

# **NATIONAL INVENTORY OF WOODLAND AND TREES**



**WALES**

**County Report for**

**POWYS**



**Forestry Commission**

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## ACKNOWLEDGEMENTS

The Forestry Commission is grateful to many people who helped in the completion of this survey. In particular, the Forestry Commission would like to thank owners and occupiers of the land selected for sampling.

Woodland Surveys Branch of Forest Research was responsible for carrying out the survey and analysing the data. A large number of Forestry Commission and contract staff were involved in the survey from its inception.

Preparation of the digital cartography for Powys was carried out by Graham Bull, Woodland Survey Officer, and Woodland GIS Officers Chris Brown, Robert Beck and Esther Whitton. Data processing and analysis was carried out by Woodland Data Officers Justin Gilbert and Shona Cameron.

The authors of this Report are Steve Smith (Head of Woodland Surveys) and Justin Gilbert (Woodland Data Officer) of Forest Research.



# INTRODUCTION

This report presents the results for Powys from the Forestry Commission National Inventory of Woodland and Trees (NIWT).

The Inventory consists of two separate surveys -

- The Main Woodland Survey (MWS) covering woodlands of 2 hectares and over
- The Survey of Small Woodland and Trees (SSWT) covering Small Woods, Groups of Trees, Linear Features and Individual Trees.

## BACKGROUND

Since 1924 the Forestry Commission has carried out a number of national woodland surveys at intervals of between 15 and 20 years. The previous survey was carried out between 1979 and 1982. With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.

The survey fieldwork for Great Britain was completed in July 2000. Work began in Scotland in 1994, followed by Southern England, Wales and Northern England.

## SURVEY METHODS

### Main Woodland Survey

In Wales, Woodland Surveys derived a digital map of all woodland showing Interpreted Forest Types from 1:25 000 scale aerial photography. This provided the basis for the sampling.

The digital map gives the extent of all woodland over 2 hectares and this was updated as survey work progressed. The maps on pages 4-6 show: overall woodland cover; woodland by ownership; and woodland by Interpreted Forest Type, respectively. The total area of woodland was obtained from the digital map with ground sampling undertaken to evaluate a wide range of woodland information such as species, age and stocking.

From the digital map the area of each woodland was recorded and this information was used to determine the intensity at which any selected woodland would be sampled. The overall sampling scheme was as follows:

- 2.0ha - <100ha : every fifth wood
- 100ha - <500ha : two woods in five
- 500ha and larger : all woods

1 hectare square plots were used to sample the selected woodlands on the ground. This was a change of practice from all previous Census surveys, where whole woods have been selected for survey. For each of the three bands of woodland area a different sampling grid was used with the density of the squares being reduced as the woodlands increase in size. The overall aim was to sample 1% of the woodland in each size class.

## Survey of Small Woodland and Trees

The land area of Wales was stratified into coastal and inland 1 km x 1 km squares and a random sample of 1 km<sup>2</sup> plots were then selected, representing around 1% of the land area. 1:25 000 scale aerial photos were then used to identify features in each sample square. Each 1 km<sup>2</sup> was then divided into 16 parts, and two of these were selected at random for field data collection. Data was collected on Small Woodlands (0.10 - <2.00 ha), Linear Features, Groups and Individual Trees. The survey did not collect information from areas of developed land of 2 hectares or more.

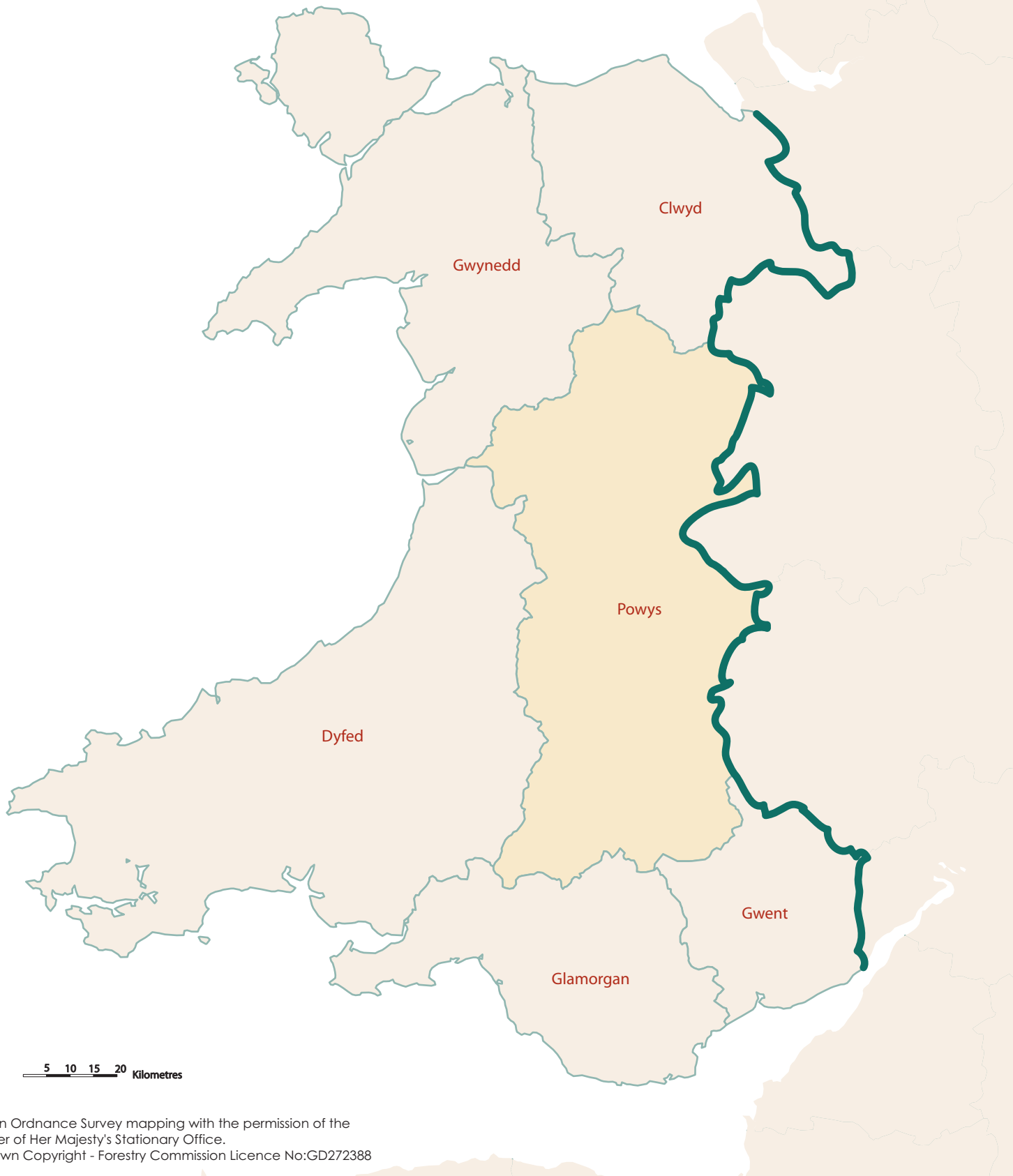
## MAIN POINTS FROM THE SURVEY RESULTS

- The total area of woodland of 0.1 hectares and over in Powys is 75,083 hectares. This represents 14.8% of the land area. (Table 1)
- Conifer woodland is the dominant forest type representing 57.2 % of all woodland. Broadleaved woodland represents 29.7 %, Mixed woodland 6.7 % and Open Space within woodlands 2.7 %. (Table 2)
- The main conifer species is Sitka spruce covering 29,529 hectares or 65.0 % of all conifer species. The main broadleaved species is oak covering 10,855 hectares or 43.6 % of all broadleaved species. (Table 3)
- 28,256 hectares or 41 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 39,939 hectares or 59 % of woodland is in Other ownership. (Table 6)
- There are a total of 2,610 woods over 2 ha within Powys with a mean wood area of 26.4 hectares. (Table 7a) There are a total of 6,639 woods from 0.1 - <2.0 hectares with a mean wood area of 1.04 hectares. (Table 14)
- There are 4.8 million live trees outside woodland in Powys. (Table 15)
- Woodland land cover increased by over 10,300 hectares from 12.7 % to 14.8 % of the land area between 1980 and 1997. (Table 19)
- The area of broadleaves increased by 56 % between 1980 and 1997, with the relative proportion of broadleaves to conifers increasing from 26 % to 35 %. (Table 20)

