

NFI 2011 woodland map Scotland

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 Scotland 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 Scotland is 1,383,410 hectares. This represents 18% of the land area. A further 47,570 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 Scotland is 1,430,980 hectares. (Table 1)
- A total of 479,087 hectares or 35% of the total mapped woodland in Scotland is owned by or leased to the Forestry Commission, with 904,323 hectares or 65% in other ownerships, based on the Forestry Commission legal boundary as at 31 March 2011. (Table 2)
- The largest interpreted forest type across Scotland is conifer, representing 59% of all mapped woodland. Broadleaved interpreted forest type represents 14%. (Table 3)
- NFI mapped a total of 1,339,320 hectares of woodland with an extent of 2 hectares and over in Scotland. 44,090 hectares of the woodland mapped in Scotland was less than 2 hectares in extent. (Table 4)
- 72% of Forestry Commission mapped woodland in Scotland is conifer interpreted forest type and 3% is broadleaved. 52% of woodland in other ownerships in Scotland is conifer and 20% is broadleaved. (Table 5)
- The area in woodlands of 500 hectares or more in extent in Scotland represents 32% of the total woodland area. (Table 7)
- There are 79,355 woods over 0.5 hectare in Scotland, with a mean wood area of 17 hectares. There are 47,373 woods between 0.5 and 2 hectares in Scotland, with a mean wood area of 1 hectare. (Table 7)
- 56% of open areas within woodland in Scotland were interpreted as grass. (Table 8)
- NFI has mapped 83,529 hectares more woodland of 2 hectares and over compared to NIWT, representing an overall increase of 6%. This represents 17% of the land area as opposed to 16% represented by the NIWT estimate. (Table 14; based on 2 ha and over). 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, 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.

NFI 2011 woodland map

- 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 (1995-1998) and NFI (2011) woodland maps for GB

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;

NIWT mapped a total of 1,256 thousand hectares of woodlands with an extent of 2 hectares and over in Scotland. The total mapped woodland with an extent of 2 hectares and over included in the NFI 2011 woodland map in Scotland is 1,339 thousand hectares, a net difference in woodland area of 83 thousand hectares. This difference is the result of the inclusion of 242 thousand hectares of woodland not mapped by NIWT and the exclusion of 159 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 Scotland for the

additional area have estimated that 8% are due to methodology, 57% are due to afforestation and 35% are due to NIWT mapping errors. Similar results for the excluded areas have estimated 82% to be due to methodological differences, 2% due to land use change, 8% were mapped as young trees by NIWT but latest available imagery shows no sign of planting or other woodland transition stage and the remaining 8% were due to NIWT error or are not discernable 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 www.forestry.gov.uk/inventory. Section 4 explores such differences in more detail.

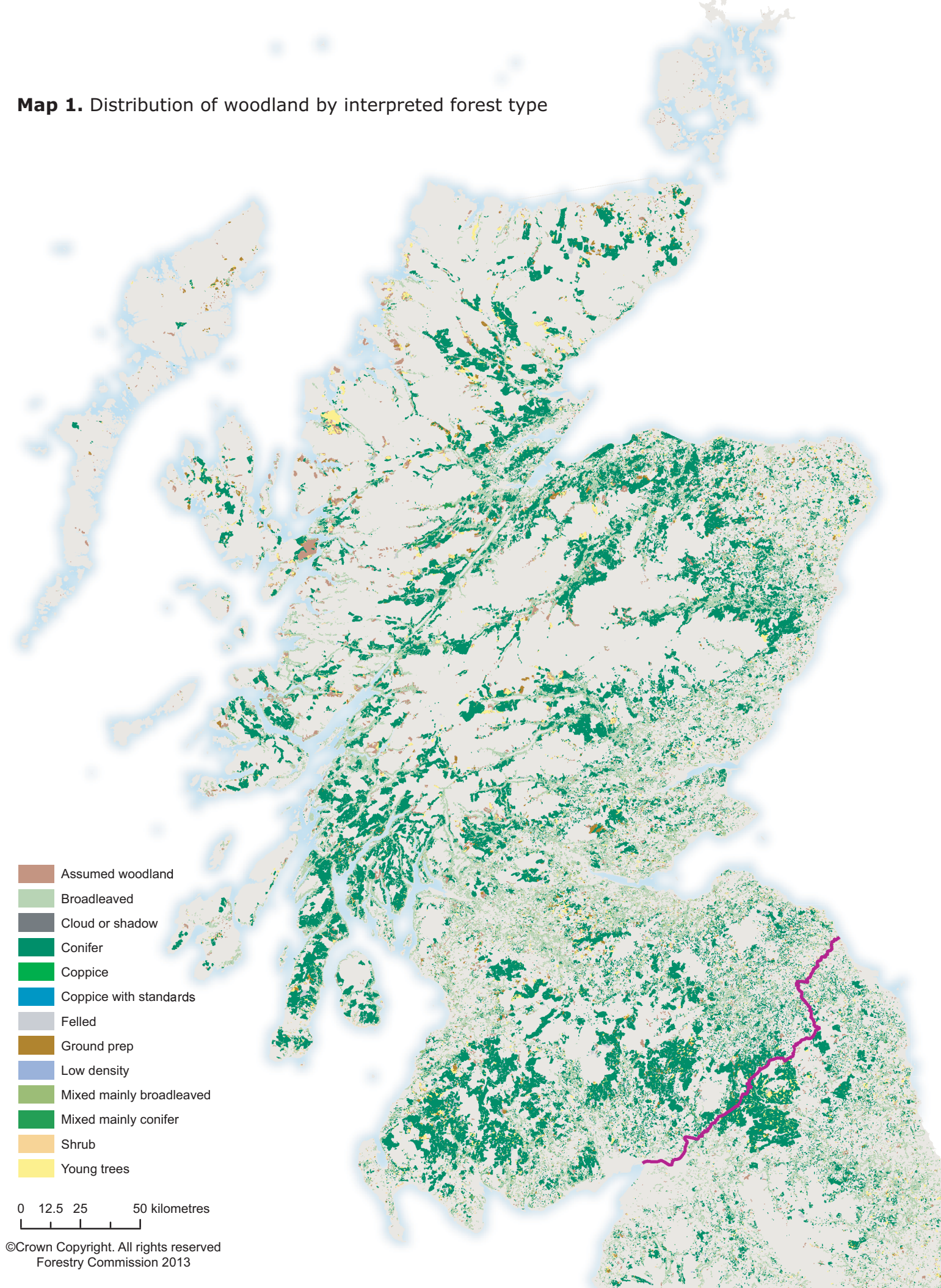
Results

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

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 GB. Note that the figures in some tables may not add to the totals due to rounding.

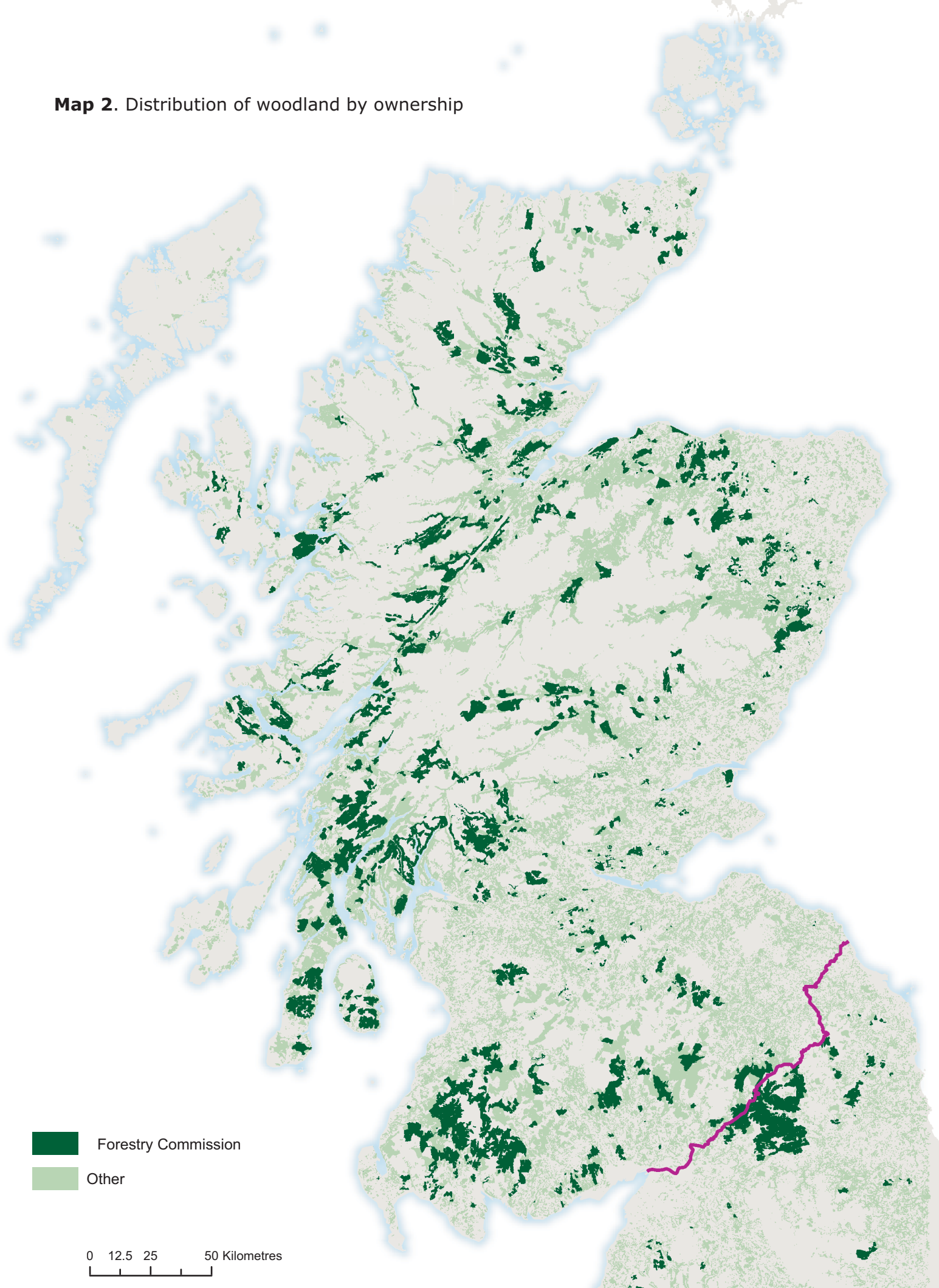
A total of 1,281,236 hectares were mapped as base data and an additional 100,863 hectares of assumed woodland and 1,310 hectares of low density woodland have since been included.

Map 1. Distribution of woodland by interpreted forest type

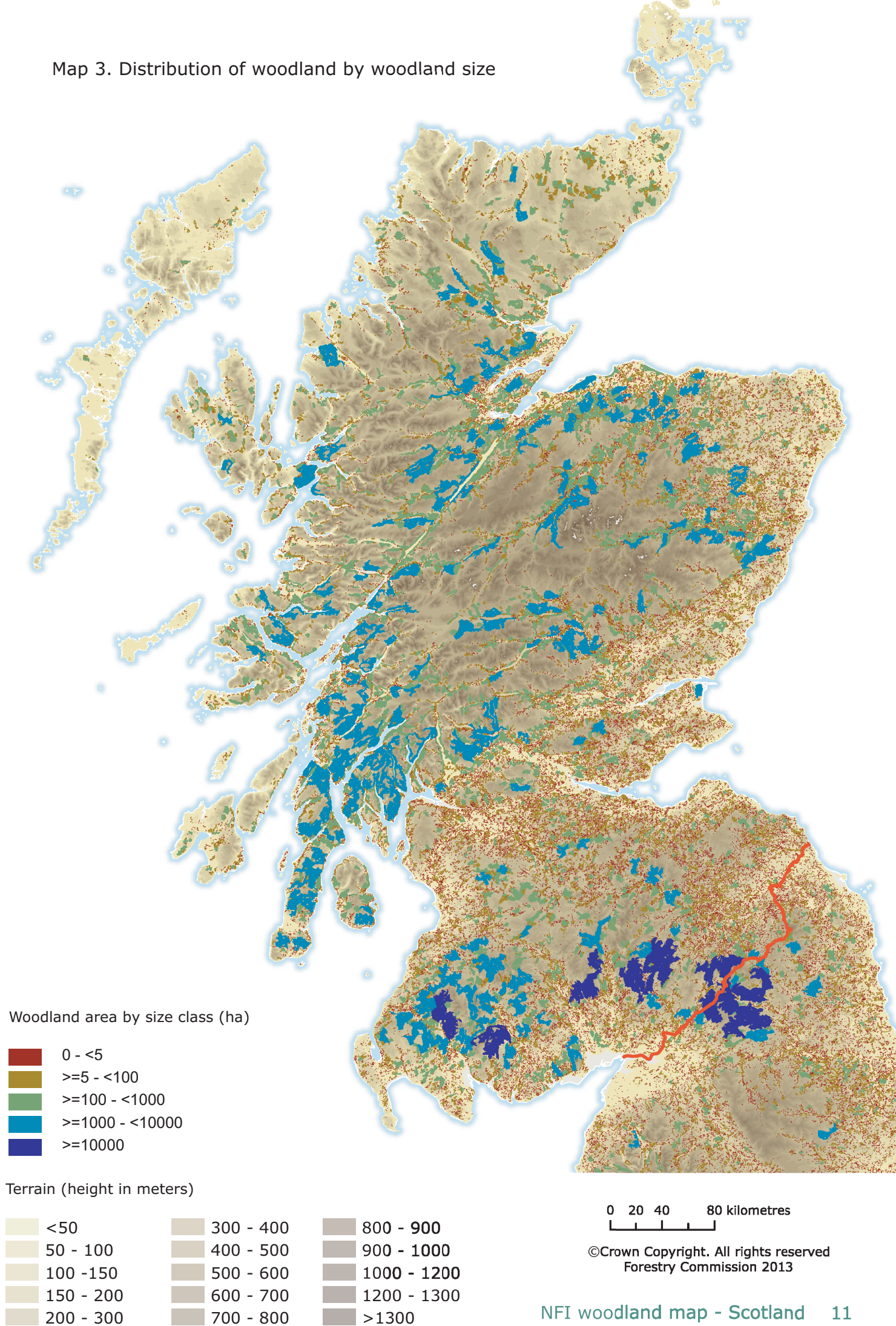


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Map 2. Distribution of woodland by ownership



