ha)	SE%	Area (000 ha)
North East England					East Midlands				
All broadleaves	2.4	33.8	6	36.2	All broadleaves	7.1	68.8	3	75.8
Oak	0.1	4.7	21	4.8	Oak	2.9	13.3	12	16.3
Beech	0.1	2.6	25	2.7	Beech	0.4	0.9	32	1.3
Sycamore	0.1	5.7	20	5.7	Sycamore	0.2	9.0	16	9.2
Ash	0.0	4.4	21	4.4	Ash	0.9	11.0	12	12.0
Birch	0.1	5.9	17	6.0	Birch	0.9	6.1	20	7.0
Sweet chestnut	0.0	0.0	0	0.0	Sweet chestnut	0.1	1.2	46	1.2
Hazel	0.0	3.1	26	3.1	Hazel	0.0	3.4	21	3.4
Hawthorn	0.0	0.8	44	0.8	Hawthorn	0.0	8.3	16	8.3
Alder	0.0	2.7	24	2.8	Alder	0.0	0.7	44	0.7
Willow	0.0	1.2	46	1.2	Willow	0.0	2.3	38	2.3
Other broadleaves	2.0	2.8	18	4.8	Other broadleaves	1.6	12.5	11	14.1
North West England					West Midlands				
All broadleaves	2.7	65.6	3	68.3	All broadleaves	3.2	80.9	3	84.1
Oak	0.5	15.5	11	16.0	Oak	1.1	19.8	12	20.8
Beech	0.2	4.1	20	4.3	Beech	0.5	3.9	32	4.4
Sycamore	0.1	8.9	15	8.9	Sycamore	0.1	6.2	23	6.2
Ash	0.2	5.1	15	5.2	Ash	0.2	10.3	14	10.5
Birch	0.6	11.6	12	12.1	Birch	0.4	8.0	18	8.4
Sweet chestnut	0.0	0.1	64	0.1	Sweet chestnut	0.1	2.5	35	2.6
Hazel	0.1	2.0	20	2.1	Hazel	0.0	7.5	19	7.5
Hawthorn	0.0	2.8	18	2.8	Hawthorn	0.0	6.3	21	6.3
Alder	0.0	6.6	18	6.6	Alder	0.0	3.0	28	3.0
Willow	0.0	4.6	27	4.6	Willow	0.0	1.9	26	1.9
Other broadleaves	1.1	4.1	15	5.2	Other broadleaves	0.9	11.6	16	12.4
York and The Humber					East England				
All broadleaves	2.7	71.4	3	74.1	All broadleaves	7.1	101.7	3	108.8
Oak	0.4	12.6	10	13.0	Oak	0.9	18.5	12	19.5
Beech	0.3	5.5	14	5.9	Beech	0.9	5.4	20	6.3
Sycamore	0.3	12.9	8	13.2	Sycamore	0.1	13.7	15	13.8
Ash	0.2	8.6	10	8.8	Ash	0.2	11.1	13	11.3
Birch	0.6	10.5	12	11.1	Birch	0.5	9.6	18	10.1
Sweet chestnut	0.0	0.3	48	0.3	Sweet chestnut	0.1	5.6	25	5.6
Hazel	0.0	1.3	19	1.3	Hazel	0.0	4.6	26	4.6
Hawthorn	0.0	3.5	15	3.5	Hawthorn	0.0	3.8	18	3.8
Alder	0.0	3.4	16	3.4	Alder	0.1	3.4	33	3.4
Willow	0.0	3.3	18	3.3	Willow	0.0	4.5	28	4.5
Other broadleaves	0.9	9.4	8	10.4	Other broadleaves	1.0	21.5	10	22.6