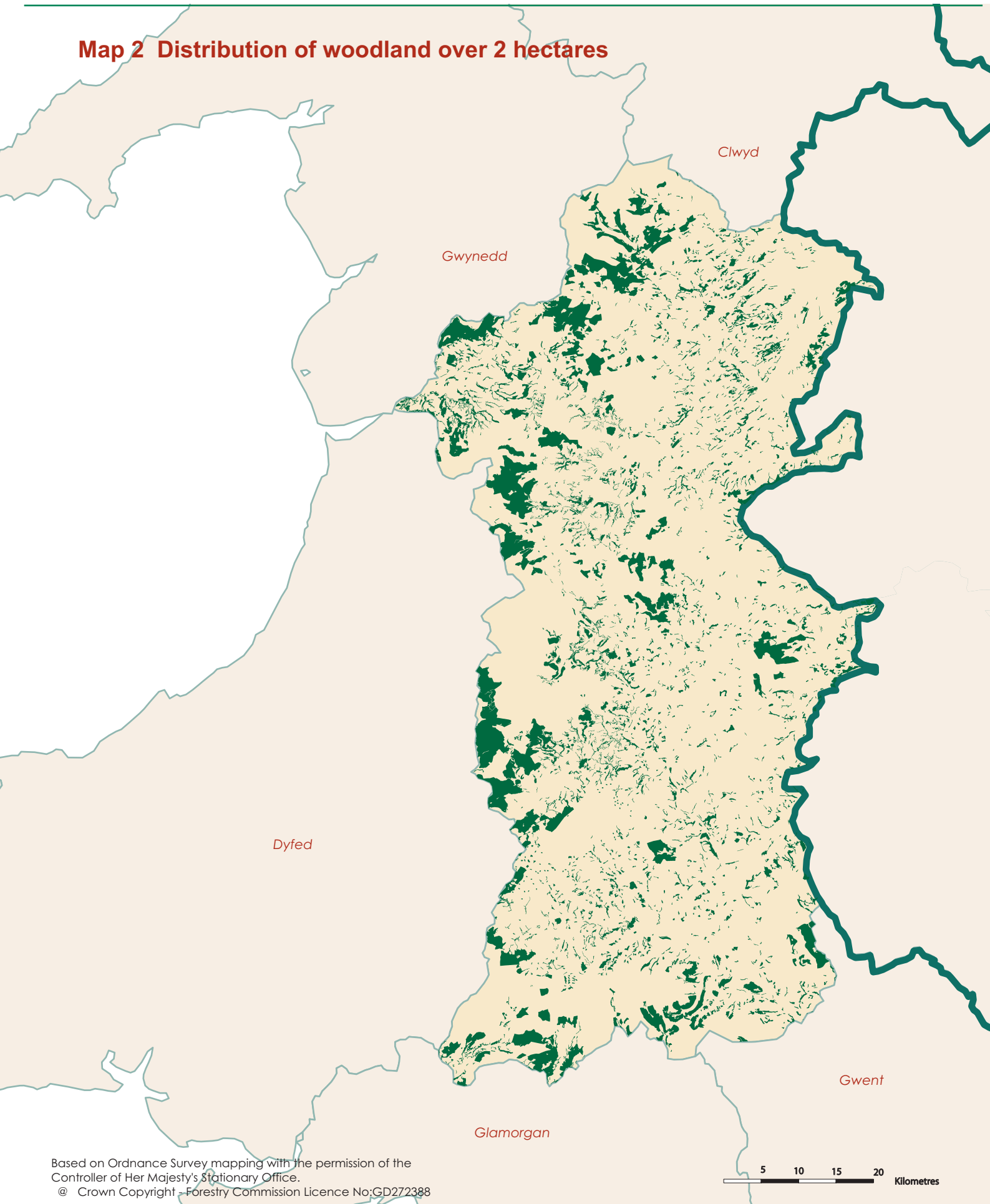
## INVENTORY REPORTS

As well as this report for Powys, reports are available for the other counties in Wales as shown on the map opposite as well as a report for the country as a whole. England and Scotland are also covered by reports. Inventory reports can also be viewed or downloaded from the website at [www.forestry.gov.uk/inventory](http://www.forestry.gov.uk/inventory).

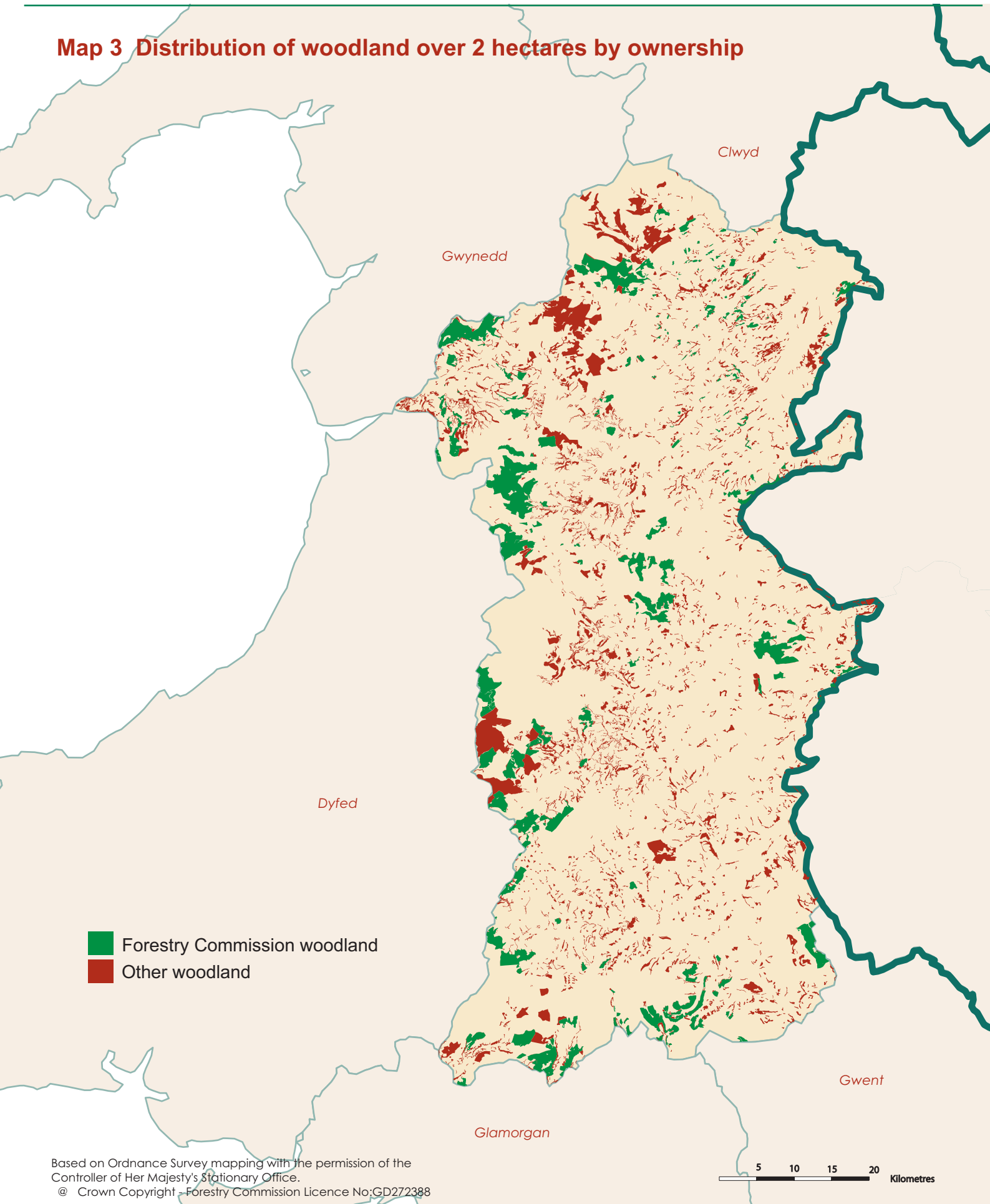
## Map 1 County boundaries



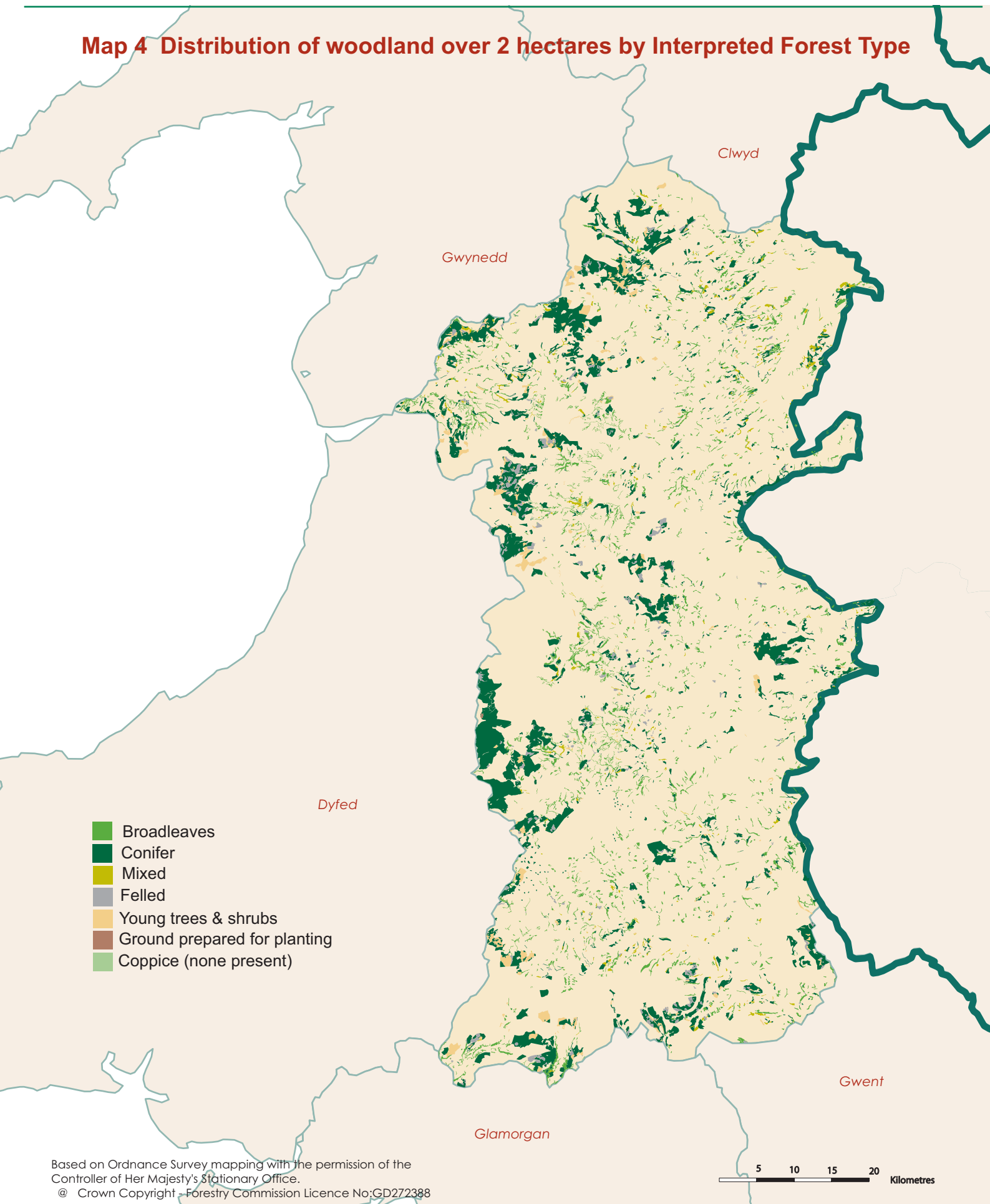
## Map 2 Distribution of woodland over 2 hectares



### Map 3 Distribution of woodland over 2 hectares by ownership



## Map 4 Distribution of woodland over 2 hectares by Interpreted Forest Type



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## SUMMARY RESULTS FROM THE NATIONAL INVENTORY OF WOODLAND AND TREES (NIWT)

Both the Main Woodland Survey and the Survey of Small Woodland and Trees contributed to the estimate of woodland area for Powys.

Tables 1-3 show the combined woodland area from the Main Woodland Survey and the Survey of Small Woodland and Trees.

Tables 4 and 5 summarise the numbers of live trees outside woodland, and the lengths of Linear Features from the Survey of Small Woodland and Trees.