Map 3. Distribution of woodland by woodland size

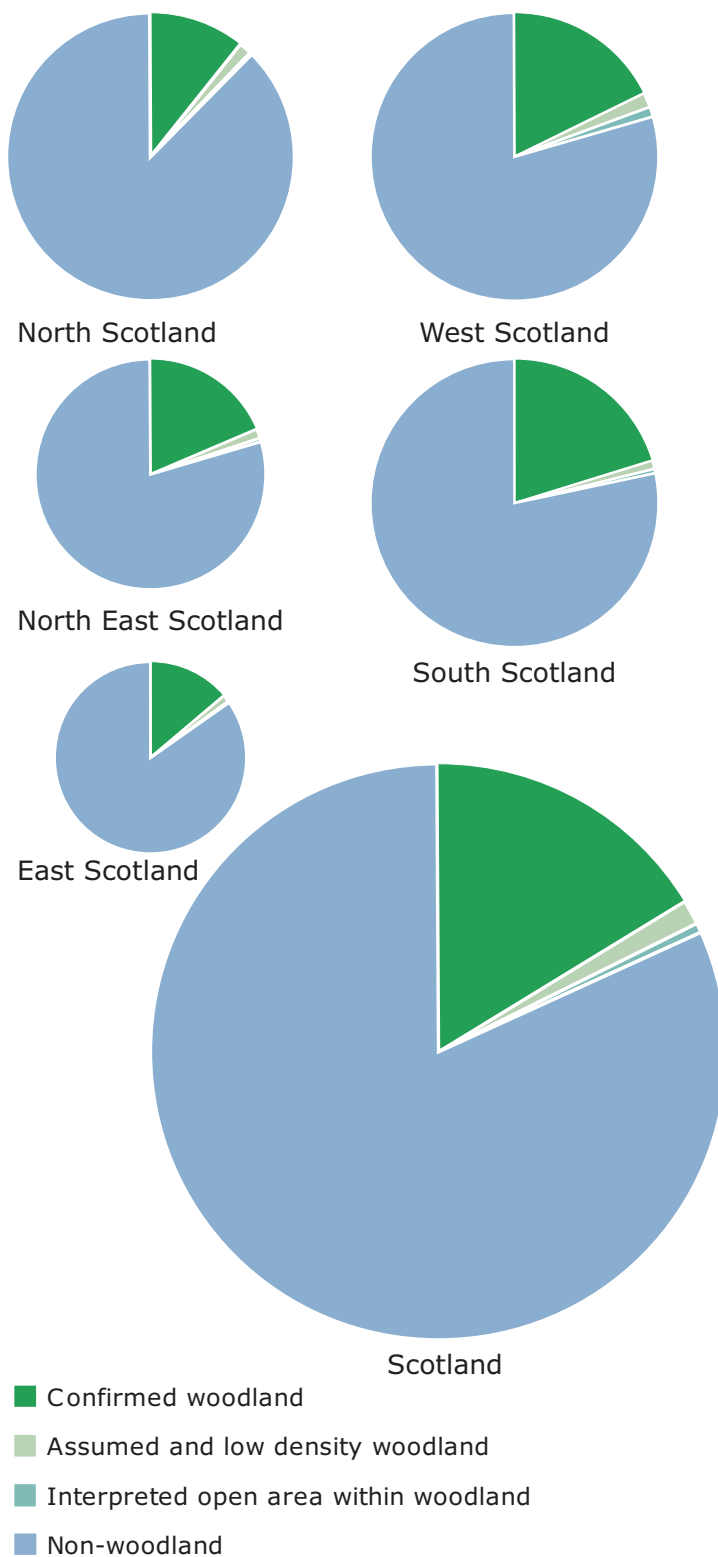


NFI 2011 woodland map

Table 1. Mapped area by woodland type and non woodland

Woodland Type	Area (ha)	%
North Scotland		
Woodland	199,853	89%
Assumed woodland	25,550	11%
Low Density	204	0%
Total mapped woodland	225,607	100%
% woodland land cover		12%
Mapped non woodland	8,379	
Total mapped area	233,986	
North East Scotland		
Woodland	215,356	93%
Assumed woodland	15,899	7%
Low Density	251	0%
Total mapped woodland	231,506	100%
% woodland land cover		20%
Mapped non woodland	6,767	
Total mapped area	238,273	
East Scotland		
Woodland	125,653	93%
Assumed woodland	8,764	7%
Low Density	143	0%
Total mapped woodland	134,560	100%
% woodland land cover		15%
Mapped non woodland	4,082	
Total mapped area	138,642	
West Scotland		
Woodland	337,399	91%
Assumed woodland	34,302	9%
Low Density	509	0%
Total mapped woodland	372,210	100%
% woodland land cover		20%
Mapped non woodland	17,121	
Total mapped area	389,331	
South Scotland		
Woodland	402,975	96%
Assumed woodland	16,348	4%
Low Density	204	0%
Total mapped woodland	419,526	100%
% woodland land cover		21%
Mapped non woodland	11,221	
Total mapped area	430,747	
All Scotland		
Woodland	1,281,236	93%
Assumed woodland	100,863	7%
Low Density	1,310	0%
Total mapped woodland	1,383,410	97%
% woodland land cover		18%
Mapped non woodland	47,570	
Total mapped area	1,430,980	

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



Note for table 1. The area of Scotland, excluding inland water, is 7,793,167 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

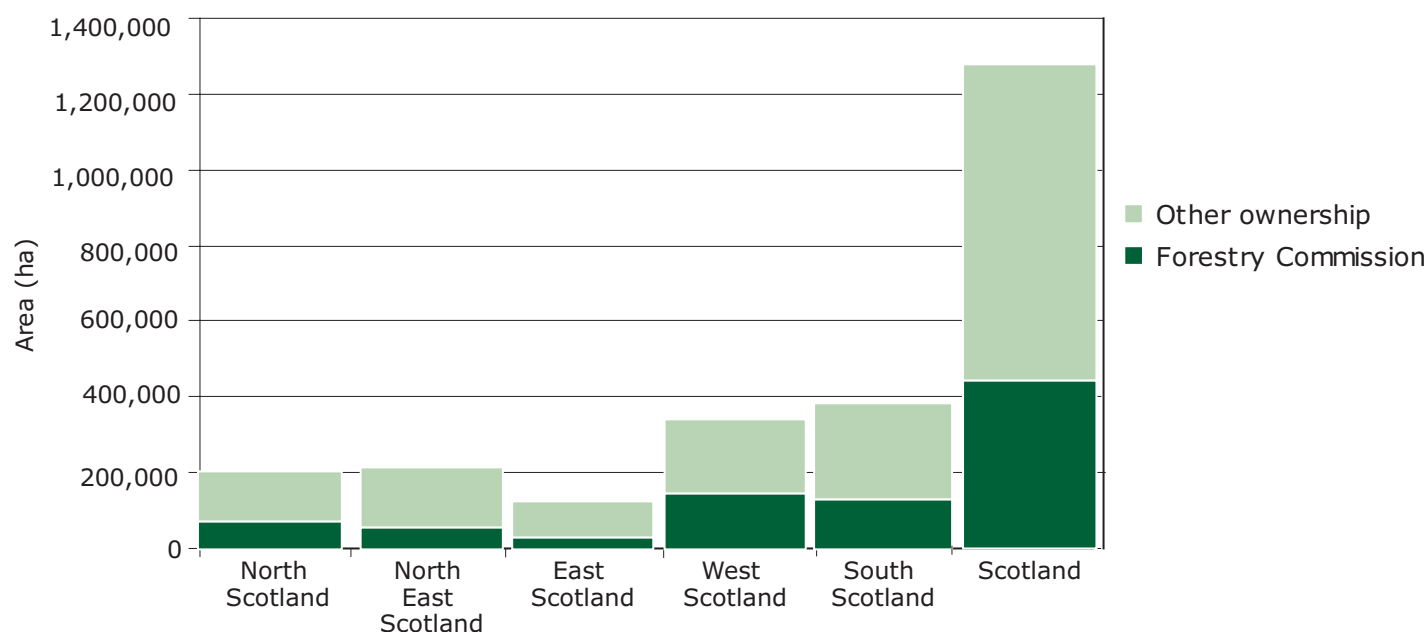
Table 2. Woodland area by ownership

Ownership	Ha	% Woodland
North Scotland		
Forestry Commission	81,048	36%
Other ownership	144,559	64%
Total area of woodland	225,607	100%
North East Scotland		
Forestry Commission	60,445	26%
Other ownership	171,061	74%
Total area of woodland	231,506	100%
East Scotland		
Forestry Commission	33,537	25%
Other ownership	101,024	75%
Total area of woodland	134,560	100%
West Scotland		
Forestry Commission	158,651	43%
Other ownership	213,560	57%
Total area of woodland	372,210	100%
South Scotland		
Forestry Commission	145,407	35%
Other ownership	274,119	65%
Total area of woodland	419,526	100%
Scotland		
Forestry Commission	479,087	35%
Other ownership	904,323	65%
Total area of woodland	1,383,410	100%

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



Figure 2b. Summary of woodland area by ownership



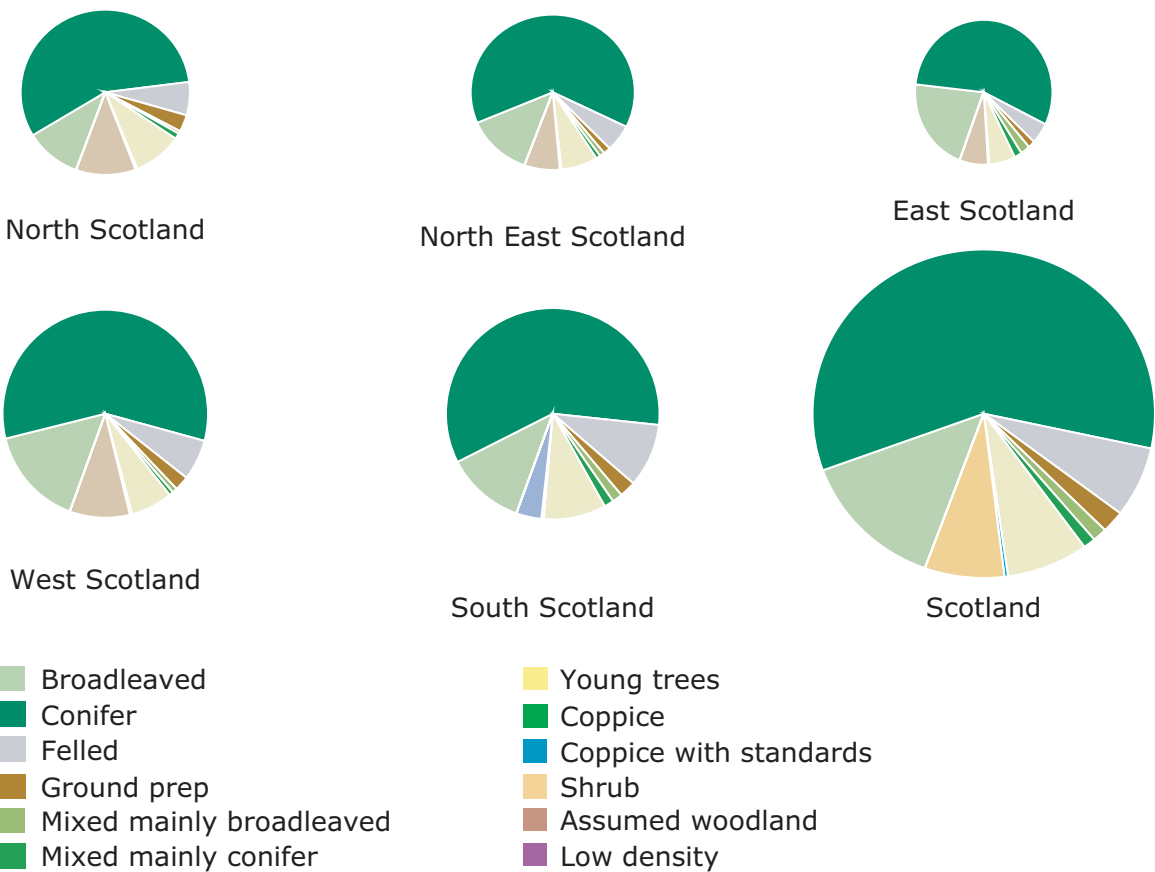
Note for Table 2. Based on Forestry Commission legal boundary dated 31 March 2011. Other ownership encompasses all woodland not owned by or leased to the Forestry Commission.