NFI 2011 woodland map

Table 20. Continued

Principal species	FC	Other		Total	Principal species	FC	Other		Total
	area (000 ha)	area (000 ha)	SE%	area (000 ha)		area (000 ha)	area (000 ha)	SE%	area (000 ha)
South East England & London					South West England				
All broadleaves	17.4	240.8	2	258.3	All broadleaves	10.6	172.7	3	183.3
Oak	6.3	46.7	6	53.0	Oak	3.4	31.8	7	35.2
Beech	7.1	29.8	8	36.8	Beech	3.1	15.8	11	18.9
Sycamore	0.2	8.4	14	8.5	Sycamore	0.1	16.1	10	16.2
Ash	0.4	27.3	7	27.7	Ash	0.6	30.0	7	30.5
Birch	1.1	32.7	7	33.7	Birch	0.5	9.2	12	9.7
Sweet chestnut	0.2	13.2	12	13.5	Sweet chestnut	0.4	4.1	21	4.4
Hazel	0.0	24.9	8	24.9	Hazel	0.1	22.0	8	22.1
Hawthorn	0.0	13.3	11	13.3	Hawthorn	0.0	10.5	16	10.5
Alder	0.1	3.9	20	4.0	Alder	0.1	5.6	17	5.7
Willow	0.0	5.2	16	5.2	Willow	0.0	10.0	14	10.0
Other broadleaves	2.1	34.7	6	36.8	Other broadleaves	2.4	18.6	10	21.0
England									
All broadleaves	50.0	835.8	1	885.8					
Oak	15.5	163.0	3	178.5					
Beech	12.7	68.0	5	80.7					
Sycamore	1.1	80.8	5	81.8					
Ash	2.7	107.7	4	110.4					
Birch	4.5	93.7	4	98.1					
Sweet chestnut	0.8	27.0	9	27.8					
Hazel	0.3	68.8	5	69.1					
Hawthorn	0.0	49.4	6	49.4					
Alder	0.5	29.2	8	29.7					
Willow	0.0	33.0	8	33.0					
Other broadleaves	12.0	115.2	4	127.2					