Table 1:	Woodland area by woodland size class
Table 2:	Woodland area by forest type and woodland size
Table 3:	Woodland area by principal species and woodland size
Table 4:	Numbers of live trees outside woodland by feature type
Table 5:	Lengths of Linear Features

*Note: The figures in many of the tables may not add due to rounding*



**Table 1** Woodland area by woodland size class

Woodland size (ha)	Woodland area (ha)	% of Woodland area
2.00 and over	68,195	90.8
0.25 - < 2.00	6,888	9.2
0.10 - < 0.25	0	0.0
<b>Total area of woodland</b>	<b>75,083</b>	<b>100.0</b>
<b>% Woodland land cover</b>	<b>14.8</b>	

1. Area of Powys, including inland water, 507,716 ha based on digital boundaries used in the 1991 Census of Population

**Table 2** Woodland area by forest type and woodland size

Forest type	Woodland size (ha)		Total area (ha)	Percentage of total area
	2.0 and over	0.1 - <2.0		
Conifer	40,084	2,863	42,947	57.2
Broadleaved	18,274	4,025	22,299	29.7
Mixed	5,063	0	5,063	6.7
Coppiced	6	0	6	0.0
Copp-w-standards	0	0	0	0.0
Windblow	0	0	0	0.0
Felled	2,735	0	2,735	3.6
Open Space	2,032	0	2,032	2.7
<b>Total</b>	<b>68,195</b>	<b>6,888</b>	<b>75,083</b>	<b>100</b>

1. See Glossary for definitions of forest types.

**Table 3** Woodland area by principal species and woodland size

Species/Groups	Woodland size (ha)		Total area (ha)	Percentage of total area	
	2.0 and over	0.1 -<2.0		Category*	Species**
Pine	1,479	166	1,645	3.6	2.3
Sitka spruce	27,122	2,407	29,529	65.0	42.0
Larch	5,439	290	5,729	12.6	8.1
Other conifers	8,314	0	8,314	18.3	11.8
Mixed conifers	202	0	202	0.4	0.3
<b>Total conifers</b>	<b>42,557</b>	<b>2,863</b>	<b>45,420</b>	<b>100.0</b>	<b>64.6</b>
Oak	8,822	2,033	10,855	43.6	15.4
Beech	1,032	415	1,447	5.8	2.1
Sycamore	519	41	560	2.2	0.8
Ash	3,772	249	4,021	16.2	5.7
Birch	2,264	332	2,596	10.4	3.7
Elm	14	0	14	0.1	0.0
Other broadleaves	3,060	871	3,931	15.8	5.6
Mixed broadleaves	1,383	83	1,466	5.9	2.1
<b>Total broadleaves</b>	<b>20,865</b>	<b>4,024</b>	<b>24,889</b>	<b>100.0</b>	<b>35.4</b>
<b>Total all species***</b>	<b>63,422</b>	<b>6,887</b>	<b>70,310</b>		<b>100.0</b>

\*Category - species/group percentage of conifer or broadleaved category

\*\*Species/group percentage of all species

\*\*\*Excludes the 4,773ha of Coppice, Felled and Open space areas which were included in Table 2

1. The standard errors of the area estimates for woodland of 2 ha and over for the most common species or species groups are as follows

Conifers	2%
Broadleaves	3%
Sitka spruce	4%
Jap/Hybrid larch	9%
Oak	6%

2. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).

**Table 4** Numbers of live trees outside woodland by feature type

Feature type	Total number of features	Total number of live trees	Mean number of trees per feature	Tree density (per sq km)
Groups	262,500	2,063,700	8	406
Narrow Linear Features	41,800	2,498,600	60	492
Individual Trees	212,500	212,500	1	42
<b>Total</b>		<b>4,774,800</b>		<b>940</b>

1. Land area used to calculate tree density 507,716ha based on digital boundaries used in 1991 Census of Population
2. The standard errors of the live tree number estimates for these feature types are:
 

Groups	17%
Narrow Linear Features	35%
Individual Trees	20%
3. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).
4. See Glossary for definitions of feature types .

**Table 5** Lengths of Linear Features

Feature type	Total number of features	Total length of features (km)	Density of features (m per sq km)
Wide Linear Features	0	0	0
Narrow Linear Features	41,800	3,259	642
<b>Total</b>		<b>3,259</b>	<b>642</b>

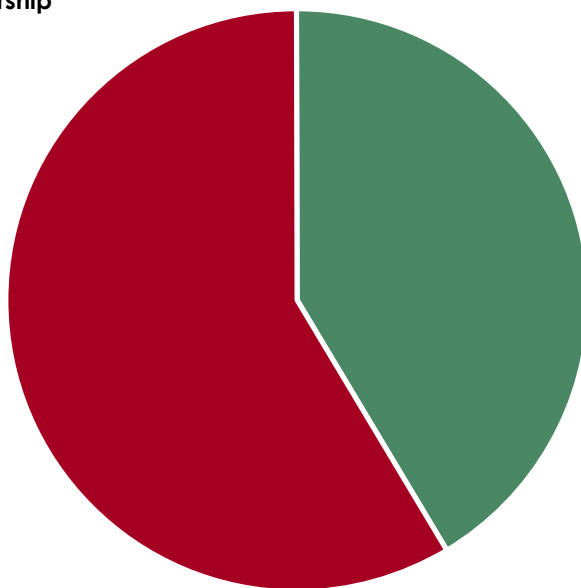
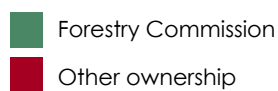
1. Land area used to calculate tree density 507,716ha based on digital boundaries used in 1991 Census of Population
2. The standard errors of the length estimates for these feature types are:
 

Wide Linear Features	-
Narrow Linear Features	27%
3. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).
4. See Glossary for definitions of feature type .

**Table 6** Summary of woodland area by ownership

Ownership	ha	% woodland
Forestry Commission	28,256	41
Other	39,939	59
<b>Total area of woodland</b>	<b>68,195</b>	<b>100</b>

1. Woodland area from aerial photographic interpretation map updated to 31 March 1997
2. See Glossary for definitions of ownership types

**Woodland area by ownership**

**Table 7a** Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	1,826	7,995	12	4.4
10 - <20	371	5,230	8	14.1
20 - <50	231	7,185	10	31.1
50 - <100	94	6,449	9	68.6
<b>&lt;100</b>	<b>2,522</b>	<b>26,858</b>	<b>39</b>	<b>10.6</b>
<b>100 - &lt;500</b>	<b>66</b>	<b>13,933</b>	<b>20</b>	<b>211.1</b>
<b>500 and &gt;</b>	<b>22</b>	<b>28,100</b>	<b>41</b>	<b>1,277.3</b>
<b>All woods</b>	<b>2,610</b>	<b>68,891</b>	<b>100</b>	<b>26.4</b>

**Table 7b** Size class distribution of woodland by ownership units

Size class (ha)	FC or Other	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	FC	53	283	0	5.3
	O	2,235	9,004	13	4.0
10 - <20	FC	40	543	1	13.6
	O	385	5,409	8	14.0
20 - <50	FC	51	1,739	3	34.1
	O	211	6,548	10	31.0
50 - <100	FC	24	1,642	2	68.4
	O	70	4,724	7	67.5
<100	FC	168	4,206	6	25.0
	O	2,901	25,684	37	8.8
100 - <500	FC	40	9,565	14	239.1
	O	40	7,555	11	188.9
500 and >	FC	14	14,484	21	1,034.6
	O	6	7,397	11	1,232.8
<b>Total</b>	<b>FC</b>	<b>222</b>	<b>28,256</b>	<b>41</b>	<b>127.3</b>
	<b>O</b>	<b>2,947</b>	<b>40,636</b>	<b>59</b>	<b>13.8</b>

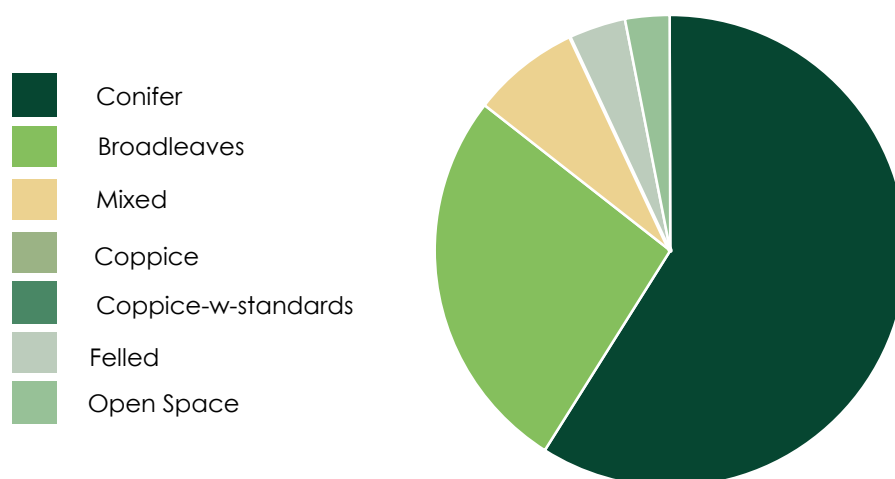
- Table 7a and 7b are based solely on the digital woodland map. The other MWS tables are derived from the field sample data.
- The total area in Tables 7a and 7b is 697 hectares more than recorded in Table 6. This is mainly due to the field samples recording some land in other land uses not differentiated from woodland in the digital map.
- The data available from the digital map enable the identification of woodlands according to their ownerships, Forestry Commission or Other. The entries in table 7b cannot be added to derive table 7a as some woods may consist of both Forestry Commission and Other ownership(s).

For example, the Forestry Commission may own most of a large wood with some parts in Other ownership(s). In Table 7a the whole area would be treated as one wood and the area allocated to one size category. In Table 7b each of the ownership units would be allocated to the size category for that unit. Dividing woods by ownership can occasionally generate part woods of less than 2 hectares.



**Table 8** Area of woodland by forest type and ownership

Forest type	Forestry Commission		Other		All ownerships	
	ha	%	ha	%	ha	%
Conifer	22,429	79.4	17,655	44.2	40,084	58.8
Broadleaved	1,742	6.2	16,532	41.4	18,274	26.8
Mixed	1,128	4.0	3,935	9.9	5,063	7.4
Coppice	0	0.0	6	0.0	6	0.0
Copp-w-Stds	0	0.0	0	0.0	0	0.0
Windblow	0	0.0	0	0.0	0	0.0
Felled	1,768	6.3	966	2.4	2,735	4.0
Open Space	1,188	4.2	843	2.1	2,032	3.0
<b>Total</b>	<b>28,256</b>	<b>100.0</b>	<b>39,939</b>	<b>100.0</b>	<b>68,195</b>	<b>100.0</b>

**Area of woodland by forest type**

## RESULTS FROM THE MAIN WOODLAND SURVEY (MWS)

### Survey Method

Woods were selected from the digital map of woodland of 2 hectares and over, then sampled using a random grid of 1 hectare sample plots. The density of sample plots was reduced as the sampled woodland increase in size, the general aim being to sample 1% of the woodland area. The ground sampling evaluated a wide range of data such as species, age and stocking.