NFI 2011 woodland map

Table 3. Woodland area by interpreted forest type

Forest type	Total area	Percentage of total	Forest type	Total area (ha)	Percentage of total
North Scotland			West Scotland		
Broadleaved	24,655	11%	Broadleaved	57,430	15%
Conifer	127,619	57%	Conifer	216,619	58%
Felled	14,550	6%	Felled	23,793	6%
Ground prep	7,090	3%	Ground prep	8,587	2%
Mixed mainly broadleaved	1,753	1%	Mixed mainly broadleaved	2,480	1%
Mixed mainly conifer	2,362	1%	Mixed mainly conifer	2,000	1%
Young trees	21,384	9%	Young trees	25,476	7%
Coppice	0	0%	Coppice	0	0%
Coppice with standards	0	0%	Coppice with standards	0	0%
Shrub	439	0%	Shrub	980	0%
Assumed woodland	25,550	11%	Assumed woodland	34,302	9%
Low density	204	0%	Low density	509	0%
Cloud/shadow/uncertain	0	0%	Cloud/shadow/uncertain	37	0%
TOTALS	225,607	100%	TOTALS	372,210	100%
North East Scotland			South Scotland		
Broadleaved	30,497	13%	Broadleaved	49,696	12%
Conifer	146,871	63%	Conifer	249,056	59%
Felled	12,661	5%	Felled	39,963	10%
Ground prep	3,580	2%	Ground prep	10,590	3%
Mixed mainly broadleaved	2,507	1%	Mixed mainly broadleaved	7,622	2%
Mixed mainly conifer	2,237	1%	Mixed mainly conifer	5,590	1%
Young trees	16,292	7%	Young trees	39,043	9%
Coppice	0	0%	Coppice	4	0%
Coppice with standards	0	0%	Coppice with standards	0	0%
Shrub	710	0%	Shrub	1,410	0%
Assumed woodland	15,899	7%	Assumed woodland	16,348	4%
Low density	251	0%	Low density	204	0%
Cloud/shadow/uncertain	0	0%	Cloud/shadow/uncertain	0	0%
TOTALS	231,506	100%	TOTALS	419,526	100%
East Scotland			Scotland		
Broadleaved	28,566	21%	Broadleaved	190,844	14%
Conifer	74,697	56%	Conifer	814,864	59%
Felled	6,154	5%	Felled	97,121	7%
Ground prep	2,497	2%	Ground prep	32,343	2%
Mixed mainly broadleaved	2,857	2%	Mixed mainly broadleaved	17,219	1%
Mixed mainly conifer	2,361	2%	Mixed mainly conifer	14,551	1%
Young trees	8,208	6%	Young trees	110,403	8%
Coppice	0	0%	Coppice	4	0%
Coppice with standards	0	0%	Coppice with standards	0	0%
Shrub	312	0%	Shrub	3,851	0%
Assumed woodland	8,764	7%	Assumed woodland	100,863	7%
Low density	143	0%	Low density	1,310	0%
Cloud/shadow/uncertain	0	0%	Cloud/shadow/uncertain	37	0%
TOTALS	134,560	100%	TOTALS	1,383,410	100%

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



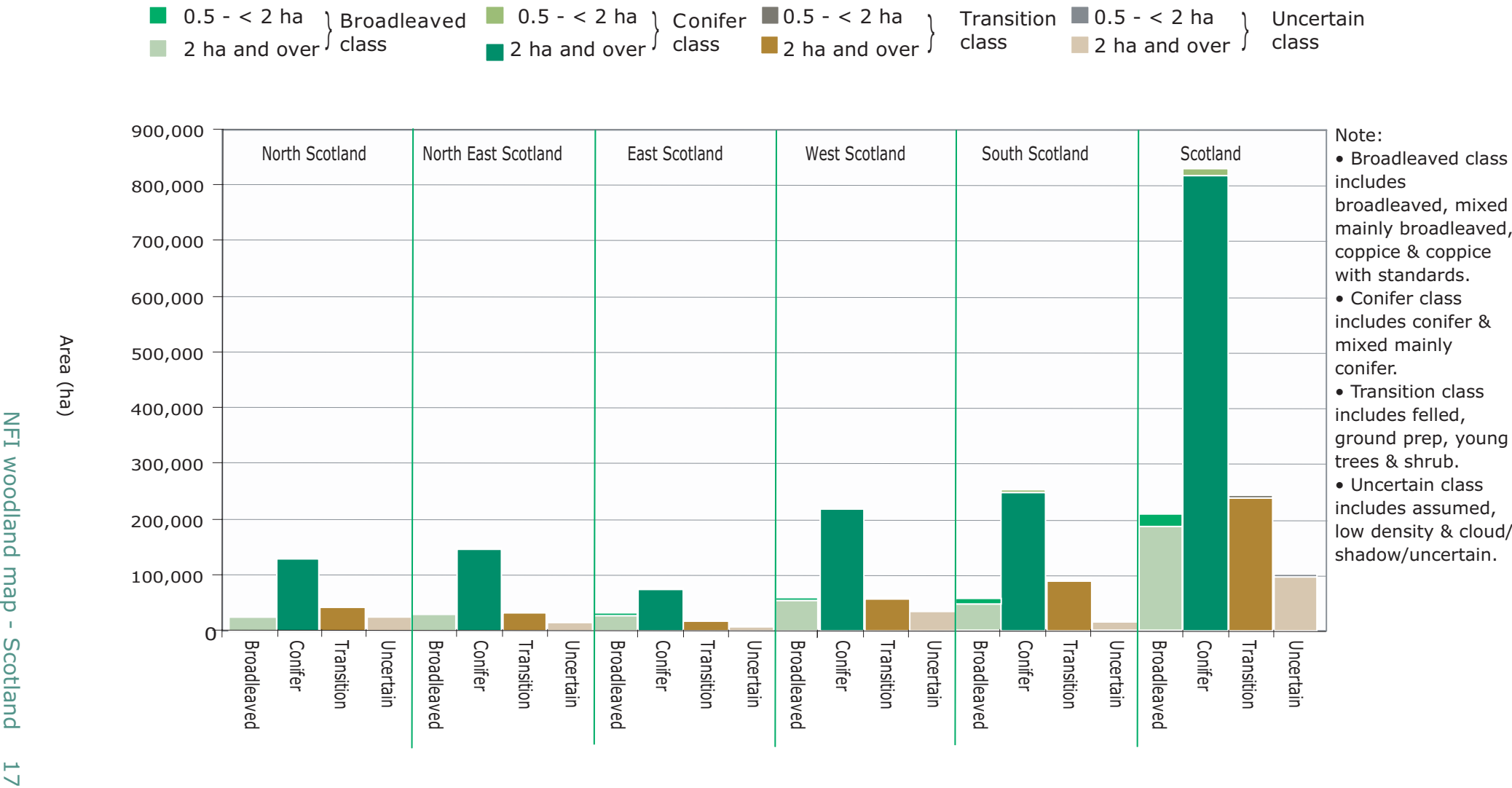
NFI 2011 woodland map

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

Forest type	Woodland Size		Total area (ha)	Forest type	Woodland Size		Total area (ha)
	2 ha and over	0.5 - < 2 ha			2 ha and over	0.5 - < 2 ha	
North Scotland				West Scotland			
Broadleaved	22,591	2,064	24,655	Broadleaved	53,258	4,172	57,430
Conifer	126,660	959	127,619	Conifer	215,753	867	216,619
Felled	14,513	37	14,550	Felled	23,759	33	23,793
Ground prep	7,007	83	7,090	Ground prep	8,517	69	8,58
Mixed mainly broadleaved	1,647	106	1,753	Mixed mainly broadleaved	2,327	152	2,480
Mixed mainly conifer	2,242	120	2,362	Mixed mainly conifer	1,858	142	2,000
Young trees	21,088	296	21,384	Young trees	25,264	212	25,476
Coppice	0	0	0	Coppice	0	0	0
Coppice with standards	0	0	0	Coppice with standards	0	0	0
Shrub	345	94	439	Shrub	775	205	980
Assumed woodland	24,958	592	25,550	Assumed woodland	33,617	684	34,302
Low density	202	2	204	Low density	503	6	509
Cloud/shadow/uncertain	0	0	0	Cloud/shadow/uncertain	35	2	37
TOTALS	221,254	4,353	225,607	TOTALS	365,665	6,545	372,210
North East Scotland				South Scotland			
Broadleaved	27,597	2,900	30,497	Broadleaved	41,752	7,945	49,696
Conifer	144,881	1,990	146,871	Conifer	244,266	4,790	249,056
Felled	12,614	47	12,661	Felled	39,785	178	39,963
Ground prep	3,556	25	3,580	Ground prep	10,505	85	10,590
Mixed mainly broadleaved	2,186	321	2,507	Mixed mainly broadleaved	6,365	1,257	7,622
Mixed mainly conifer	1,930	307	2,237	Mixed mainly conifer	4,576	1,014	5,590
Young trees	15,858	433	16,292	Young trees	38,034	1,009	39,043
Coppice	0	0	0	Coppice	4	0	4
Coppice with standards	0	0	0	Coppice with standards	0	0	0
Shrub	552	158	710	Shrub	923	487	1,410
Assumed woodland	14,911	988	15,899	Assumed woodland	14,283	2,065	16,348
Low density	247	3	251	Low density	202	2	204
Cloud/shadow/uncertain	0	0	0	Cloud/shadow/uncertain	0	0	0
TOTALS	224,333	7,173	231,506	TOTALS	400,694	18,833	419,527
East Scotland				Scotland			
Broadleaved	25,211	3,355	28,566	Broadleaved	170,408	20,435	190,844
Conifer	73,052	1,646	74,697	Conifer	804,611	10,253	814,864
Felled	6,113	41	6,154	Felled	96,785	337	97,122
Ground prep	2,465	32	2,497	Ground prep	32,049	294	32,343
Mixed mainly broadleaved	2,424	433	2,857	Mixed mainly broadleaved	14,950	2,269	17,219
Mixed mainly conifer	2,002	359	2,361	Mixed mainly conifer	12,608	1,942	14,551
Young trees	7,783	425	8,208	Young trees	108,027	2,376	110,403
Coppice	0	0	0	Coppice	4	0	4
Coppice with standards	0	0	0	Coppice with standards	0	0	0
Shrub	230	82	312	Shrub	2,825	1,026	3,851
Assumed woodland	7,951	813	8,764	Assumed woodland	95,722	5,142	100,863
Low density	143	0	143	Low density	1,296	14	1,310
Cloud/shadow/uncertain	0	0	0	Cloud/shadow/uncertain	35	2	37
TOTALS	127,374	7,187	134,560	TOTALS	1,339,320	44,090	1,383,410

NFI 2011 woodland map

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

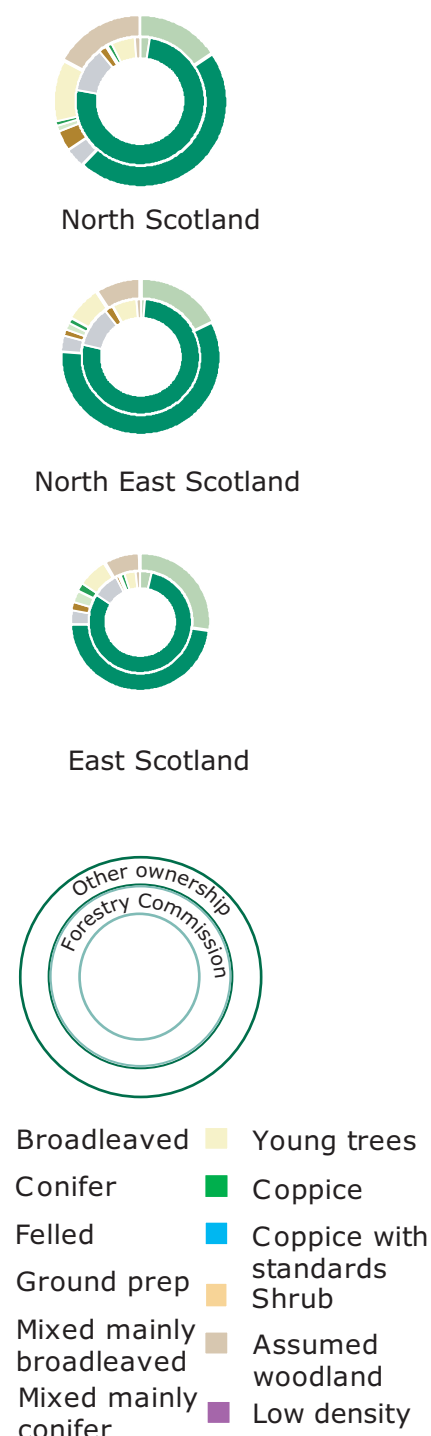


NFI 2011 woodland map

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 Scotland				
Broadleaved	2,020	2%	22,635	16%
Conifer	61,112	75%	66,507	46%
Felled	9,165	11%	5,385	4%
Ground prep	1,457	2%	5,633	4%
Mixed mainly broadleaved	476	1%	1,278	1%
Mixed mainly conifer	1,021	1%	1,341	1%
Young trees	4,673	6%	16,711	12%
Coppice	0	0%	0	0%
Coppice with standards	0	0%	0	0%
Shrub	30	0%	409	0%
Assumed woodland	1,078	1%	24,472	17%
Low density	17	0%	188	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	81,048	100%	144,559	100%
North East Scotland				
Broadleaved	625	1%	29,872	17%
Conifer	46,661	77%	100,211	59%
Felled	6,889	11%	5,773	3%
Ground prep	1,338	2%	2,242	1%
Mixed mainly broadleaved	157	0%	2,350	1%
Mixed mainly conifer	133	0%	2,104	1%
Young trees	3,948	7%	12,344	7%
Coppice	0	0%	0	0%
Coppice with standards	0	0%	0	0%
Shrub	66	0%	644	0%
Assumed woodland	628	1%	15,271	9%
Low density	0	0%	251	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	60,445	100%	171,061	100%
East Scotland				
Broadleaved	1,230	4%	27,335	27%
Conifer	26,892	80%	47,806	47%
Felled	2,843	8%	3,311	3%
Ground prep	272	1%	2,225	2%
Mixed mainly broadleaved	213	1%	2,643	3%
Mixed mainly conifer	406	1%	1,956	2%
Young trees	1,241	4%	6,968	7%
Coppice	0	0%	0	0%
Coppice with standards	0	0%	0	0%
Shrub	16	0%	296	0%
Assumed woodland	423	1%	8,341	8%
Low density	1	0%	142	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	33,537	100%	101,024	100%