NFI 2011 woodland map

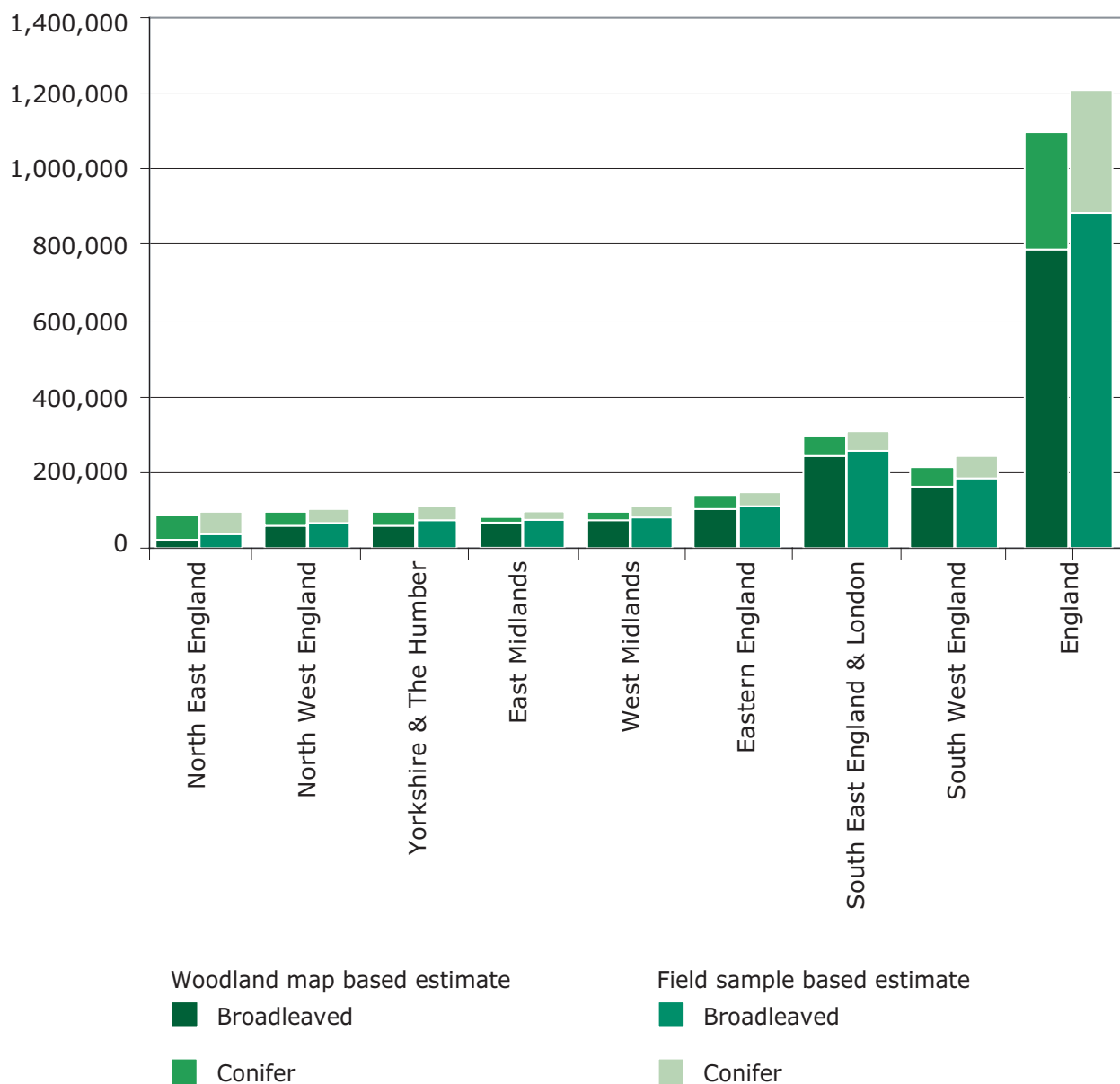
Figure 12. Summary of stocked area by principal broadleaved species for England by region (size relative to total stocked area of broadleaved)



The total stocked area of broadleaves in England, according to Table 20 is 885,800 hectares. This compares to the total area of broadleaved IFT on the 2011 NFI map of 784,858 hectares. The two estimates differ because the incidence of broadleaved species is predominantly to be found within the areas identified as broadleaved woodland in the aerial photography interpretation used for the construction of the NFI IFT map. However, it is not expected that these areas would be identical since there are important differences in what these estimates represent (as explained above for conifers). In the case of stocked areas, the estimate represents the area occupied by broadleaved species at the time of the NFI field survey, excluding from the total forest area that occupied by conifer species and that which is currently felled with no evidence of a newly planted crop. Figure 13 summarises the differences between the two estimates for conifer and broadleaved woodland types.

NFI 2011 woodland map

Figure 13. Comparison of mapped area estimates and stocked area estimates for England



Note for Figure 13.

- Broadleaved class includes broadleaved, mixed mainly broadleaved, coppice & coppice with standards.
- Conifer class includes conifer & mixed mainly conifer.

The transition class (not included in this table), includes young trees which have been included in the field based estimate, as conifer or broadleaved but cannot yet be differentiated by aerial photography interpretation due to their immaturity.

Conclusion

The previous woodland map of Great Britain (National Inventory of Woodland and Trees - NIWT) was derived from 1:25,000 scale aerial photography dating between 1988 and 2000. This was updated to 2002 with new planting based on paid grant schemes and Forestry Commission first rotation planting. Like previous inventories these data were periodic and became increasingly out of date; even the new planting data that were added were accepted without visual verification of successful planting. While this approach was reasonable based on the available technology at that time, it quickly lacked current information on the nature and rate of change to the woodland resource.