Table 6:	Summary of woodland area by ownership
Chart:	Woodland area by ownership
Table 7a:	Size class distribution of woodland
Table 7b:	Size class distribution of woodland by ownership units
Table 8:	Area of woodland by forest type and ownership
Chart:	Area of woodland by forest type
Table 9a:	Area of High Forest by principal species and ownership
Graph:	Area of High Forest by principal species and ownership
Table 9b:	Area of High Forest by principal species, ownership and category
Graph:	High Forest Category 1 Area by principal species and ownership
Graph:	High Forest Category 2 Area by principal species and ownership
Table 10a:	High Forest Category 1 Area by principal species and planting year class
Graph:	High Forest Category 1 Area by planting year class
Table 10b:	High Forest Category 1 Forestry Commission: area by principal species and planting year class
Graph:	High Forest Category 1 Forestry Commission - area by planting year class
Table 10c:	High Forest Category 1 Other ownership: area by principal species and planting year class
Graph:	High Forest Category 1 Other ownership: area by planting year class
Table 11:	High Forest: principal species by planting year class
Table 12:	Ownership type by area and percentage
Chart:	Ownership type by area

*Note: The figures in many of the tables may not add due to rounding*



**Table 9a** Area of High Forest by principal species and ownership

Species	Forestry Commission			Other			All ownerships		
	area (ha)	cat* %	spp** %	area (ha)	cat* %	spp** %	area (ha)	cat* %	spp** %
Scots pine	236	1	1	319	2	1	555	1	1
Corsican pine	0	0	0	85	0	0	85	0	0
Lodgepole pine	332	1	1	507	3	1	839	2	1
Sitka spruce	14,354	63	57	12,768	65	33	27,122	64	43
Norway spruce	2,494	11	10	1,084	6	3	3,578	8	6
European larch	0	0	0	254	1	1	254	1	0
Jap/Hybrid larch	2,653	12	10	2,532	13	7	5,185	12	8
Douglas fir	1,491	7	6	1,372	7	4	2,863	7	5
Other conifers	1,299	6	5	574	3	2	1,873	4	3
Mixed conifers	63	0	0	140	1	0	202	0	0
<b>Total conifers</b>	<b>22,922</b>	<b>100</b>	<b>91</b>	<b>19,635</b>	<b>100</b>	<b>52</b>	<b>42,557</b>	<b>100</b>	<b>67</b>
Oak	992	42	4	7,831	42	21	8,822	42	14
Beech	216	9	1	817	4	2	1,032	5	2
Sycamore	57	2	0	461	2	1	519	2	1
Ash	164	7	1	3,608	20	9	3,772	18	6
Birch	471	20	2	1,792	10	5	2,264	11	4
Poplar	42	2	0	28	0	0	70	0	0
Sweet chestnut	0	0	0	25	0	0	25	0	0
Elm	0	0	0	14	0	0	14	0	0
Other broadleaves	217	9	1	2,748	15	7	2,965	14	5
Mixed broadleaves	218	9	1	1,164	6	3	1,383	7	2
<b>Total broadleaves</b>	<b>2,378</b>	<b>100</b>	<b>9</b>	<b>18,487</b>	<b>100</b>	<b>48</b>	<b>20,865</b>	<b>100</b>	<b>33</b>
<b>Total - all species</b>	<b>25,299</b>		<b>100</b>	<b>38,122</b>		<b>100</b>	<b>63,422</b>		<b>100</b>
<b>Felled</b>	<b>1,768</b>			<b>966</b>			<b>2,735</b>		
<b>Total High Forest</b>	<b>27,067</b>			<b>39,088</b>			<b>66,157</b>		

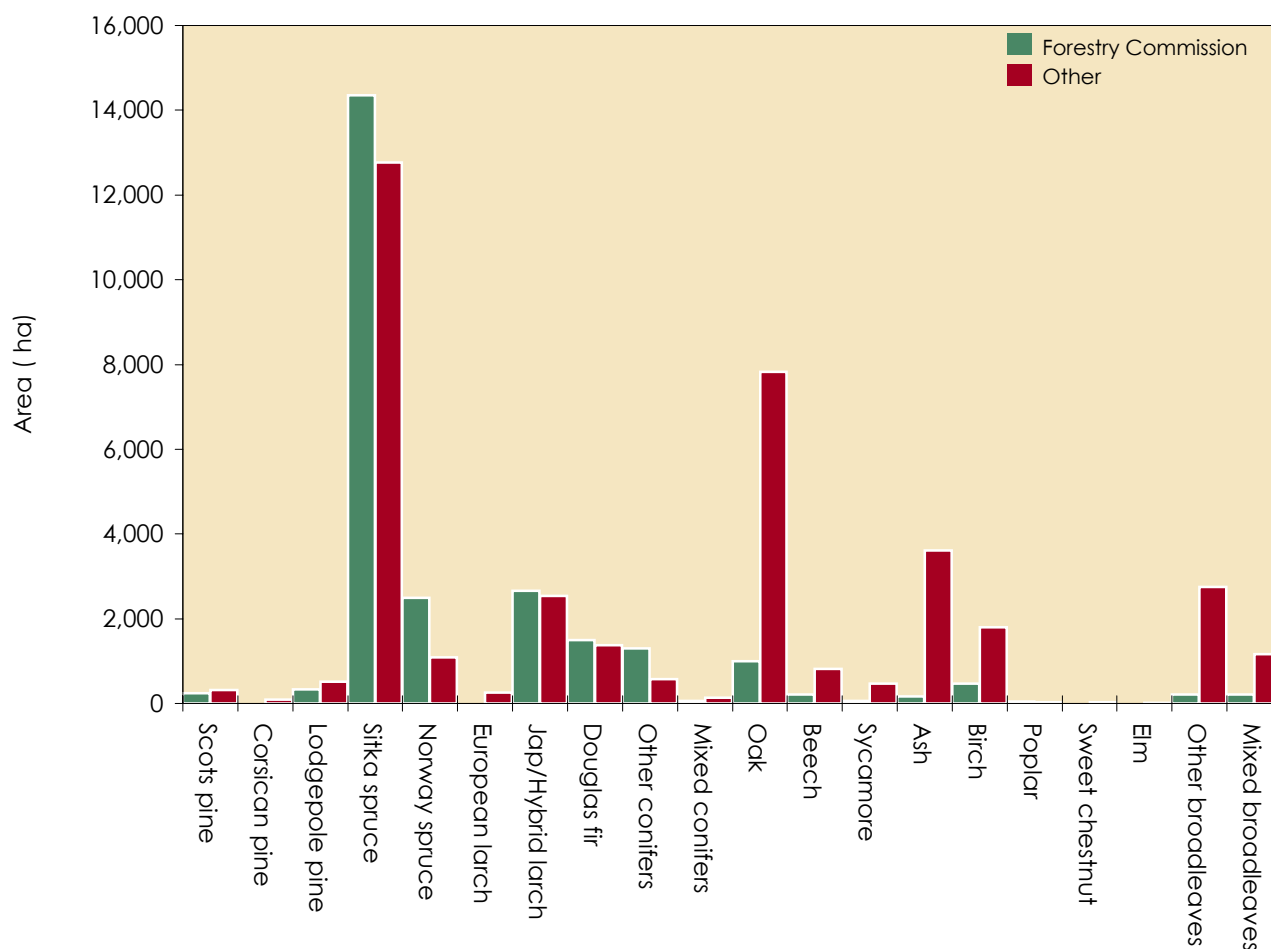
\*cat : species percentage of Conifer or Broadleaved in the ownership category

\*\*spp : percentage of all species in the ownership category

1. In addition to the areas shown there are 2,032ha of other areas integral to the woodland not stocked with tree species.
2. The standard errors of the all ownerships area estimates for the most common species or species groups are as follows;
 

Conifers	2%
Broadleaves	3%
Sitka spruce	4%
Jap/Hybrid larch	9%
Oak	6%
3. Mixtures: where possible the species in mixtures have been separately recorded. Where this has not been possible they were described as 'Mixed conifers' or 'Mixed broadleaves'.
4. Confidence Intervals: where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).

#### Area of High Forest by principal species and ownership



**Table 9b** Area of High Forest by principal species,ownership and category

Species	Forestry Commission			Other			All ownerships		
	cat. 1	cat. 2	Total (ha)	cat. 1	cat. 2	Total (ha)	cat. 1	cat. 2	Total (ha)
Scots pine	203	33	236	262	57	319	465	90	555
Corsican pine	0	0	0	85	0	85	85	0	85
Lodgepole pine	291	40	332	349	158	507	640	198	839
Sitka spruce	13,562	792	14,354	11,548	1,220	12,768	25,111	2,012	27,122
Norway spruce	2,484	9	2,494	1,050	34	1,084	3,534	44	3,578
European larch	0	0	0	254	0	254	254	0	254
Jap/Hybrid larch	2,557	97	2,653	2,254	278	2,532	4,810	375	5,185
Douglas fir	1,463	28	1,491	1,342	30	1,372	2,805	58	2,863
Other conifers	1,232	67	1,299	547	27	574	1,780	93	1,873
Mixed conifers	44	19	63	108	31	140	152	50	202
<b>Total conifers</b>	<b>21,837</b>	<b>1,084</b>	<b>22,922</b>	<b>17,799</b>	<b>1,836</b>	<b>19,635</b>	<b>39,637</b>	<b>2,920</b>	<b>42,557</b>
Oak	464	528	992	2,104	5,727	7,831	2,568	6,254	8,822
Beech	70	145	216	583	234	817	653	379	1,032
Sycamore	0	57	57	82	379	461	82	436	519
Ash	19	145	164	1,344	2,264	3,608	1,363	2,409	3,772
Birch	97	374	471	111	1,681	1,792	208	2,055	2,264
Poplar	0	42	42	28	0	28	28	42	70
Sweet chestnut	0	0	0	25	0	25	25	0	25
Elm	0	0	0	0	14	14	0	14	14
Other broadleaves	65	153	217	216	2,531	2,748	281	2,684	2,965
Mixed broadleaves	19	200	218	536	628	1,164	555	828	1,383
<b>Total broadleaves</b>	<b>734</b>	<b>1,644</b>	<b>2,378</b>	<b>5,029</b>	<b>13,458</b>	<b>18,487</b>	<b>5,763</b>	<b>15,102</b>	<b>20,865</b>
<b>Total - all species</b>	<b>22,571</b>	<b>2,728</b>	<b>25,299</b>	<b>22,828</b>	<b>15,294</b>	<b>38,122</b>	<b>45,400</b>	<b>18,022</b>	<b>63,422</b>