Figure 5. Summary of woodland area by interpreted forest type and ownership



NFI 2011 woodland map

Table 5. Continued

Forest Type	Forestry Commission		Other ownership	
	Area (ha)	% of total area	Area (ha)	% of total area
West Scotland				
Broadleaved	8,155	5%	49,275	23%
Conifer	109,818	69%	106,802	50%
Felled	16,162	10%	7,631	4%
Ground prep	3,540	2%	5,047	2%
Mixed mainly broadleaved	868	1%	1,611	1%
Mixed mainly conifer	451	0%	1,549	1%
Young trees	13,521	9%	11,954	6%
Coppice	0	0%	0	0%
Coppice with standards	0	0%	0	0%
Shrub	154	0%	826	0%
Assumed woodland	5,893	4%	28,409	13%
Low density	85	0%	423	0%
Cloud/shadow/uncertain	4	0%	33	0%
TOTALS	158,651	100%	213,560	100%
South Scotland				
Broadleaved	1,647	1%	48,049	18%
Conifer	99,980	69%	149,077	54%
Felled	19,080	13%	20,883	8%
Ground prep	3,627	2%	6,962	3%
Mixed mainly broadleaved	569	0%	7,053	3%
Mixed mainly conifer	288	0%	5,302	2%
Young trees	18,062	12%	20,981	8%
Coppice	0	0%	4	0%
Coppice with standards	0	0%	0	0%
Shrub	34	0%	1,377	1%
Assumed woodland	2,057	1%	14,292	5%
Low density	63	0%	140	0%
Cloud/shadow/uncertain	0	0%	0	0%
TOTALS	145,407	100%	274,119	100%
Scotland				
Broadleaved	13,678	3%	177,166	20%
Conifer	344,462	72%	470,402	52%
Felled	54,139	11%	42,982	5%
Ground prep	10,234	2%	22,109	2%
Mixed mainly broadleaved	2,283	0%	14,936	2%
Mixed mainly conifer	2,299	0%	12,252	1%
Young trees	41,444	9%	68,958	8%
Coppice	0	0%	4	0%
Coppice with standards	0	0%	0	0%
Shrub	300	0%	3,552	0%
Assumed woodland	10,079	2%	90,784	10%
Low density	166	0%	1,144	0%
Cloud/shadow/uncertain	4	0%	33	0%
TOTALS	479,087	100%	904,323	100%

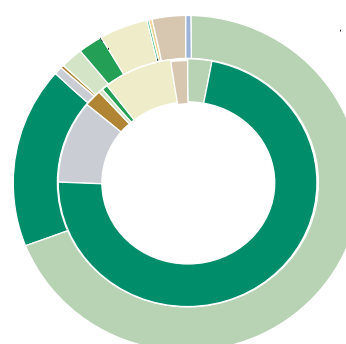
Figure 5. Continued



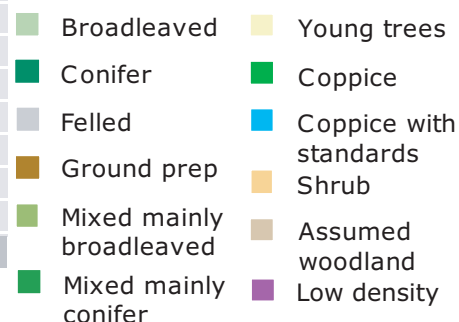
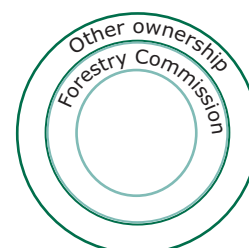
West Scotland



South Scotland



Scotland



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	Forestry Commission	Other	
North Scotland					
Broadleaved	1,973	20,618	47	2,017	24,655
Conifer	60,997	65,663	115	845	127,619
Felled	9,162	5,351	3	34	14,550
Ground prep	1,451	5,556	6	77	7,090
Mixed mainly broadleaved	472	1,175	3	103	1,753
Mixed mainly conifer	1,018	1,224	3	118	2,362
Young trees	4,659	16,429	13	283	21,384
Coppice	0	0	0	0	0
Coppice with standards	0	0	0	0	0
Shrub	28	317	2	92	439
Assumed woodland	1,007	23,951	70	521	25,550
Low density	17	186	0	2	204
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	80,785	140,468	263	4,091	225,607
North East Scotland					
Broadleaved	620	26,978	5	2,895	30,497
Conifer	46,626	98,255	35	1,955	146,871
Felled	6,887	5,727	2	45	12,661
Ground prep	1,338	2,218	0	25	3,580
Mixed mainly broadleaved	157	2,030	0	320	2,507
Mixed mainly conifer	131	1,799	2	305	2,237
Young trees	3,946	11,912	2	432	16,292
Coppice	0	0	0	0	0
Coppice with standards	0	0	0	0	0
Shrub	65	487	1	157	710
Assumed woodland	600	14,311	29	959	15,899
Low density	0	247	0	3	251
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	60,369	163,965	76	7,096	231,506
East Scotland					
Broadleaved	1,212	23,999	18	3,337	28,566
Conifer	26,867	46,185	25	1,621	74,697
Felled	2,841	3,272	2	39	6,154
Ground prep	270	2,194	2	31	2,497
Mixed mainly broadleaved	208	2,216	5	427	2,857
Mixed mainly conifer	401	1,600	4	355	2,361
Young trees	1,235	6,548	6	419	8,208
Coppice	0	0	0	0	0
Coppice with standards	0	0	0	0	0
Shrub	16	214	0	82	312
Assumed woodland	359	7,592	64	749	8,764
Low density	1	142	0	0	143
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	33,410	93,964	126	7,060	134,560

NFI 2011 woodland map

Table 6. Continued

Forest Type	2 ha and over		0.5 - < 2 ha		Total area (ha)
	Forestry Commission	Other	Forestry Commission	Other	
West Scotland					
Broadleaved	7,961	45,297	194	3,978	57,430
Conifer	109,688	106,065	130	737	216,619
Felled	16,151	7,608	11	23	23,793
Ground prep	3,522	4,995	18	51	8,587
Mixed mainly broadleaved	865	1,463	4	149	2,488
Mixed mainly conifer	444	1,414	7	135	2,000
Young trees	13,505	11,758	16	196	25,476
Coppice	0	0	0	0	0
Coppice with standards	0	0	0	0	0
Shrub	151	624	3	202	980
Assumed woodland	5,786	27,831	106	578	34,302
Low density	85	417	0	6	509
Cloud/shadow/uncertain	4	31	0	2	37
TOTALS	158,162	207,503	488	6,057	372,210
South Scotland					
Broadleaved	1,622	40,129	25	7,920	49,696
Conifer	99,875	144,391	105	4,685	249,056
Felled	19,076	20,708	4	175	39,963
Ground prep	3,624	6,881	4	81	10,590
Mixed mainly broadleaved	561	5,803	7	1,250	7,622
Mixed mainly conifer	285	4,291	3	1,011	5,590
Young trees	18,044	19,990	18	991	39,043
Coppice	0	4	0	0	4
Coppice with standards	0	0	0	0	0
Shrub	31	892	3	484	1,410
Assumed woodland	1,941	12,342	115	1,950	16,348
Low density	63	138	0	2	204
Cloud/shadow/uncertain	0	0	0	0	0
TOTALS	145,124	255,570	283	18,549	419,526
Scotland					
Broadleaved	13,388	157,020	290	20,146	190,844
Conifer	344,052	460,559	410	9,843	814,864
Felled	54,118	42,667	21	316	97,121
Ground prep	10,205	21,844	29	265	32,343
Mixed mainly broadleaved	2,263	12,686	20	2,249	17,219
Mixed mainly conifer	2,280	10,328	19	1,923	14,551
Young trees	41,389	66,638	55	2,321	110,403
Coppice	0	4	0	0	4
Coppice with standards	0	0	0	0	0
Shrub	291	2,535	9	1,017	3,851
Assumed woodland	9,694	86,028	385	4,757	100,863
Low density	166	1,130	0	14	1,310
Cloud/shadow/uncertain	4	31	0	2	37
TOTALS	477,850	861,469	1,237	42,853	1,383,410

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 7. Woodland area by size class distribution

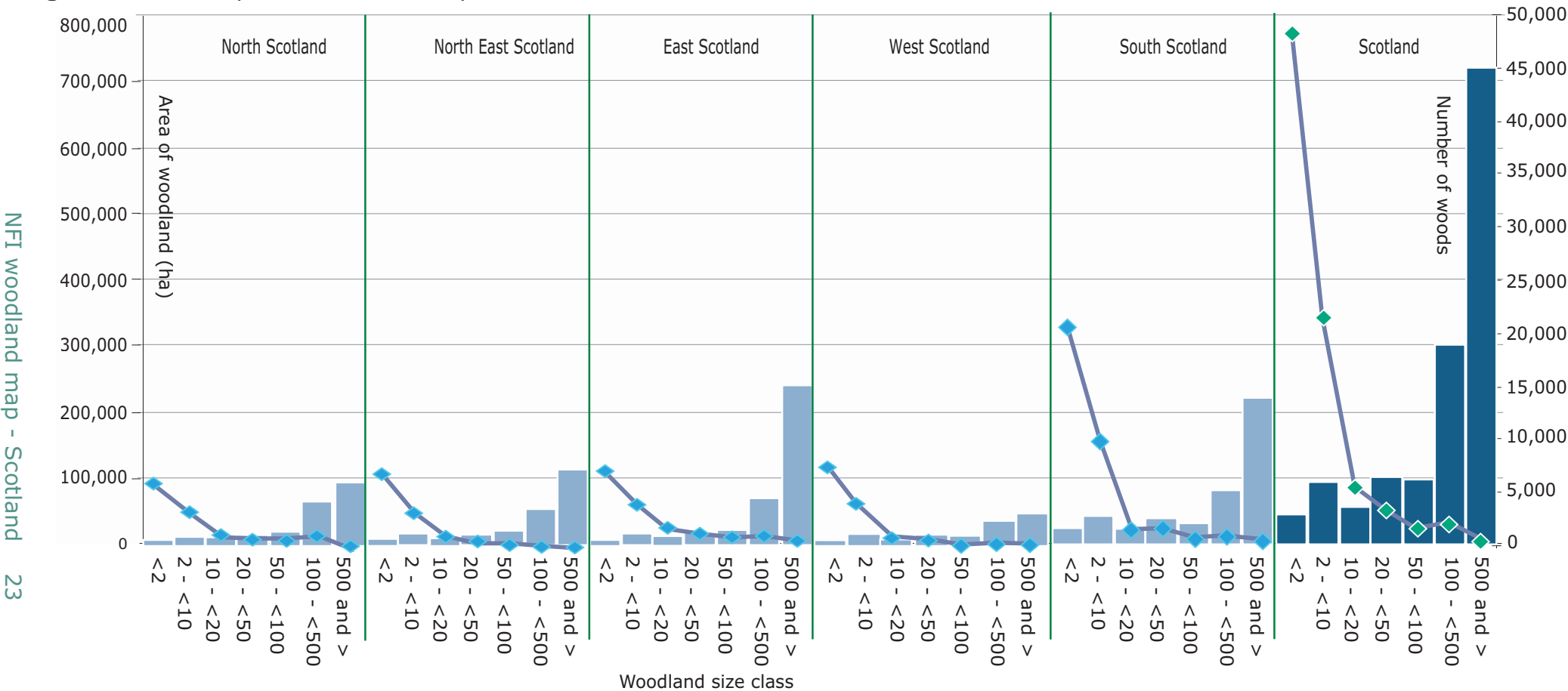
Size Class (ha)	Total area (ha)	Number of woods	Percentage of total area	Mean wood area
North Scotland				
<2	4,353	4,801	2%	1
2 - <10	11,091	2,478	5%	4
10 - <20	9,682	686	4%	14
20 - <50	18,057	567	8%	32
50 - <100	19,266	272	9%	71
100 - <500	64,639	303	29%	213
500 and >	98,518	82	44%	1,201
All woods	225,607	9,189	100%	25
North East Scotland				
<2	7,173	7,702	3%	1
2 - <10	15,565	3,584	7%	4
10 - <20	10,007	712	4%	14
20 - <50	18,415	586	8%	31
50 - <100	19,208	273	8%	70
100 - <500	51,096	244	22%	209
500 and >	110,041	84	48%	1,310
All woods	231,506	13,185	100%	18
East Scotland				
<2	7,187	7,421	5%	1
2 - <10	14,904	3,458	11%	4
10 - <20	8,168	594	6%	14
20 - <50	13,902	450	10%	31
50 - <100	12,748	184	9%	69
100 - <500	31,018	164	23%	189
500 and >	46,635	32	35%	1,457
All woods	134,560	12,303	100%	11
West Scotland				
<2	6,545	7,213	2%	1
2 - <10	14,286	3,287	4%	4
10 - <20	9,032	646	2%	14
20 - <50	18,243	576	5%	32
50 - <100	19,300	282	5%	68
100 - <500	73,326	356	20%	206
500 and >	231,478	144	62%	1,607
All woods	372,210	12,504	100%	30
South Scotland				
<2	18,833	20,263	4%	1
2 - <10	37,044	8,823	9%	4
10 - <20	19,514	1,407	5%	14
20 - <50	29,929	969	7%	31
50 - <100	24,529	351	6%	70
100 - <500	74,316	362	18%	205
500 and >	215,361	94	51%	2,291
All woods	419,527	32,269	100%	13
Scotland				
<2	44,090	47,373	3%	1
2 - <10	92,890	21,607	7%	4
10 - <20	56,403	4,041	4%	14
20 - <50	98,546	3,139	7%	31
50 - <100	95,051	1,357	7%	70
100 - <500	294,396	1,409	21%	209
500 and >	702,034	429	51%	1,636
All woods	1,383,410	79,355	100%	17