The advancement of GIS technology coupled with the availability of up to date orthorectified aerial imagery meant that a new more accurate digital map could be developed to form the basis of a continuous rolling woodland inventory programme for sample plot measurement and an annual cycle for woodland map updating. This approach will enable us to create a more timely and accurate picture of the extent, nature and sustainability of GB woodland and its change over time and provide up to date woodland analysis data as and when required, without the inhibiting cost of a complete remapping project.

The change in mapping methodology to exclude all public roads and the reduction of the minimum gap between woodlands to 20 metres has highlighted the degree and distribution of woodland fragmentation throughout GB. This is summarised in Table 7 for England.

Of the total number of discrete woodlands in England, 65% are less than 2 hectares in extent, although this represents only 11% of the total woodland area. Less than 1% of the total number of discrete woodlands are greater than or equal to 100 hectares in extent, although these woods represent 32% of the total woodland area.

Of the conifer woodland class 19% fall into the category of greater than or equal to 100 hectares in extent, representing 56% by area of all conifer woodland in GB. In the case of broadleaves, just 6% of the this woodland class falls into this category, representing 21% by area of the total broadleaved woodland in England.

In comparison, 25% of the conifer woodland class falls within the category of less than 2 hectares, representing just 5% of the total conifer woodland area while 53% of the broadleaved woodland class falls within this category, representing 14% of the total broadleaved woodland area for England. The conifer and broadleaved woodland size distribution is summarised in Table 7a.

Glossary

Area (forest/woodland)	Forest and woodland area is divided into net forest area - the land area actually covered by trees (in the National Forest Inventory defined to the drip line of the canopy), and gross forest area - which includes both the area covered by trees and small open spaces of less than 0.5 hectare within the forest boundary (e.g. rides, glades, ponds).
Broadleaves	Trees and shrubs that belong to the angiosperm division of the plant kingdom (as distinct from the gymnosperm division, which includes conifers). Most broadleaves in the UK have laminar leaves and are deciduous. They are sometimes referred to as 'hardwoods' but not all produce hardwood timber.
Canopy	The mass of foliage and branches formed collectively by the crowns of trees.
Clearfelling	Cutting down of an area of woodland (if it is within a larger area of woodland it is typically a felling greater than 0.25 hectare). Sometimes a scatter or small clumps of trees may be left standing within the felled area.
Conifers	Trees and shrubs that belong to the gymnosperm division of the plant kingdom (as distinct from the angiosperm division, which includes broadleaves). Conifers mostly have needles or scale-like leaves and, with the exception of larch, all are evergreen. Sometimes referred to as 'softwoods', they produce softwood timber.
Forest (and woodland)	For the National Forest Inventory woodland is defined as land with a minimum area of 0.5 hectare under stands of trees, and tree crown cover of at least 20%, or the potential to achieve this. Areas of open space completely enclosed by woodland have been mapped as interpreted open areas. The minimum width for woodland is 20 metres, although where a woodland includes a narrow neck of woodland less than 20 metres wide, then the neck may be included if there is less than 20 metres in distance between woodlands. Tarmac roads and normal gauge railways have been excluded from the data regardless of width. Rivers, rides and power lines have been excluded when the feature (e.g. river) is visibly 20 metres wide and greater than 0.5 hectares in area. Parts of river features could be excluded, while other parts of the same feature are included.
Forestry Commission	The government department responsible for the regulation of forestry, implementing forestry policy and management of state forests in Great Britain. Forestry policy is devolved, with the exception of common issues addressed on a GB or UK basis, such as international forestry, plant health and forestry standards.

Glossary (continued)

Forestry Commission estate	Forests, woodlands, open land and other property managed by the Forestry Commission.
Great Britain (GB)	England, Scotland and Wales.
Interpreted forest type	The woodland map is differentiated into interpreted forest types (IFTs) as outlined in Appendix B1.
Interpreted open area	Open areas completely surrounded by woodland are differentiated into interpreted open areas (IOAs) as outlined in Appendix B2.
Other ownership	Land not owned or leased to the Forestry Commission. This could include private individuals, private forestry or timber businesses, other private businesses, local authorities, charitable organisations and community ownership or common land. It also includes government departments other than the Forestry Commission, such as the Ministry of Defence.