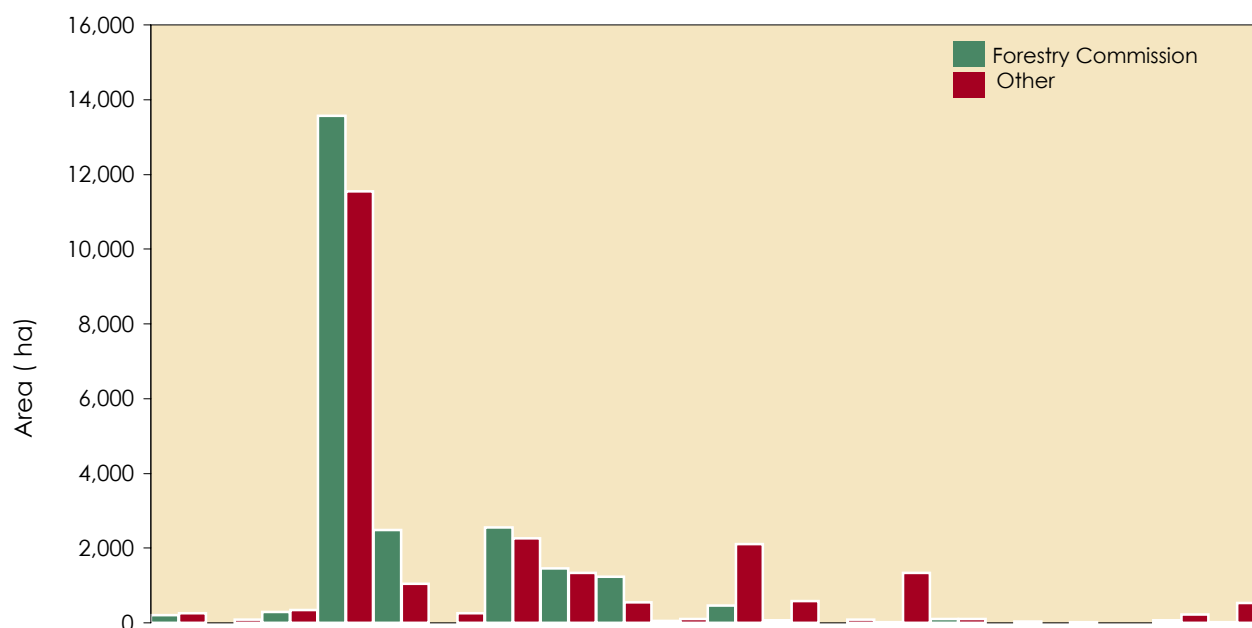
1. The standard errors of the all ownerships area estimates for the most common species or species groups (in all woodland types) are as follows

	Category 1*	Category 2*	Total High Forest	
Conifers	2%	12%	2%	
Broadleaves	8%	3%	3%	
Sitka spruce	4%	15%	4%	
Jap/Hybrid larch	10%	34%	9%	*See Glossary for Category 1 and Category 2 descriptions
Oak	12%	6%	6%	

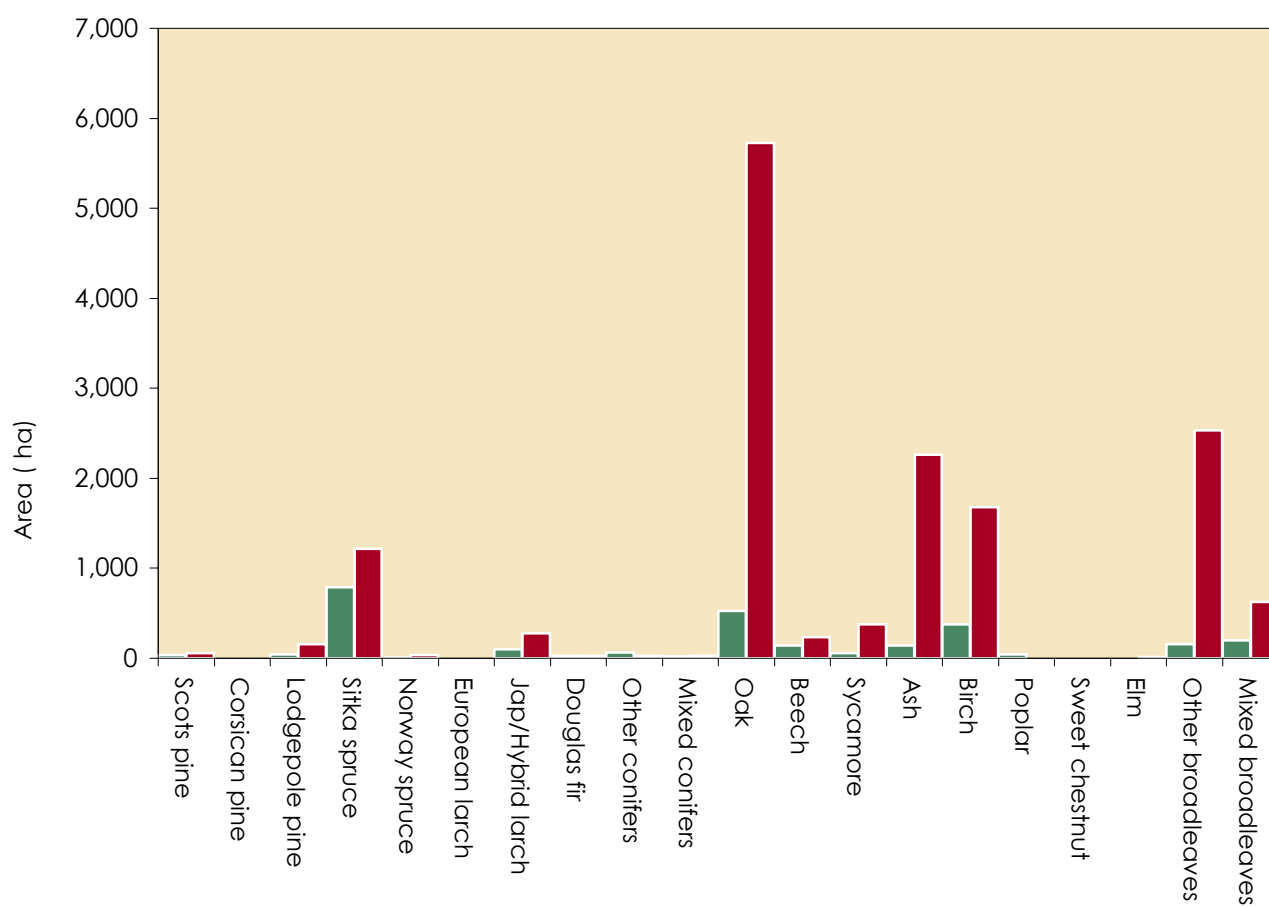
2. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).

3. Where possible the species in mixtures have been separately recorded. Where this has not been possible they were described as 'Mixed conifers' or 'Mixed broadleaves'.

### High Forest Category 1 - Area by principal species and ownership



### High Forest Category 2 - Area by principal species and ownership



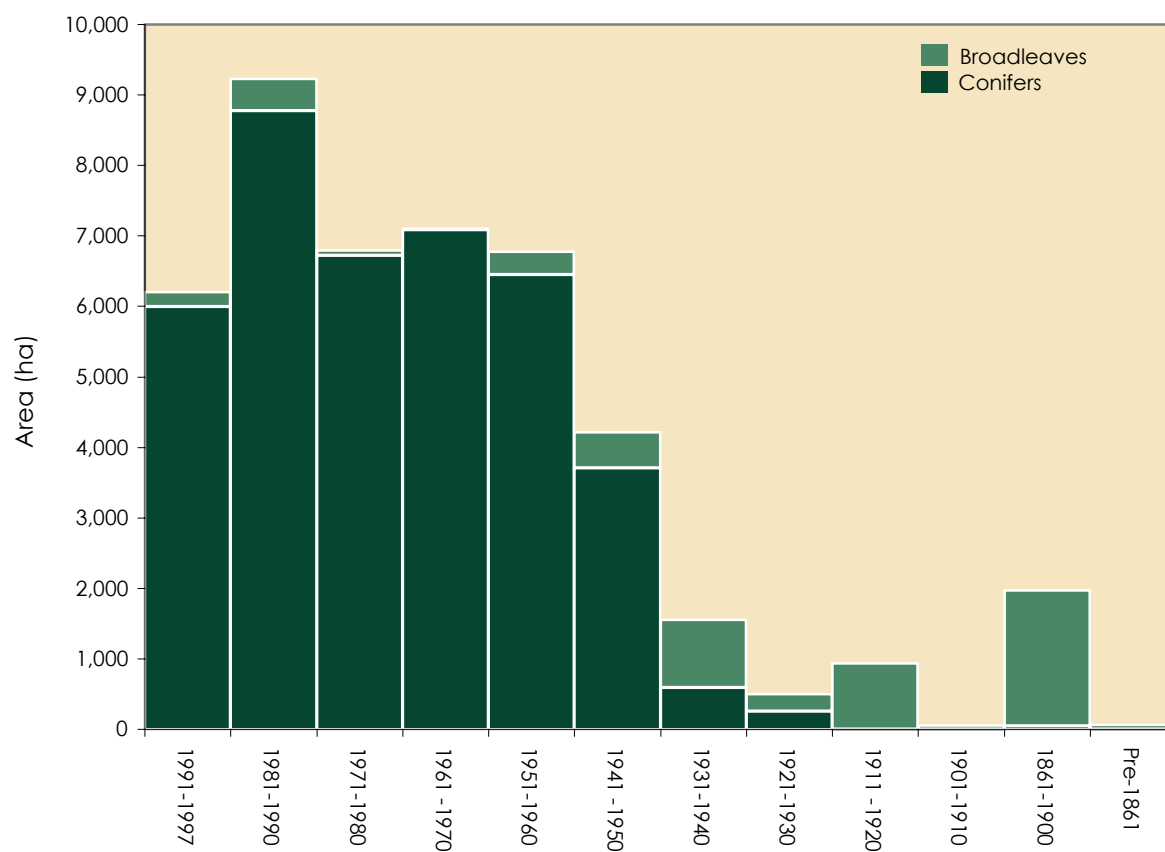
**Table 10a** High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	155	0	23	33	76	161	5	12	0	0	0	0	465
Corsican pine	0	68	0	0	0	0	18	0	0	0	0	0	85
Lodgepole pine	0	95	200	179	141	0	25	0	0	0	0	0	640
Sitka spruce	3,815	7,510	5,261	4,370	2,472	1,599	84	0	0	0	0	0	25,111
Norway spruce	288	162	160	1,095	1,013	710	106	0	0	0	0	0	3,534
European larch	0	0	0	0	96	109	14	9	0	0	26	0	254
Jap/Hybrid larch	566	477	519	327	1,866	832	48	156	0	0	18	0	4,810
Douglas fir	779	344	193	667	442	65	244	68	0	0	4	0	2,805
Other conifers	396	120	355	394	282	176	47	9	0	0	0	0	1,780
Mixed conifers	0	0	14	23	62	53	0	0	0	0	0	0	152
<b>Total conifers</b>	<b>5,999</b>	<b>8,776</b>	<b>6,724</b>	<b>7,089</b>	<b>6,451</b>	<b>3,705</b>	<b>591</b>	<b>254</b>	<b>0</b>	<b>0</b>	<b>48</b>	<b>0</b>	<b>39,637</b>
Oak	90	71	6	0	137	173	392	119	386	0	1,179	14	2,568
Beech	0	10	13	13	14	73	67	5	184	0	274	0	653
Sycamore	0	6	0	0	0	18	0	9	43	0	6	0	82
Ash	48	157	13	0	116	134	342	55	174	59	217	46	1,363
Birch	21	88	18	0	0	0	9	0	0	0	72	0	208
Poplar	0	0	0	0	23	0	0	0	0	0	5	0	28
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	25	0	25
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	40	23	14	0	23	63	102	0	9	0	6	0	281
Mixed broadleaves	5	93	5	4	13	50	46	58	140	0	142	0	555
<b>Total broadleaves</b>	<b>204</b>	<b>449</b>	<b>70</b>	<b>17</b>	<b>326</b>	<b>511</b>	<b>959</b>	<b>247</b>	<b>936</b>	<b>59</b>	<b>1,927</b>	<b>60</b>	<b>5,763</b>
<b>Total - all species</b>	<b>6,203</b>	<b>9,225</b>	<b>6,793</b>	<b>7,106</b>	<b>6,776</b>	<b>4,215</b>	<b>1,550</b>	<b>501</b>	<b>936</b>	<b>59</b>	<b>1,975</b>	<b>60</b>	<b>45,400</b>