NFI 2011 woodland map

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

Broadleaved woodland class	% Area	Number of woods	Conifer woodland class	% Area	Number of woods
Scotland					
22,705	11%	24,212	12,195	1%	12,351
41,284	20%	14,167	32,076	4%	11,444
20,852	10%	3,933	22,300	3%	3,992
30,102	14%	4,427	44,039	5%	4,838
18,971	9%	2,857	50,924	6%	3,270
36,734	18%	5,654	183,551	22%	6,159
37,419	18%	8,280	484,330	58%	8,060
208,067	100%	63,530	829,414	100%	50,114

Figure 6. Summary of woodland area by size class distribution



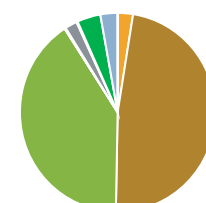
NFI 2011 woodland map

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

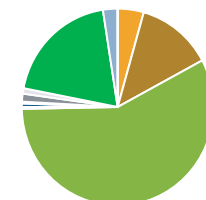
Interpreted open area	Total area (ha)	Percentage of total area	Interpreted open area	Total area (ha)	Percentage of total area
North Scotland			East Scotland		
Agricultural	213	3%	Agricultural	154	4%
Bare area	3,993	48%	Bare area	1,087	27%
Grass	3,411	41%	Grass	2,072	51%
Power line	1	0%	Power line	0	0%
Quarry	12	0%	Quarry	8	0%
River	10	0%	River	20	0%
Road	165	2%	Road	87	2%
Urban	20	0%	Urban	42	1%
Other vegetation	312	4%	Other vegetation	433	11%
Open water	243	3%	Open water	179	4%
Wind farm	0	0%	Wind farm	0	0%
Totals	8,379	100%	Totals	4,082	100%
North East Scotland			South Scotland		
Agricultural	297	4%	Agricultural	331	3%
Bare area	871	13%	Bare area	1,367	12%
Grass	3,894	58%	Grass	7,471	67%
Power line	18	0%	Power line	1	0%
Quarry	38	1%	Quarry	36	0%
River	6	0%	River	78	1%
Road	100	1%	Road	574	5%
Urban	59	1%	Urban	87	1%
Other vegetation	1,321	20%	Other vegetation	888	8%
Open water	163	2%	Open water	363	3%
Wind farm	0	0%	Wind farm	25	0%
Totals	6,767	100%	Totals	11,221	100%
West Scotland			Scotland		
Agricultural	19	0%	Agricultural	1,013	2%
Bare area	3,931	23%	Bare area	11,249	24%
Grass	9,785	57%	Grass	26,635	56%
Power line	0	0%	Power line	19	0%
Quarry	20	0%	Quarry	113	0%
River	15	0%	River	129	0%
Road	365	2%	Road	1,290	3%
Urban	45	0%	Urban	253	1%
Other vegetation	1,933	11%	Other vegetation	4,887	10%
Open water	1,008	6%	Open water	1,957	4%
Wind farm	0	0%	Wind farm	25	0%
Totals	17,121	100%	Totals	47,571	100%

Figure 7.

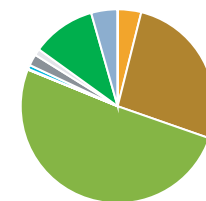
Summary of open areas in woodland by land-use type



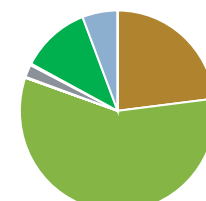
North Scotland



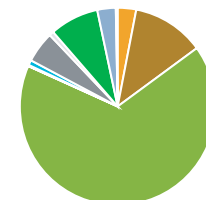
North East Scotland



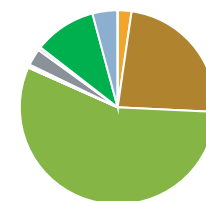
East Scotland



West Scotland



South Scotland



Scotland

Figure 7. Legend



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

The total woodland area on the 2011 NFI woodland map of Scotland is 1,383,410 hectares. The published NFI woodland area for Scotland for 2010 (National Forest Inventory Woodland Area Statistics: Scotland, NFI, 26 May 2011) was 1,385,000 hectares. After further correction and processing, the published 2010 woodland map contained a total woodland area of 1,375,087 hectares. The change in mapped woodland area from the 2010 to the 2011 woodland maps was 8,323 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.

Table 9. Comparison between 2010 and 2011 NFI woodland maps

Woodland type	2010		2011		Difference
	Area (ha)	%	Area (ha)	%	
Scotland					
Woodland	1,281,378	90%	1,281,236	90%	-141
Assumed woodland	92,983	7%	100,863	7%	7,880
Low density	727	0%	1,310	0%	584
Mapped non woodland	42,265	3%	47,570	3%	5,305
Total mapped area	1,417,352	100%	1,430,980	100%	13,628
% woodland land cover		18%		18%	

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
Scotland			
Published woodland area (26th May 2011)	1,385,000		
Removal of border polygons	-5,226		
Removal of duplicate polygons	-2,127		
Addition of missed base map polygons	1,940		
Deduction of assumed woodland area from non spatial records	-4,500		
Mapped Woodland	1,375,087	1,383,410	8,323
Mapped Non Woodland (IOA's)	42,265	47,570	5,305
Total mapped area	1,417,352	1,430,980	13,628

Note for Table 9. The net area of the woodland category removed from the 2010 map as part of the 2011 map update is 1,543 hectares. Of that area 164 hectares were due to land use change, and the remaining 1,379 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.

Note for Table 10. 4,500 hectares have been deducted to take account of the non-spatial element of paid grant schemes included in the published woodland area. This element is now available as spatial data and has been included in the 2011 update of the woodland map.

NFI 2011 woodland map

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

Woodland source	Source area (hectares)	Woodland type	Type area (hectares)
Scotland			
Base map corrections	1027	Non-woodland	32
		Woodland	995
NIWT comparison validation	547	Low density	430
		Woodland	117
Validated grant schemes	0	Assumed woodland	0
Grand total	1,575		1575

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

Woodland source	source area (ha)	Woodland type	type area (ha)
Scotland			
Remote sensing	10	Woodland	10
		Low density	1
Aerial photography update	2,199	woodland	58
		Low density	1
		Non woodland	2,141
NIWT comparison validation	2,626	woodland	1,685
		Low density	623
		Non woodland	319
New planting	9,597	Assumed Woodland	9,597
Additional mapping	769	woodland	8
		Low density	0
		Non woodland	762
Grand Total	15,203		15,203

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

	NFI 2010 Area (ha)	NFI 2011 Area (ha)
Scotland		
Total mapped area 2010	1,417,352	
Deducted from NFI 2010	1,575	
Added to NFI 2010		15,203
Total mapped area 2011		1,430,980

Section 3 - Summary of differences between NIWT 1995 and NFI 2011 woodland maps for Scotland

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 in area based on interpreted forest type. Tables 16 to 18 provide an overall summary of the changes in area between the two maps.

NFI 2011 woodland map

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.

Table 14. Differences in woodland area by interpreted forest type between NIWT (1995) release and NFI 2011 (based on woodlands 2 hectares and over)

Forest Type	NIWT - 1995 Inventory		NFI - 2011 Inventory 2 ha and over		Difference NFI-NIWT
	area (ha)	%	area (ha)	%	
North Scotland					
Broadleaved	19,536	10%	22,591	10%	3,055
Conifer	88,072	44%	126,660	57%	38,588
Felled	2,303	1%	14,513	7%	12,210
Ground prep	31,372	16%	7,007	3%	-24,364
Mixed	9,266	5%	3,889	2%	-5,377
Young trees	48,030	24%	46,046	21%	-1,984
Coppice	0	0%	0	0%	0
Coppice with standards	0	0%	0	0%	0
Shrub	2,244	1%	547	0%	-1,697
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	200,823	100%	221,254	100%	20,431
% of land area		11%		12%	
North East Scotland					
Broadleaved	16,604	8%	27,597	12%	10,993
Conifer	126,425	63%	144,881	65%	18,456
Felled	6,679	3%	12,614	6%	5,935
Ground prep	10,957	5%	3,556	2%	-7,402
Mixed	13,247	7%	4,117	2%	-9,130
Young trees	26,290	13%	30,769	14%	4,479
Coppice	0	0%	0	0%	0
Coppice with standards	0	0%	0	0%	0
Shrub	1,973	1%	799	0%	-1,174
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	202,175	100%	224,333	100%	22,158
% of land area		18%		19%	
East Scotland					
Broadleaved	13,595	12%	25,211	20%	11,615
Conifer	50,154	44%	73,052	57%	22,898
Felled	2,938	3%	6,113	5%	3,175
Ground prep	16,126	14%	2,465	2%	-13,662
Mixed	20,194	18%	4,426	3%	-15,768
Young trees	10,363	9%	15,734	12%	5,371
Coppice	0	0%	0	0%	0
Coppice with standards	0	0%	0	0%	0
Shrub	577	1%	373	0%	-204
Cloud/shadow/uncertain	0	0%	0	0%	0
Total	113,948	100%	127,374	100%	13,426
% of land area		13%		14%	

NFI 2011 woodland map

Table 14. Continued

Forest Type	NIWT - 1995 Inventory		NFI - 2011 Inventory 2 ha and over		Difference NFI-NIWT
	area (ha)	%	area (ha)	%	
West Scotland					
Broadleaved	40,056	11%	53,258	15%	13,202
Conifer	140,902	40%	215,753	59%	74,851
Felled	9,546	3%	23,759	6%	14,213
Ground prep	53,495	15%	8,517	2%	-44,978
Mixed	18,375	5%	4,185	1%	-14,190
Young trees	88,187	25%	58,881	16%	-29,306
Coppice	0	0%	0	0%	0
Coppice with standards	0	0%	0	0%	0
Shrub	364	0%	1,278	0%	913
Cloud / shadow / uncertain	0	0%	35	0%	35
Total	350,925	100%	365,666	100%	14,741
% of land area		18%		19%	
South Scotland					
Broadleaved	14,077	4%	41,752	10%	27,674
Conifer	222,263	57%	244,266	61%	22,003
Felled	9,624	2%	39,785	10%	30,161
Ground prep	42,008	11%	10,505	3%	-31,503
Mixed	27,231	7%	10,941	3%	-16,290
Young trees	70,045	18%	52,317	13%	-17,728
Coppice	0	0%	4	0%	4
Coppice with standards	0	0%	0	0%	0
Shrub	2,673	1%	1,125	0%	-1,547
Cloud / shadow / uncertain	0	0%	0	0%	0
Total	387,920	100%	400,694	100%	12,774
% of land area		20%		20%	
All Scotland					
Broadleaved	103,868	8%	170,408	13%	66,540
Conifer	627,815	50%	804,611	60%	176,796
Felled	31,090	2%	96,785	7%	65,695
Ground prep	153,958	12%	32,049	2%	-121,909
Mixed	88,313	7%	27,558	2%	-60,755
Young trees	242,915	19%	203,748	15%	-39,166
Coppice	0	0%	4	0%	4
Coppice with standards	0	0%	0	0%	0
Shrub	7,831	1%	4,122	0%	-3,710
Cloud / shadow / uncertain	0	0%	35	0%	35
Total	1,255,791	100%	1,339,320	100%	83,529
% of land area	16%		17%		