Appendix A: Summary of methodology differences between the NIWT woodland map and the NFI woodland map

	National Inventory of Woodland and Trees (NIWT)	National Forest Inventory (NFI)
Minimum extent of woodland, and also minimum extent of interpreted forest type (IFT) and interpreted open area (IOA)	2 hectares	0.5 hectare
Minimum width of gaps between woodlands and minimum width of IOA	50 metres	20 metres
Derived from	In England 1:25,000 fixed scale photography flown between 1991 and 1999. In Wales 1:25,000 fixed scale photography flown between 1991 and 1997. In Scotland, based on Land Cover of Scotland (LCS) 1988 project - which also used 1:25,000 fixed scale photography flown between 1987 and 1989	25 cm resolution orthorectified imagery for Scotland and England (Ordnance Survey). 40 cm resolution orthorectified imagery for Wales (Welsh Assembly)
Interpreted forest types (IFTs)	Broadleaved Conifer Felled Ground prepared for planting Mixed Young trees Coppice Coppice with standards Shrub	Broadleaved Conifer Felled Ground prepared for planting Mixed mainly broadleaved Mixed mainly conifer Young trees Coppice Coppice with standards Shrub Assumed woodland Low density

Appendix A: Continued

	National Inventory of Woodland and Trees (NIWT)	National Forest Inventory (NFI)
Interpreted open areas (IOAs)	N/A	Agricultural Bare area Grass Power line Quarry River Road Urban Other vegetation Open water Wind farm
Requirements	All woodland, both urban and rural, is mapped and included in the survey	All woodland, both urban and rural, is mapped and included in the survey OS MasterMap® features are used as boundaries where they fall within 10 metres of the perceived woodland edge
	Rivers visibly less than 50 metres wide are included in the woodland area	Rivers visibly less than 20 metres wide are included in the woodland area
	Roads less than 50 metres are included in the woodland area	All public roads are excluded from the woodland area regardless of width
	Power lines less than 50 metres wide are included in the woodland area	Power lines less than 20 metres wide are included in the woodland area
	Railways less than 50 metres wide are included in the woodland area	All railways are excluded from the woodland area
Updates	Updated to 31 March 2002 with new planting information from Forestry Commission sub-compartment database (SCDB) and country based grant scheme data	Annual updates based on: <ul style="list-style-type: none"> polygons identified from comparison with other sources; felling/restocking polygons from SCDB; availability of new photography; object based classification of remote sensing data

Appendix B1: Descriptions of interpreted forest types

Abbreviation code	Description text	Comments
B	Broadleaved	The canopy of broadleaved woodland is generally more uneven than that of coniferous woodland, being made up of rounded crowns but with variations according to species, age, height and season. Boundaries with adjacent internal polygons are generally less clearly defined than with conifers and naturally occurring stands. Some conifer trees may also be present but greater than 80% of the area will consist of broadleaved trees.
C	Conifer	Coniferous woodland often occurs as large plantations with trees in regular rows and the stand edges may be regular and sharply defined. Some broadleaved trees may also be present but greater than 80% of the area will consist of conifer trees.
F	Felled	Areas of woodland where the trees have been harvested or felled. Stumps or felled trees may be visible and there may be long heaps of felling debris ('windrows'). Some standing trees within this limit may also be present but should be disregarded. This category should not be confused with coppice. The areas concerned may also have been restocked but the new trees are not yet visible.
G	Ground prepared for planting	Very difficult to differentiate from agricultural, but may show plough furrows, spaced earth mounds or weed killed patches or strips as part of a new woodland regime. Likely to be part of an approved grant scheme held on Grants & Licences databases.
Mc	Mixed mainly conifer	Mixed woodland exhibits intermediate characteristics between conifer and broadleaved woodland. There can be several types of mixed woodland. A plantation of alternate rows of conifers and broadleaves may produce a 'striped' appearance. Conifers and broadleaves may be planted in blocks, or there may be general interspersed woodland. The proportion of the conifers will be more than 50% of the area and less than 80%.
Mb	Mixed mainly broadleaved	Mixed woodland exhibits intermediate characteristics between conifer and broadleaved woodland. There can be several types of mixed woodland. A plantation of alternate rows of conifers and broadleaves may produce a 'striped' appearance. Conifers and broadleaves may be planted in blocks, or there may be general interspersed woodland. The proportion of the broadleaves will be more than 50% of the area and less than 80%.