\*Age determined from records where these were available. Where records were not available or were clearly inaccurate age-class was assigned by reference to similar crops of known age in the locality.



## High Forest Category 1 - Area by planting year class

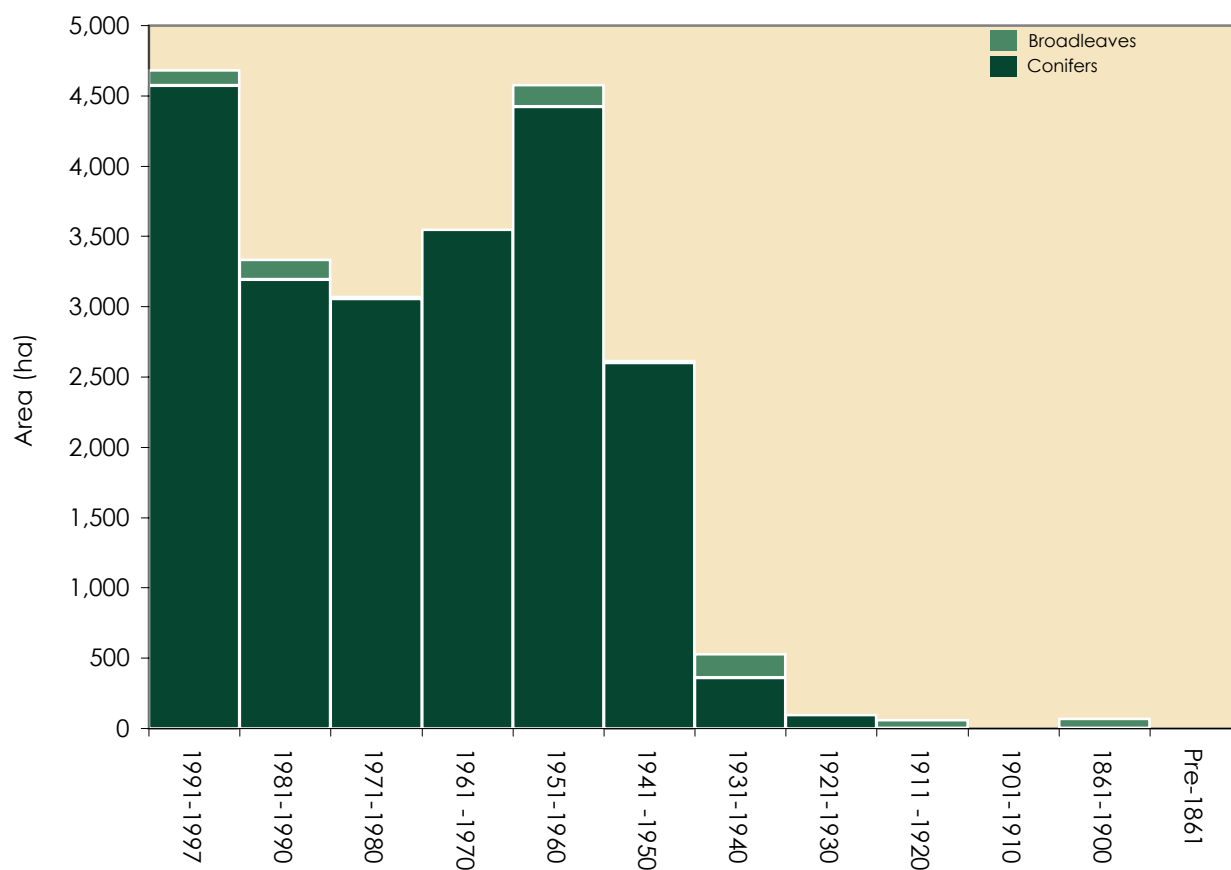


1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

**Table 10b** High Forest Category 1 - Forestry Commission : area by principal species and planting year classes

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	155	0	0	0	39	9	0	0	0	0	0	0	203
Corsican pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodgepole pine	0	14	5	179	75	0	19	0	0	0	0	0	291
Sitka spruce	3,207	2,809	2,436	2,016	1,898	1,113	84	0	0	0	0	0	13,562
Norway spruce	206	42	33	603	887	680	33	0	0	0	0	0	2,484
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	457	196	252	47	865	626	19	94	0	0	0	0	2,557
Douglas fir	155	47	161	535	407	0	158	0	0	0	0	0	1,463
Other conifers	390	83	169	168	211	165	47	0	0	0	0	0	1,232
Mixed conifers	0	0	0	0	39	5	0	0	0	0	0	0	44
<b>Total conifers</b>	<b>4,570</b>	<b>3,192</b>	<b>3,055</b>	<b>3,547</b>	<b>4,421</b>	<b>2,599</b>	<b>360</b>	<b>94</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21,837</b>
Oak	40	33	0	0	137	0	132	0	61	0	61	0	464
Beech	0	0	0	0	10	13	37	0	0	0	9	0	70
Sycamore	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	9	9	0	0	0	0	0	0	0	0	0	0	19
Birch	14	83	0	0	0	0	0	0	0	0	0	0	97
Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	40	0	14	0	10	0	0	0	0	0	0	0	65
Mixed broadleaves	5	14	0	0	0	0	0	0	0	0	0	0	19
<b>Total broadleaves</b>	<b>109</b>	<b>140</b>	<b>14</b>	<b>0</b>	<b>157</b>	<b>13</b>	<b>170</b>	<b>0</b>	<b>61</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>734</b>
<b>Total - all species</b>	<b>4,678</b>	<b>3,332</b>	<b>3,069</b>	<b>3,547</b>	<b>4,579</b>	<b>2,612</b>	<b>529</b>	<b>94</b>	<b>61</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>22,571</b>

\*Age determined from records where these were available. Where records were not available or were clearly inaccurate age-class was assigned by reference to similar crops of known age in the locality.

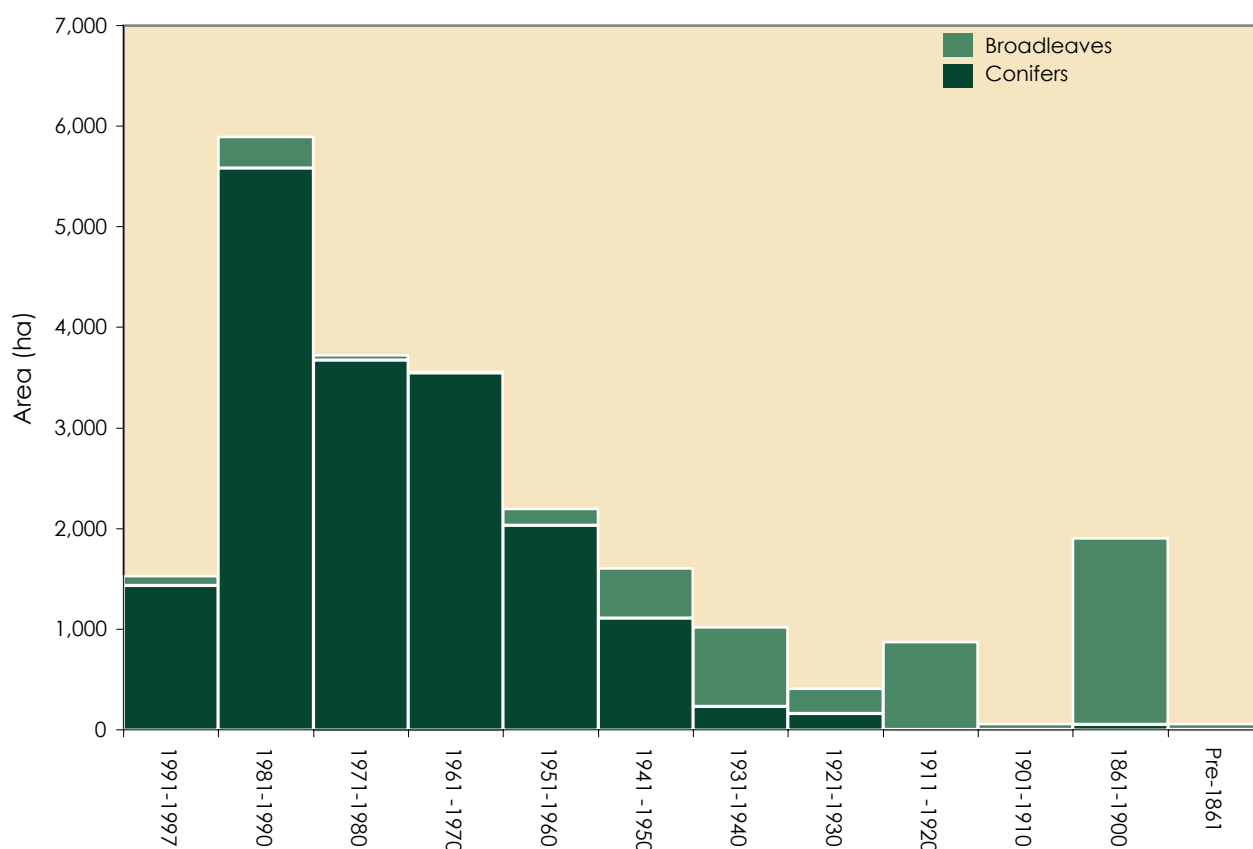
**High Forest Category 1 - Forestry Commission: area by planting year class**