NFI 2011 woodland map

Table 15. Differences in woodland area in hectares by interpreted forest type and ownership between NIWT (1995) release and NFI 2011 (based on woodlands 2 hectares and over)

Forest type area (ha)	NIWT - 1995 Inventory		NFI - 2011 Inventory		Difference from NIWT to NFI	
	FC	Other	FC	Other	FC	Other
North Scotland						
Broadleaved	1,324	18,212	1,973	20,618	649	2,406
Conifer	54,604	33,468	60,997	65,663	6,393	32,194
Felled	1,268	1,035	9,162	5,351	7,894	4,317
Ground prep	9,690	21,681	1,451	5,556	-8,239	-16,125
Mixed	2,672	6,594	1,490	2,399	-1,182	-4,195
Young trees	23,279	24,751	5,667	40,380	-17,612	15,629
Coppice	0	0	0	0	0	0
Coppice with standards	0	0	0	0	0	0
Shrub	55	2,189	45	502	-10	-1,687
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	92,893	107,930	80,785	140,468	-12,108	32,538
% of land cover	5%	6%	4%	8%		
North East Scotland						
Broadleaved	169	16,435	620	26,978	451	10,543
Conifer	52,933	73,492	46,626	98,255	-6,307	24,763
Felled	2,781	3,898	6,887	5,727	4,106	1,829
Ground prep	2,538	8,419	1,338	2,218	-1,200	-6,202
Mixed	761	12,485	288	3,829	-473	-8,657
Young trees	5,431	20,859	4,546	26,224	-885	5,365
Coppice	0	0	0	0	0	0
Coppice with standards	0	0	0	0	0	0
Shrub	56	1,917	65	734	9	-1,183
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	64,669	137,506	60,369	163,965	-4,300	26,458
% of land cover	6%	12%	5%	14%		
East Scotland						
Broadleaved	308	13,287	1,212	23,999	904	10,711
Conifer	25,253	24,901	26,867	46,185	1,614	21,284
Felled	1,256	1,682	2,841	3,272	1,585	1,590
Ground prep	3,897	12,229	270	2,194	-3,627	-10,035
Mixed	3,217	16,977	610	3,816	-2,607	-13,161
Young trees	4,873	5,490	1,594	14,141	-3,280	8,651
Coppice	0	0	0	0	0	0
Coppice with standards	0	0	0	0	0	0
Shrub	55	522	16	357	-39	-165
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	38,859	75,089	33,410	93,964	-5,449	18,875
% of land cover	4%	8%	4%	10%		

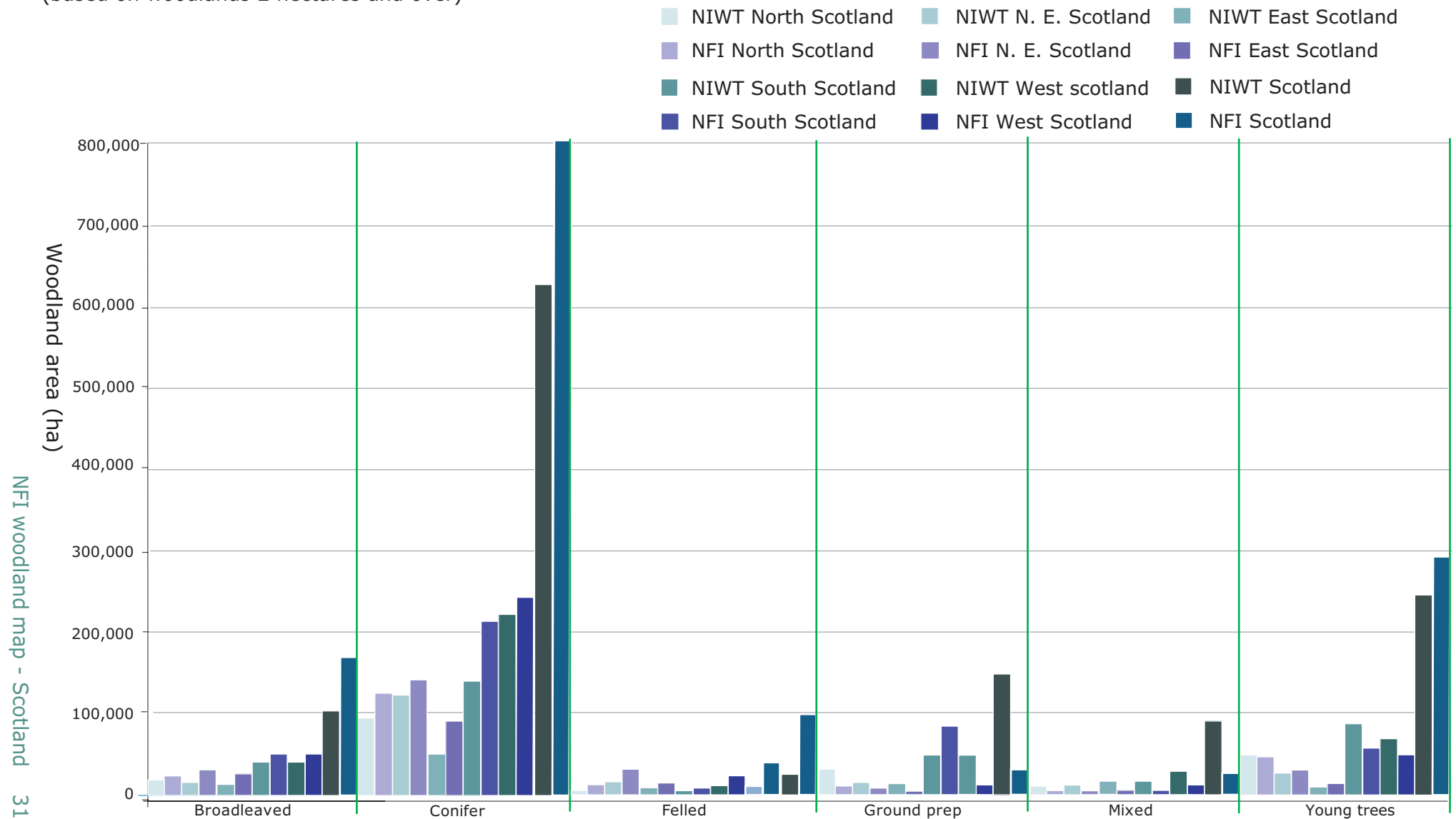
NFI 2011 woodland map

Table 15. Continued

Forest type area (ha)	NIWT - 1995 Inventory		NFI - 2011 Inventory		Difference from NIWT to NFI	
	FC	Other	FC	Other	FC	Other
West Scotland						
Broadleaved	3,474	36,582	7,961	45,297	4,487	8,715
Conifer	101,465	39,437	109,688	106,065	8,223	66,628
Felled	8,230	1,316	16,151	7,608	7,921	6,292
Ground prep	19,157	34,339	3,522	4,995	-15,635	-29,343
Mixed	4,034	14,341	1,309	2,876	-2,725	-11,465
Young trees	47,606	40,580	19,292	39,589	-28,315	-991
Coppice	0	0	0	0	0	0
Coppice with standards	0	0	0	0	0	0
Shrub	6	358	237	1,041	230	683
Cloud/shadow/uncertain	0	0	4	31	4	31
Total	183,971	166,954	158,162	207,503	-25,809	40,549
% of land cover	10%	9%	8%	11%		
South Scotland						
Broadleaved	515	13,562	1,622	40,129	1,107	26,567
Conifer	112,168	110,094	99,875	144,391	-12,294	34,297
Felled	5,527	4,096	19,076	20,708	13,549	16,612
Ground prep	8,760	33,247	3,624	6,881	-5,136	-26,367
Mixed	720	26,512	847	10,094	127	-16,418
Young trees	30,183	39,862	19,985	32,332	-10,198	-7,530
Coppice	0	0	0	4	0	4
Coppice with standards	0	0	0	0	0	0
Shrub	15	2,657	94	1,031	79	-1,627
Cloud/shadow/uncertain	0	0	0	0	0	0
Total	157,889	230,031	145,124	255,570	-12,765	25,539
% of land cover	8%	12%	7%	13%		
Scotland						
Broadleaved	5,790	98,078	13,388	157,020	7,598	58,942
Conifer	346,423	281,392	344,052	460,559	-2,371	179,167
Felled	19,063	12,027	54,118	42,667	35,055	30,639
Ground prep	44,042	109,916	10,205	21,844	-33,837	-88,072
Mixed	11,403	76,910	4,544	23,015	-6,859	-53,896
Young trees	111,373	131,542	51,083	152,665	-60,290	21,123
Coppice	0	0	0	4	0	4
Coppice with standards	0	0	0	0	0	0
Shrub	187	7,644	457	3,665	270	-3,979
Cloud/shadow/uncertain	0	0	4	31	4	31
Total	538,281	717,510	477,851	861,469	-60,431	143,960
% of land cover	7%	9%	6%	11%		

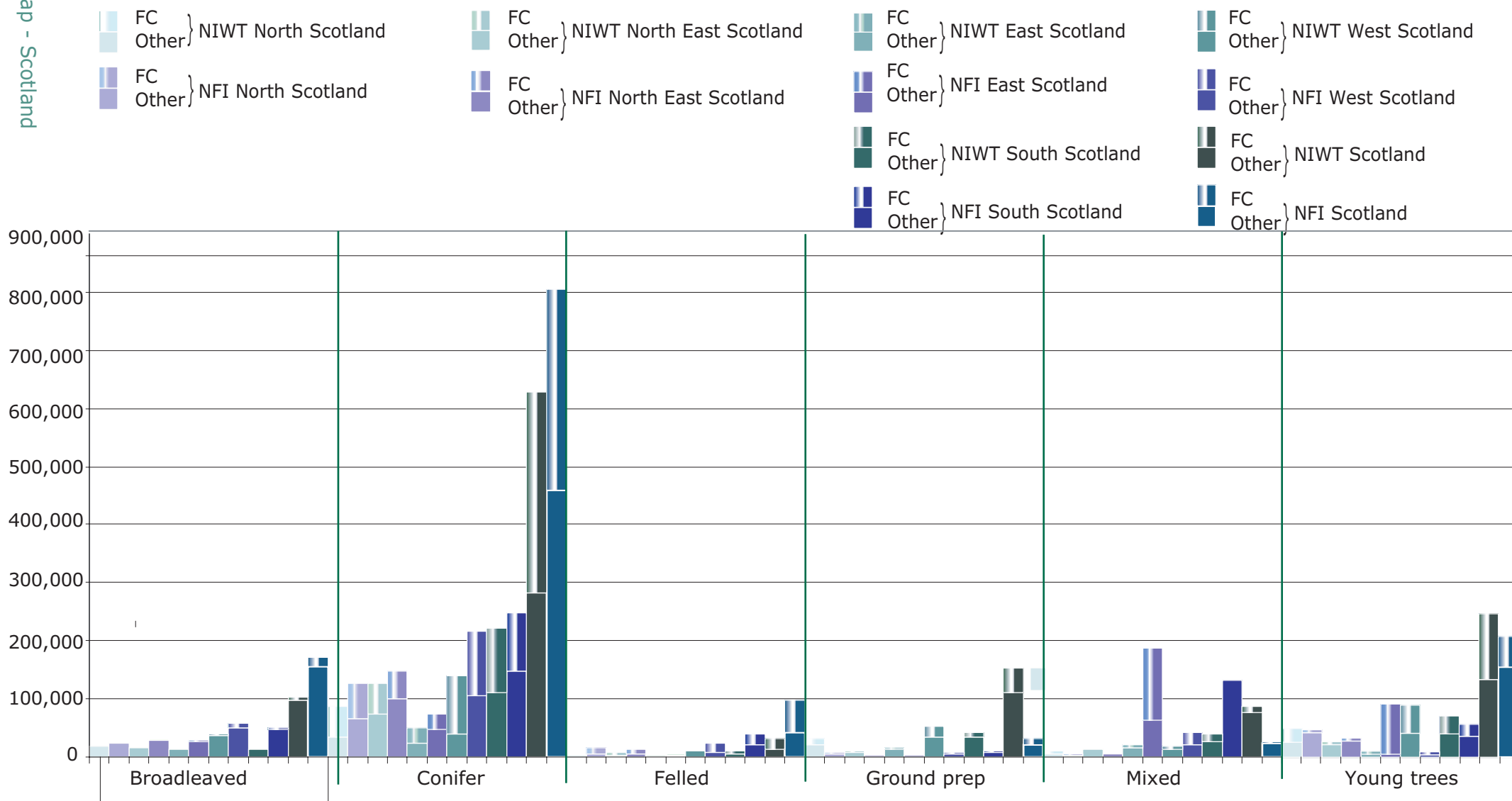
NFI 2011 woodland map

Figure 8. Summary of differences in woodland area by interpreted forest type and ownership between NIWT (1995) release and NFI (2011) (based on woodlands 2 hectares and over)