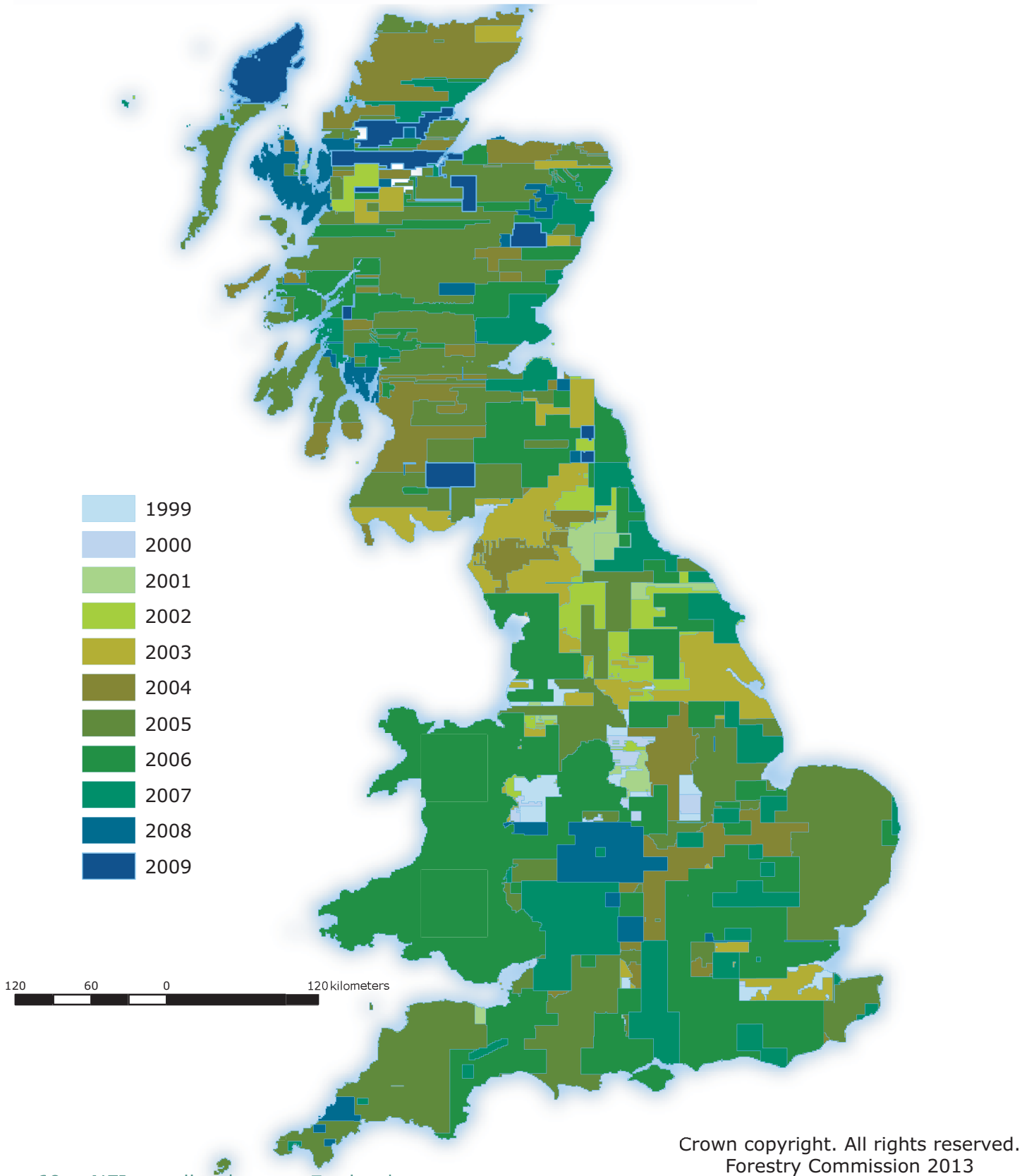
Appendix B1: Continued

Abbreviation code	Description text	Comments
N	Young trees	Areas where planting is clearly visible but the trees cannot yet be differentiated between conifer and broadleaved due to their immaturity. Such areas can be either on land new to woodland or where a felled crop has been replaced.
O	Coppice	The most important characteristic of coppice areas on aerial photographs is their very even, smooth appearance. The coppice area may be made up of a patchwork of different ages (heights) but all exhibit this very even texture. Areas recently cut may appear to have a very clear floor with little felling debris. Coppice is always of broadleaved trees.
P	Coppice with standards	Some areas of coppice may also include larger broadleaved trees set into the coppice matrix. Such broadleaved trees, often oak, are known as standards and show very clearly over the even coppice as large, rounded crowns. The distribution of the standards may also be fairly scattered with approximately 25 stems per hectare.
S	Shrub	This category is intended to include areas that may possibly be woodland, where the growth is close to the ground and shows a rough character but no clear differentiation between conifer and broadleaved can yet be made. Areas being colonised by woody species may fall into this category. The cover will be at least 20%.
Aw	Assumed woodland	Areas of woodland identified as having been planted through woodland planting grant aid, which are not currently visible in aerial photography, but are assumed to exist.
Ld	Low density	The 'low density' polygons are areas that were mapped by NIWT but not mapped by NFI where investigation of the archive images shows a higher density than at present. These have been included for future monitoring.
CS	Cloud/ shadow	If cloud or shadow areas obscure woodland detail and it is difficult to allocate one of the above IFTs, then a feature is digitised around the uncertain area.
X	Uncertain	Where the interpreter is uncertain of the IFT/IOA to be used, X will be designated. The rate of use of this category should decline over time, as operators become more proficient and better at recognising IFTs/IOAs. As part of the quality control and update procedures Xs will be checked against the latest imagery