1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

**Table 10c** High Forest Category 1 - Other ownership: area by principal species and planting year classes

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	0	0	23	33	37	152	5	12	0	0	0	0	262
Corsican pine	0	68	0	0	0	0	18	0	0	0	0	0	85
Lodgepole pine	0	81	195	0	66	0	6	0	0	0	0	0	349
Sitka spruce	608	4,701	2,825	2,355	574	486	0	0	0	0	0	0	11,548
Norway spruce	82	120	127	492	126	30	73	0	0	0	0	0	1,050
European larch	0	0	0	0	96	109	14	9	0	0	26	0	254
Jap/Hybrid larch	110	280	267	280	1,001	206	30	62	0	0	18	0	2,254
Douglas fir	624	297	31	132	35	65	86	68	0	0	4	0	1,342
Other conifers	6	37	186	226	71	11	0	9	0	0	0	0	547
Mixed conifers	0	0	14	23	23	48	0	0	0	0	0	0	108
<b>Total conifers</b>	<b>1,430</b>	<b>5,584</b>	<b>3,669</b>	<b>3,542</b>	<b>2,029</b>	<b>1,106</b>	<b>231</b>	<b>160</b>	<b>0</b>	<b>0</b>	<b>48</b>	<b>0</b>	<b>17,799</b>
Oak	50	38	6	0	0	173	260	119	326	0	1,118	14	2,104
Beech	0	10	13	13	4	60	30	5	184	0	265	0	583
Sycamore	0	6	0	0	0	18	0	9	43	0	6	0	82
Ash	39	148	13	0	116	134	342	55	174	59	217	46	1,344
Birch	6	5	18	0	0	0	9	0	0	0	72	0	111
Poplar	0	0	0	0	23	0	0	0	0	0	5	0	28
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	25	0	25
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	23	0	0	13	63	102	0	9	0	6	0	216
Mixed broadleaves	0	79	5	4	13	50	46	58	140	0	142	0	536
<b>Total broadleaves</b>	<b>95</b>	<b>309</b>	<b>55</b>	<b>17</b>	<b>168</b>	<b>498</b>	<b>789</b>	<b>247</b>	<b>875</b>	<b>59</b>	<b>1,857</b>	<b>60</b>	<b>5,029</b>
<b>Total - all species</b>	<b>1,525</b>	<b>5,893</b>	<b>3,724</b>	<b>3,559</b>	<b>2,197</b>	<b>1,604</b>	<b>1,020</b>	<b>407</b>	<b>875</b>	<b>59</b>	<b>1,905</b>	<b>60</b>	<b>22,828</b>

\*Age determined from records where these were available. Where records were not available or were clearly inaccurate age-class was assigned by reference to similar crops of known age in the locality.

**High Forest Category 1 - Other Ownership: area by planting year class**

1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

**Table 11** High Forest : principal species by planting year class

Planting year class	First	%	Second	%	Third	%
1991-97	Sitka spruce	56	Douglas fir	11	Jap/Hybrid larch	8
1981-90	Sitka spruce	77	Jap/Hybrid larch	5	Douglas fir	3
1971-80	Sitka spruce	76	Jap/Hybrid larch	7	Other conifers	4
1961-70	Sitka spruce	57	Norway spruce	13	Douglas fir	8
1951-60	Sitka spruce	32	Jap/Hybrid larch	23	Norway spruce	12
1941-50	Sitka spruce	26	Jap/Hybrid larch	14	Norway spruce	12
1931-40	Oak	33	Ash	22	Other broadleaves	13
1921-30	Oak	43	Ash	18	Other broadleaves	17
1911-20	Oak	46	Ash	18	Beech	11
1901-10	Oak	68	Ash	23	Other broadleaves	4
1861-1900	Oak	69	Ash	11	Beech	7
Pre 1861	Oak	57	Ash	36	Mixed broadleaves	4
<b>All years</b>	<b>Sitka spruce</b>	<b>43</b>	<b>Oak</b>	<b>14</b>	<b>Jap/Hybrid larch</b>	<b>8</b>

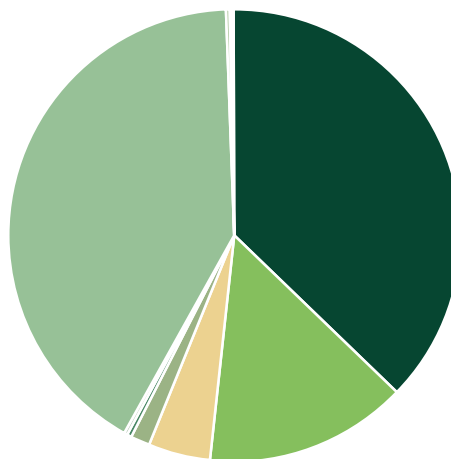
1. Principal species as a percentage of area in the planting year class.

**Table 12** Ownership type\* by area and percentage

Ownership type	Area (ha)	%
Personal	25,354	37.2
Business	9,799	14.4
Forestry or timber business	3,197	4.7
Charity	829	1.2
Local Authority	159	0.2
Other public (not FC)	268	0.4
Forestry Commission	28,256	41.4
Community ownership or common land	154	0.2
Unidentified	178	0.3
<b>Total</b>	<b>68,195</b>	<b>100.0</b>

\* This table is produced from data contributed on a voluntary basis by owners or their representatives.

#### Ownership type by area







## RESULTS FROM THE SURVEY OF SMALL WOODLAND AND TREES (SSWT)

### Survey Method

The land area of Wales was stratified into coastal and inland 1 km x 1 km squares and a random sample of 1 km<sup>2</sup> plots were then selected, representing around 1% of the land area. 1:25 000 scale aerial photos were then used to identify features in each sample square. Each 1 km<sup>2</sup> was then divided into 16 parts, and two of these were selected at random for field data collection. Data was collected on Small Woodlands (0.10 - <2.00 ha), Linear Features, Groups and Individual Trees. The survey did not collect information from areas of developed land of 2 hectares or more.

Table 13:	Summary of information from the Survey of Small Woodland and Trees
Table 14:	Woodland area by feature type and woodland size
Table 15:	Numbers of live trees outside woodland by species and feature type
Table 16 :	Numbers of dead trees outside woodland by species and feature type
Table 17:	Numbers of live trees outside woodland by species and height band
Table 18:	Numbers of Groups by group size

*Note: The figures in many of the tables may not add due to rounding*



**Table 13** Summary of information from the Survey of Small Woodlands and Trees

Feature type	Number of features	Total	Unit
Small Woods	6,639	6,888	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	41,800	3,259	Length (Km)
Narrow Linear Features	41,800	2,498,600	Number of live trees
Groups	262,500	2,063,700	Number of live trees
Individual Trees	212,500	212,500	Number of live trees

1. See Glossary for definitions of feature types.

**Table 14** Woodland area by feature type and woodland size

Feature type	Woodland size (ha)		Total area (ha)	Number of features	Mean size (ha)
	0.1 - <0.25	0.25 - <2.0			
Small Woods	0	6,888	6,888	6,639	1.04
Wide Linear Features	0	0	0	0	0.00
<b>Total</b>	<b>0</b>	<b>6,888</b>	<b>6,888</b>	<b>6,639</b>	<b>1.04</b>

1. See Glossary for definitions of feature types.

**Table 15** Numbers of live trees outside woodland by species and feature type (000's trees)

Species	Feature type				Total live trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.8	0.8	33.6	50.1	85.3	12.1	1.8
Spruce	1.6	0.0	163.3	422.1	587.0	83.4	12.3
Larch	3.1	2.3	4.7	1.9	12.0	1.7	0.3
Cypress	0.0	0.0	0.0	1.9	1.9	0.3	0.0
Other conifers	0.0	0.0	18.0	0.0	18.0	2.6	0.4
<b>Total conifers</b>	<b>5.5</b>	<b>3.1</b>	<b>219.5</b>	<b>476.1</b>	<b>704.2</b>	<b>100.0</b>	<b>14.7</b>
Oak	29.7	10.9	150.0	103.4	294.0	7.2	6.2
Beech	1.6	0.8	18.7	12.2	33.3	0.8	0.7
Sycamore	2.3	0.8	69.5	112.4	185.0	4.5	3.9
Ash	18.7	4.0	190.6	130.4	343.7	8.4	7.2
Birch	4.7	6.2	118.7	91.9	221.5	5.4	4.6
Poplar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	1.6	0.0	1.6	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alder	1.6	0.0	126.5	116.3	244.4	6.0	5.1
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	0.8	0.0	0.0	0.0	0.8	0.0	0.0
Willow	7.0	1.6	231.2	284.0	523.8	12.9	11.0
Other broadleaves	53.4	59.9	937.3	1,171.9	2,222.5	54.6	46.5
<b>Total broadleaves</b>	<b>119.7</b>	<b>84.3</b>	<b>1,844.2</b>	<b>2,022.6</b>	<b>4,070.6</b>	<b>100.0</b>	<b>85.3</b>
<b>Total - all species</b>	<b>125.2</b>	<b>87.4</b>	<b>2,063.7</b>	<b>2,498.7</b>	<b>4,774.8</b>		<b>100.0</b>

## 1. Percentages

Category : species percentage of conifer or broadleaved.  
 Species : percentage of all species.