NFI 2011 woodland map

Figure 9. Summary of differences in woodland area by interpreted forest type and ownership between NIWT (1995) 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 woodland 2 ha and over)

Source of change	Source area (ha)	Woodland type	Type area (ha)	IFT/IOA	IFT/IOA area (ha)
Scotland					
Remote Sensing	694	Woodland	578	Broadleaved	0
				Conifer	0
				Felled	573
				Mixed mainly broadleaved	0
				Mixed mainly conifer	1
				Young trees	4
		Low density	116	Low density	116
Aerial photography update	147	Woodland	69	Broadleaved	30
				Conifer	12
				Felled	2
				Ground prep	2
				Mixed mainly broadleaved	5
				Mixed mainly conifer	2
				Young trees	14
				Shrub	2
		Low density	79	Low density	79
Validated potential change polygons	247	Woodland	51	Broadleaved	13
				Conifer	8
				Felled	12
				Mixed mainly broadleaved	1
				Mixed mainly conifer	0
				Young trees	11
				Shrub	6
		Low Density	196	Low Density	196
Assumed woodland	84,147	Assumed woodland	84,147	Assumed woodland	84,147
Additional woodland mapped as NFI but not identified as NIWT	157,212	Woodland	157,212	Broadleaved	46,000
				Conifer	52,632
				Felled	2,084
				Ground prep	10,392
				Mixed mainly broadleaved	3,677
				Mixed mainly conifer	2,906
				Young trees	37,815
				Coppice	4
				Shrub	1,690
				Cloud/shadow/uncertain	11
TOTALS	242,448		242,448		242,448

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 (ha)
Scotland	
Broadleaved	27,169
Conifer	40,708
Coppice	0
Coppice with standards	0
Felled	3,544
Ground prep	24,670
Mixed	17,801
Shrub	5,537
Young trees	39,491
Total	158,919

Table 18. Summary of change between NIWT 1995 and NFI 2011

	NIWT 1995	NFI 2011
Scotland		
Total woodland area	1,255,791	
Deducted from NIWT 1995	158,919	
Added post NIWT 1995		242,448
		1,339,320

Figure 10. Summary of net changes from NIWT to NFI

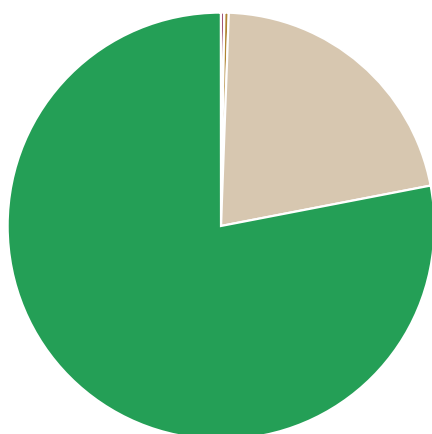


Table 16 (additions)
categorised by source of update

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

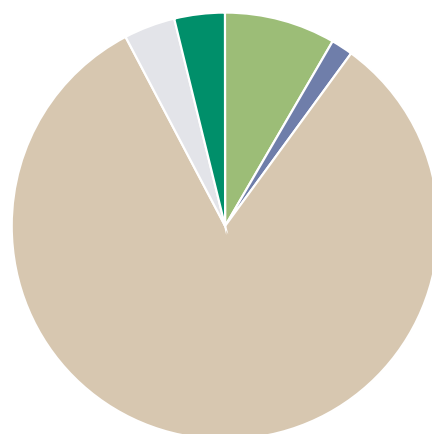


Table 17 (deletions)
categorised by type of change

- 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 Scotland in Table 19 and summarised in Figure 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 for 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 Scotland

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 Scotland					West Scotland				
All conifers	65	79	3	144	All conifers	116	107	2	224
Sitka spruce	16	28	8	45	Sitka spruce	90	87	3	176
Scots pine	17	20	13	38	Scots pine	3	4	25	6
Corsican pine	0	0	108	0	Corsican pine	0	1	58	1
Norway spruce	1	1	50	2	Norway spruce	3	1	54	4
Larches	4	3	25	7	Larches	7	6	18	13
Douglas fir	2	1	40	3	Douglas fir	1	0	72	1
Lodgepole pine	24	24	9	48	Lodgepole pine	11	7	17	19
Other conifers	1	0	73	1	Other conifers	1	3	35	4
North East Scotland					South Scotland				
All conifers	50	125	2	175	All conifers	115	167	2	282
Sitka spruce	19	24	10	42	Sitka spruce	92	133	3	225
Scots pine	16	78	5	94	Scots pine	2	7	17	10
Corsican pine	1	0	108	1	Corsican pine	0	0	65	0
Norway spruce	2	3	29	5	Norway spruce	3	7	18	10
Larches	5	11	15	15	Larches	8	13	12	21
Douglas fir	1	2	32	3	Douglas fir	1	1	33	2
Lodgepole pine	6	6	23	11	Lodgepole pine	7	4	25	11
Other conifers	1	2	39	2	Other conifers	1	1	30	2
East Scotland					Scotland				
All conifers	28	54	5	82	All conifers	374.1	532.1	1	906.2
Sitka spruce	12	22	7	35	Sitka spruce	229.3	294.0	2	523.3
Scots pine	6	17	15	23	Scots pine	45.1	126.0	4	171.1
Corsican pine	0	0	0	0	Corsican pine	1.6	1.4	41	3.0
Norway spruce	1	3	25	4	Norway spruce	10.9	15.0	12	25.9
Larches	2	9	13	12	Larches	26.4	42.0	7	68.4
Douglas fir	1	0	33	1	Douglas fir	5.4	5.1	19	10.5
Lodgepole pine	4	1	45	5	Lodgepole pine	52.1	42.0	7	94.1
Other conifers	0	1	36	1	Other conifers	3.3	6.4	19	9.8

NFI 2011 woodland map

The total stocked area of conifer in Scotland, according to table 19 is 906,200 hectares. This compares to the total area of conifer IFT on the 2011 NFI map of 829,414 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, whether in pure stands of conifer or in mixed stands with broadleaves 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 Scotland (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 Scotland in Table 20 and summarised in Figure 11.

Table 20. Stocked area by principal broadleaved species for Scotland

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 Scotland					West Scotland				
All broadleaves	4.3	29.6	6	33.9	All broadleaves	12.0	57.8	6	69.8
Oak	0.1	1.2	55	1.3	Oak	1.5	8.9	21	10.4
Beech	0.0	0.8	60	0.8	Beech	0.2	2.5	32	2.6
Sycamore	0.0	0.5	79	0.5	Sycamore	0.1	1.4	55	1.4
Ash	0.0	1.1	45	1.1	Ash	0.2	1.1	43	1.3
Birch	2.7	18.9	8	21.6	Birch	4.5	28.0	12	32.4
Sweet chestnut	0.0	0.0	0	0.0	Sweet chestnut	0.0	0.0	0	0.0
Hazel	0.0	0.9	72	0.9	Hazel	0.2	2.7	29	2.9
Hawthorn	0.0	0.0	0	0.0	Hawthorn	0.0	0.2	53	0.2
Alder	0.1	2.8	36	2.9	Alder	0.3	4.7	24	5.0
Willow	0.0	0.6	41	0.6	Willow	0.0	1.2	28	1.2
Other broadleaves	1.3	2.9	25	4.2	Other broadleaves	5.1	6.9	21	12.1
North East Scotland					South Scotland				
All broadleaves	2.7	39.1	6	41.8	All broadleaves	6.8	74.5	5	81.4
Oak	0.1	2.5	40	2.6	Oak	0.6	7.9	14	8.5
Beech	0.1	2.0	44	2.1	Beech	0.2	5.5	18	5.7
Sycamore	0.0	1.4	41	1.4	Sycamore	0.1	10.6	11	10.8
Ash	0.0	0.2	42	0.3	Ash	0.1	9.0	15	9.1
Birch	0.9	26.1	8	27.0	Birch	0.7	19.9	10	20.6
Sweet chestnut	0.0	0.0	0	0.0	Sweet chestnut	0.0	0.0	0	0.0
Hazel	0.0	0.4	73	0.5	Hazel	0.0	1.2	33	1.2
Hawthorn	0.0	0.0	52	0.0	Hawthorn	0.0	4.9	25	4.9
Alder	0.1	0.7	45	0.7	Alder	0.1	4.3	20	4.4
Willow	0.0	0.6	42	0.6	Willow	0.0	3.2	18	3.2
Other broadleaves	1.4	5.0	17	6.5	Other broadleaves	5.1	7.9	13	13.0
East Scotland					Scotland				
All broadleaves	1.6	36.5	4	38.1	All broadleaves	27.3	237.5	2	264.9
Oak	0.2	3.7	22	3.8	Oak	2.5	24.1	11	26.6
Beech	0.1	2.9	22	3.1	Beech	0.6	13.7	13	14.3
Sycamore	0.1	3.6	18	3.7	Sycamore	0.3	17.6	15	17.9
Ash	0.1	1.7	25	1.8	Ash	0.4	13.1	12	13.5
Birch	0.5	15.7	9	16.2	Birch	9.2	108.5	4	117.8
Sweet chestnut	0.0	0.0	0	0.0	Sweet chestnut	0.0	0.0	0	0.0
Hazel	0.0	0.5	29	0.5	Hazel	0.2	5.7	20	6.0
Hawthorn	0.0	0.9	37	0.9	Hawthorn	0.0	6.0	21	6.0
Alder	0.0	1.2	33	1.3	Alder	0.6	13.7	13	14.2
Willow	0.0	3.0	19	3.0	Willow	0.0	8.6	11	8.6
Other broadleaves	0.6	3.2	16	3.8	Other broadleaves	13.5	26.0	8	39.5

NFI 2011 woodland map

The total stocked area of broadleaves in Scotland according to Table 20 is 264,900 hectares. This compares to the total area of broadleaved IFT on the 2011 NFI map of 208,066 hectares. The two estimates are reasonably close 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.