Appendix B2: Descriptions of interpreted open areas

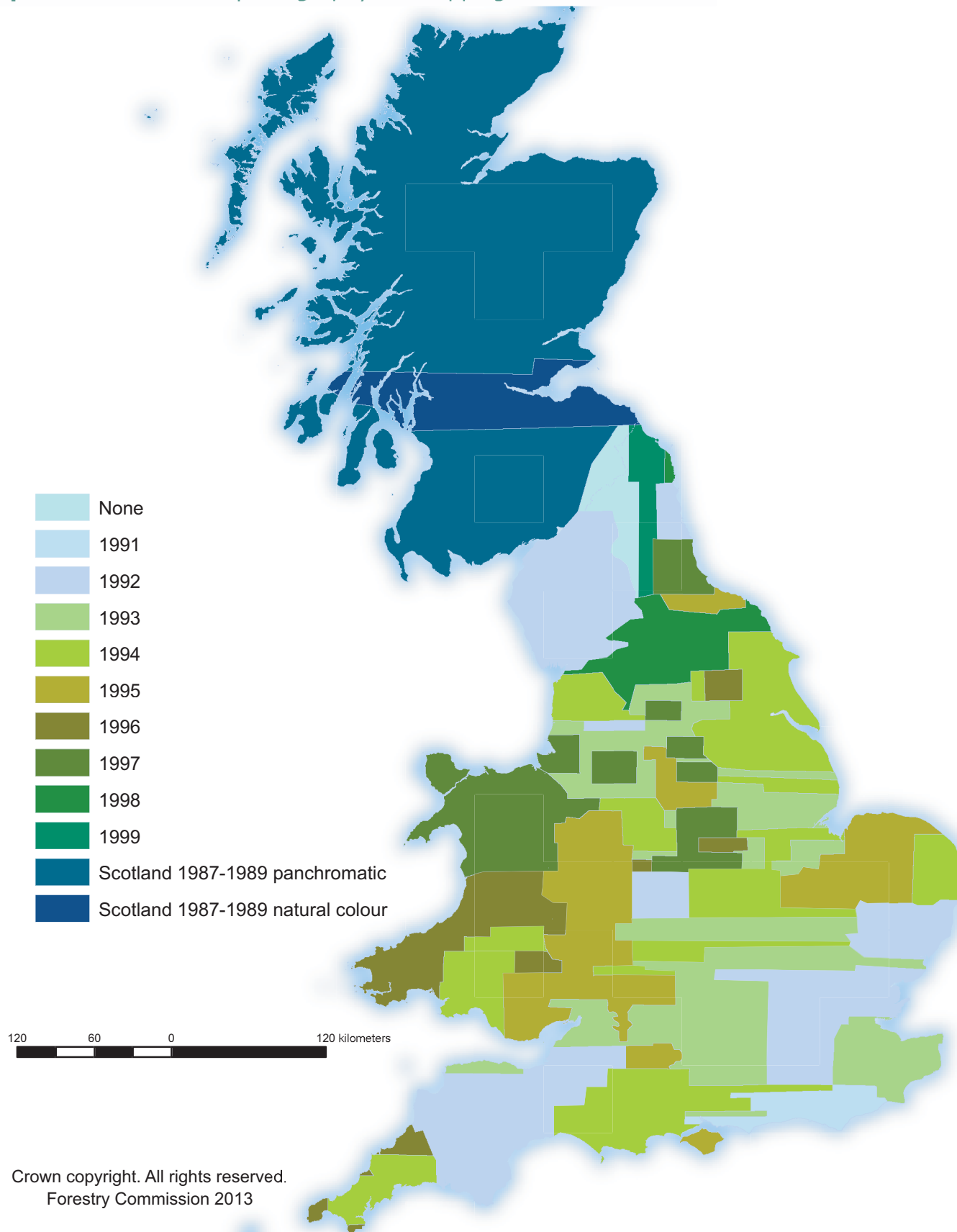
Abbreviation code	Description text	Comments
A	Agricultural	May contain a cereal crop or pasture.
Ba	Bare area	Bare ground or rock.
Gs	Grass	A predominantly grassy area - may or may not be agricultural.
L	Power line	Linear feature, possibly shadow evidence of poles, pylons or even the cables/lines.
Q	Quarry	Evidence of change from vegetation to geology; sand, slate, rock etc. Active quarries could have buildings, and heavy plant tracks leading into the quarry.
Ri	River	Linear feature; depending on location can be fairly straight or meander through woodland.
Ro	Road	Linear feature; often fairly straight with gentle bends or turning circles.
U	Urban	Buildings within woodland areas; may include gardens surrounding the buildings.
V	Other vegetation	Not covered by the above (e.g. gorse, rhododendron, bracken, heather etc).
W	Open water	Normally labelled within OS MasterMap ®, areas of even colour.
Wf	Wind farm	Possible shadow evidence of turbines, normally in groups.

Appendix C: Aerial photography years of flying
Map C1. NFI dates of photography for mapping



Appendix C: Aerial photography years of flying

Map C2. NIWT dates of photography for mapping



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