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

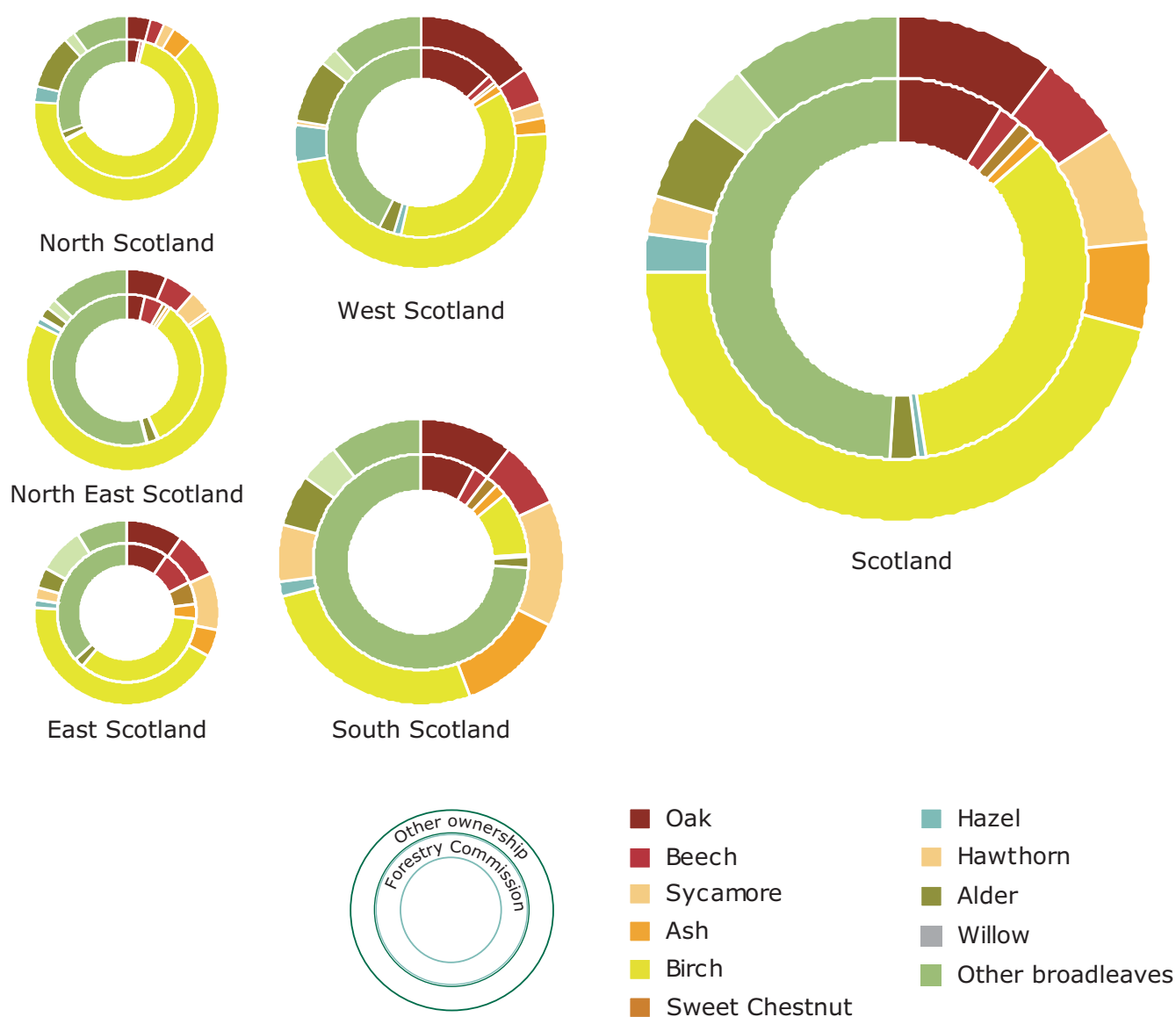
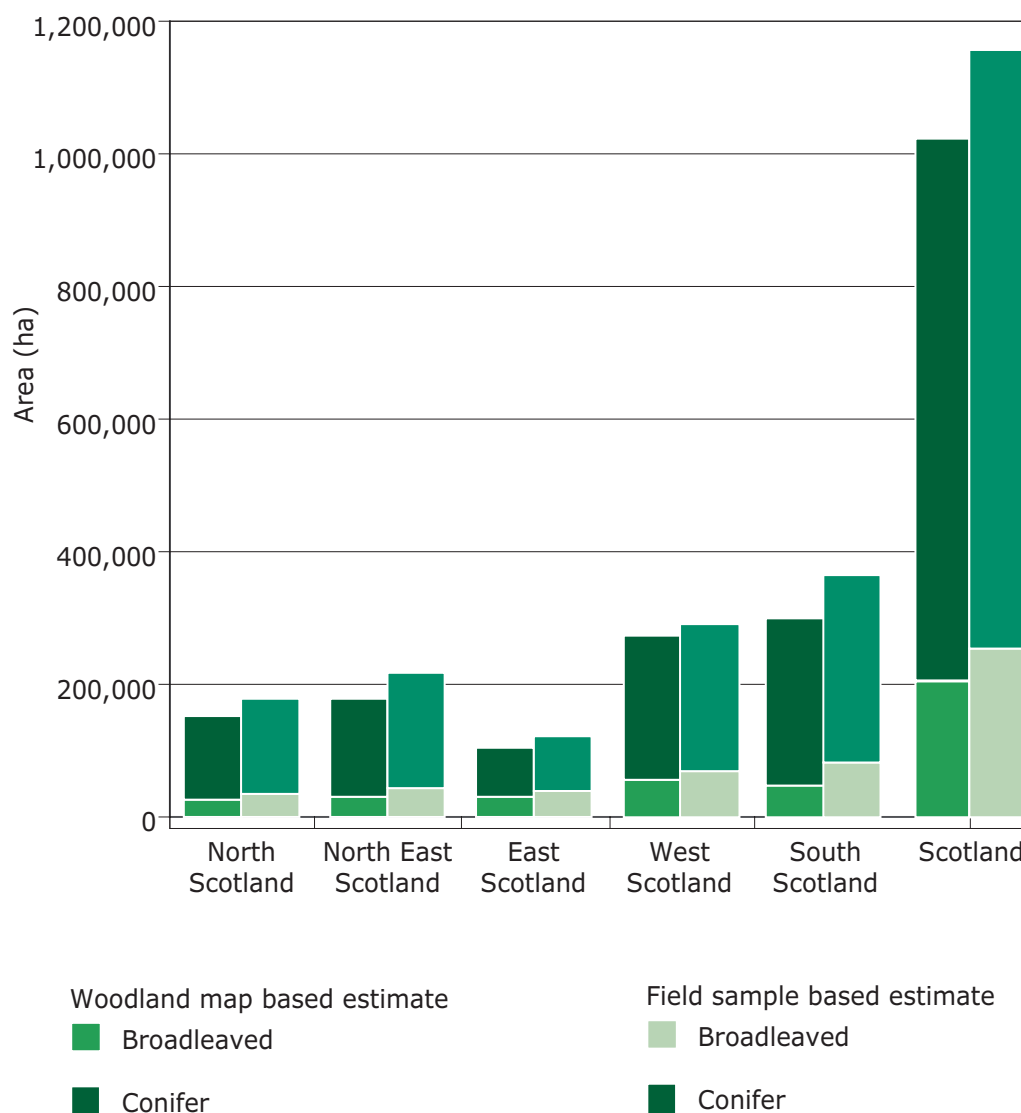


Figure 13. Comparison of mapped area estimates and stocked area estimates for Scotland



Note for Figure 13. Mapped IFT classes in the woodland map based estimates.

- 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 Scotland.

Of the total number of discrete woodlands in Scotland, 60% are less than 2 hectares in extent, although this represents only 3% of the total woodland area. Only 2% of the total number of discrete woodlands are greater than or equal to 100 hectares in extent, although these woods represent 72% of the total woodland area.

Of the conifer woodland class 22% fall into the category of greater than or equal to 100 hectares in extent, representing 78% by area of all conifer woodland in Scotland. In the case of broadleaves, just 12% of this woodland class fall into this category representing 20% by area of the total broadleaved woodland in Scotland.

In comparison, 28% of the conifer woodland class falls within the category of less than 2 hectares, representing just 2% of the total conifer woodland area, while 40% of the broadleaved woodland class falls within this category, representing 12% of the total broadleaved woodland area for Scotland.

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%.

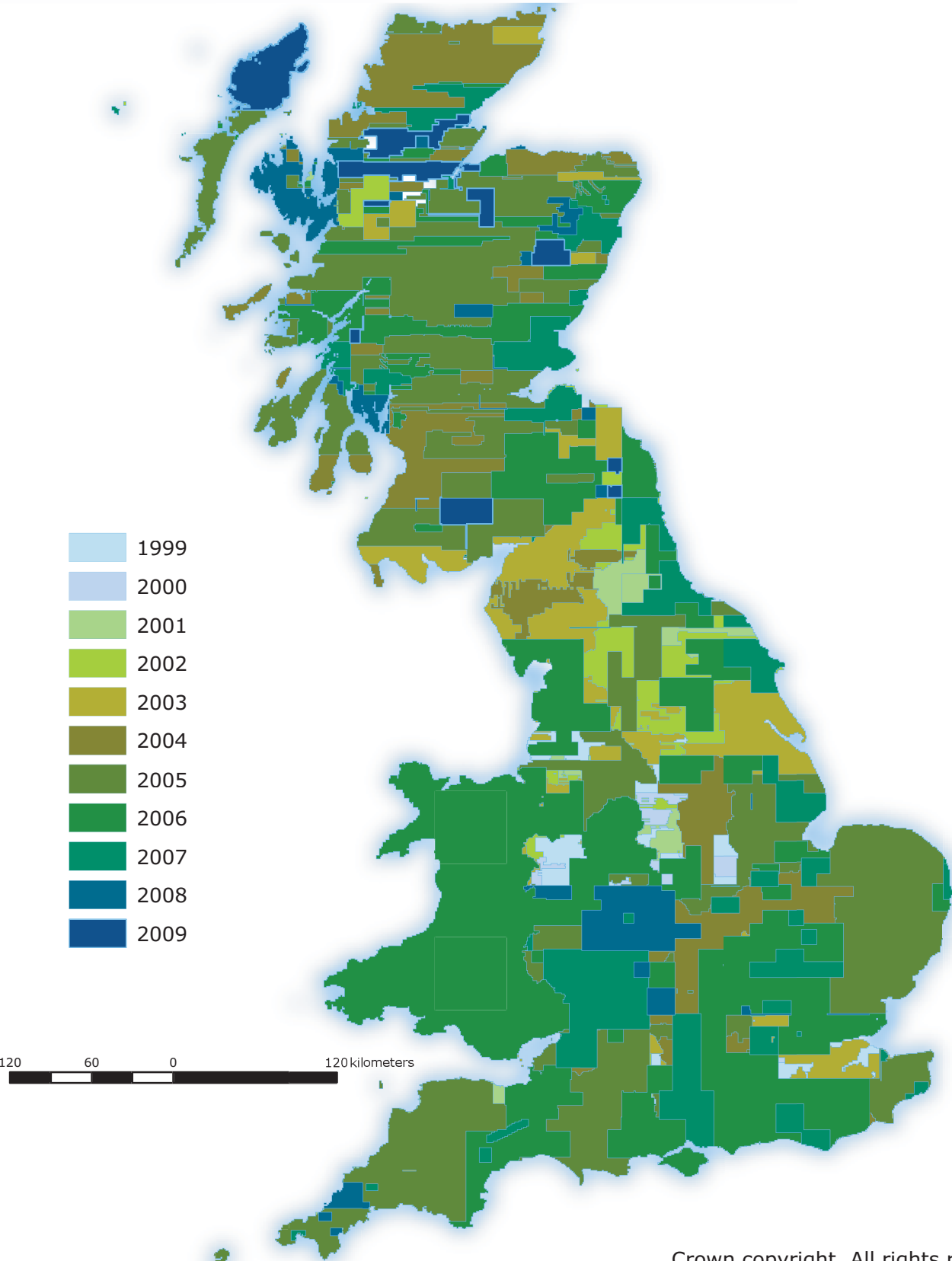
Appendix B1: Continued

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 B1: Continued

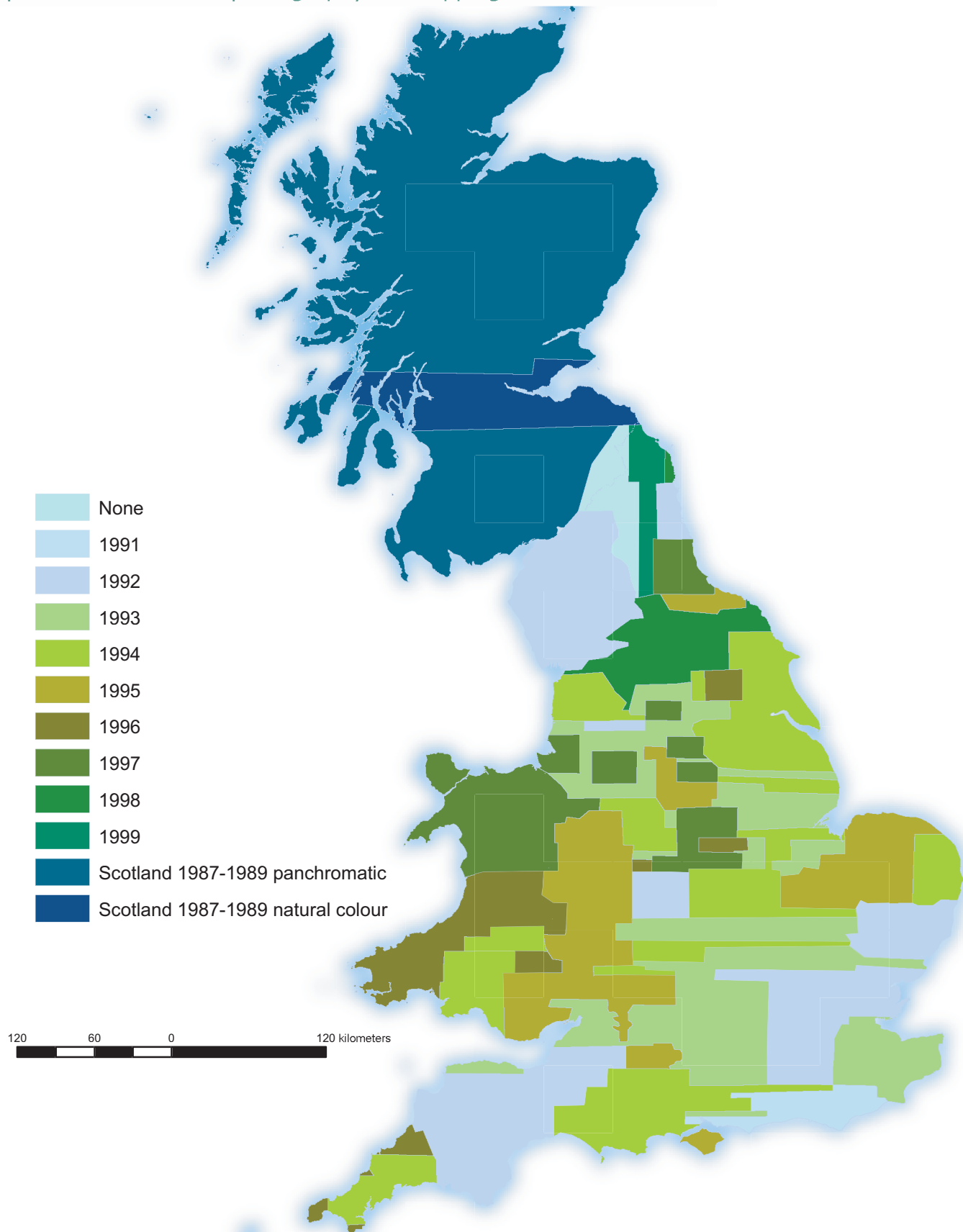
Abbreviation code	Description text	Comments
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O	Coppice	The most important characteristic of coppice areas on aerial photographs is their very even, smooth appearance. The coppice area may be made up of a patchwork of different ages (heights) but all 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%.
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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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