## 2. The standard errors of the total tree number estimates for these feature types are:

Individual Trees                      20%  
 Groups                                    17%  
 Narrow Linear Features            35%

## 3. See Glossary for definitions of feature types.

**Table 16** Numbers of dead trees outside woodland by species and feature type (000's trees)

Species	Feature type				Total dead trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.0	19.3	19.3	100.0	58.5
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total conifers</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>19.3</b>	<b>19.3</b>	<b>100.0</b>	<b>58.5</b>
Oak	0.8	0.0	0.0	0.0	0.8	5.8	2.4
Beech	0.0	0.0	0.8	0.0	0.8	5.8	2.4
Sycamore	0.0	0.0	0.8	0.6	1.4	10.2	4.2
Ash	0.0	0.0	0.0	1.3	1.3	9.5	3.9
Birch	0.0	0.0	0.0	1.3	1.3	9.5	3.9
Poplar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alder	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Willow	0.0	0.0	0.0	1.3	1.3	9.5	3.9
Other broadleaves	0.0	0.0	2.3	4.5	6.8	49.6	20.6
<b>Total broadleaves</b>	<b>0.8</b>	<b>0.0</b>	<b>3.9</b>	<b>9.0</b>	<b>13.7</b>	<b>100.0</b>	<b>41.5</b>
<b>Total - all species</b>	<b>0.8</b>	<b>0.0</b>	<b>3.9</b>	<b>28.3</b>	<b>33.0</b>		<b>100.0</b>

1. See Glossary for definitions of feature types.

**Table 17** Numbers of live trees outside woodland by species and height band (000's trees)

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	0.0	26.2	38.0	21.1	85.3
Spruce	148.2	355.3	83.4	0.0	586.9
Larch	2.3	6.0	3.8	0.0	12.1
Cypress	1.9	0.0	0.0	0.0	1.9
Other conifers	14.8	0.0	3.1	0.0	17.9
<b>Total conifers</b>	<b>167.2</b>	<b>387.5</b>	<b>128.3</b>	<b>21.1</b>	<b>704.1</b>
Oak	30.2	179.5	83.6	0.8	294.1
Beech	3.6	5.8	14.5	9.4	33.3
Sycamore	25.5	129.0	20.5	10.2	185.2
Ash	46.9	221.6	73.0	2.2	343.7
Birch	54.8	162.8	3.9	0.0	221.5
Poplar	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	1.6	0.0	0.0	1.6
Horse chestnut	0.0	0.0	0.0	0.0	0.0
Alder	36.5	187.4	17.3	3.2	244.4
Lime	0.0	0.0	0.0	0.0	0.0
Elm	0.8	0.0	0.0	0.0	0.8
Willow	376.1	145.1	2.6	0.0	523.8
Other broadleaves	2,052.1	170.4	0.0	0.0	2,222.5
<b>Total broadleaves</b>	<b>2,626.5</b>	<b>1,203.2</b>	<b>215.4</b>	<b>25.8</b>	<b>4,070.9</b>
<b>Total - all species</b>	<b>2,793.6</b>	<b>1,590.7</b>	<b>343.6</b>	<b>46.8</b>	<b>4,774.8</b>

**Table 18** Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	33
3-5	84
6-10	56
11-20	53
21-50	29
51-100	6
>100	2
<b>Total</b>	<b>262</b>

\*The size of the group is determined by the total number of trees, live plus dead.





## COMPARISON OF RESULTS WITH THE 1980 CENSUS AND PREVIOUS SURVEYS

### Survey Method

The 1980 Census and 1997 Inventory were undertaken using very different sampling methods.

Inventory practice and technology have moved on since the 1980 Census; this has led to changes in sampling methodology, scope and woodland definitions. For example, the Main Woodland Survey used the digital woodland map, created from aerial photos as a basis for sampling whereas the 1980 Census relied only on the woodland shown on the 1:50,000 Ordnance Survey map. Also in contrast to the 1980 Census, the Survey of Small Woodland and Trees did not record information within developed land e.g. residential or industrial areas of 2 or more hectares.

Where possible adjustments have been made to both the 1980 Census and the Inventory to achieve the nearest available comparison. The apparent changes indicated in the following tables and charts should therefore be treated with caution, particularly where areas are small.

Table 19:	Comparison of woodland area between 1980 Census and 1997 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1997 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1997 Inventory

### Woodland cover

Chart	Change in woodland cover through time (1890 – 2000)
Maps:	Woodland by county through time (1895 – 1997)

*Note: The figures in many of the tables may not add due to rounding*



**Table 19** Comparison of woodland area between 1980 Census and 1997 Inventory

Woodland size (ha)	1980 Census woodland area		1997 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	62,061	95.9	68,195	90.8	10
0.25 - <2.0	2,643	4.1	6,888	9.2	161
<b>Total</b>	<b>64,704</b>		<b>75,083</b>		<b>16</b>
<b>% Woodland land cover</b>	<b>12.7</b>		<b>14.8</b>		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1997), 507,716 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 507,740ha, (Ordnance Survey data)

**Table 20** Comparison of High Forest area by species between 1980 Census and 1997 Inventory

Species	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
Scots pine	684	721	5
Corsican pine	90	85	-5
Lodgepole pine	1,234	839	-32
Sitka spruce	26,416	29,529	12
Norway spruce	5,530	3,578	-35
European larch	883	254	-71
Jap/Hybrid larch	5,046	5,475	9
Douglas fir	3,276	2,863	-13
Other conifers	2,088	1,873	-10
Mixed conifers	453	202	-55
<b>Total conifers</b>	<b>45,700</b>	<b>45,419</b>	<b>-1</b>
Oak	7,284	10,855	49
Beech	738	1,447	96
Sycamore	388	560	44
Ash	2,938	4,021	37
Birch	1,322	2,596	96
Poplar	90	70	-22
Sweet chestnut	55	25	-55
Elm	17	14	-15
Other broadleaves	2,426	3,836	58
Mixed broadleaves	747	1,466	96
<b>Total broadleaves</b>	<b>16,006</b>	<b>24,890</b>	<b>56</b>
<b>Total all species</b>	<b>61,706</b>	<b>70,309</b>	<b>14</b>
<b>Felled</b>	<b>1,214</b>	<b>2,735</b>	<b>125</b>
<b>Total High Forest</b>	<b>62,920</b>	<b>73,044</b>	<b>16</b>

1. Differences in sampling methodology may account for some of the apparent differences.
2. In the 1980 Census the areas assigned to species included any associated open space such as roads and rides. In the Inventory open spaces are separately identified and the overall proportion is 2.7% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 2.7%.
3. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
4. The 1980 figures include scrub to enable comparison

Comparison of High Forest area by species between 1980 Census and 1997 Inventory

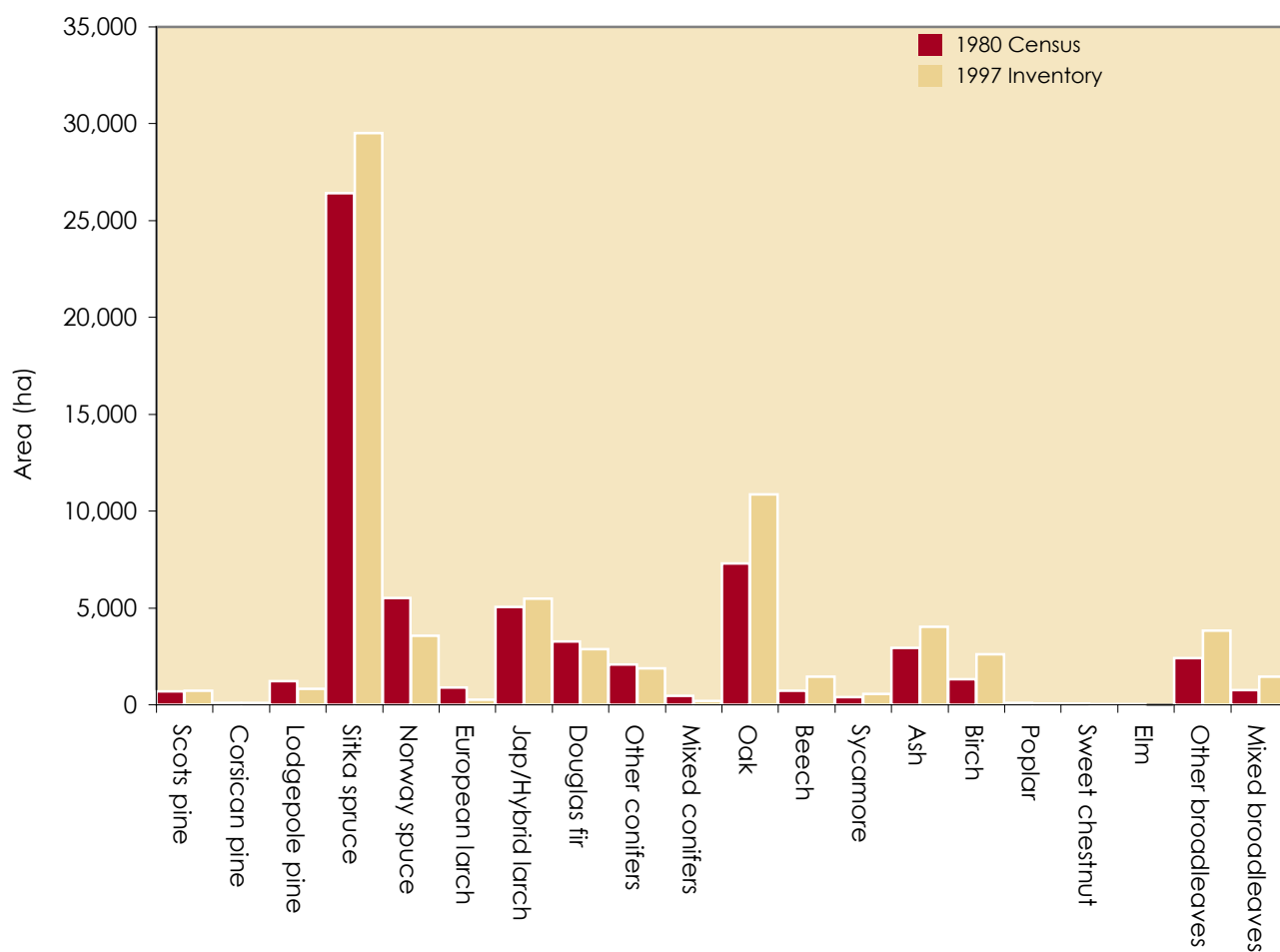
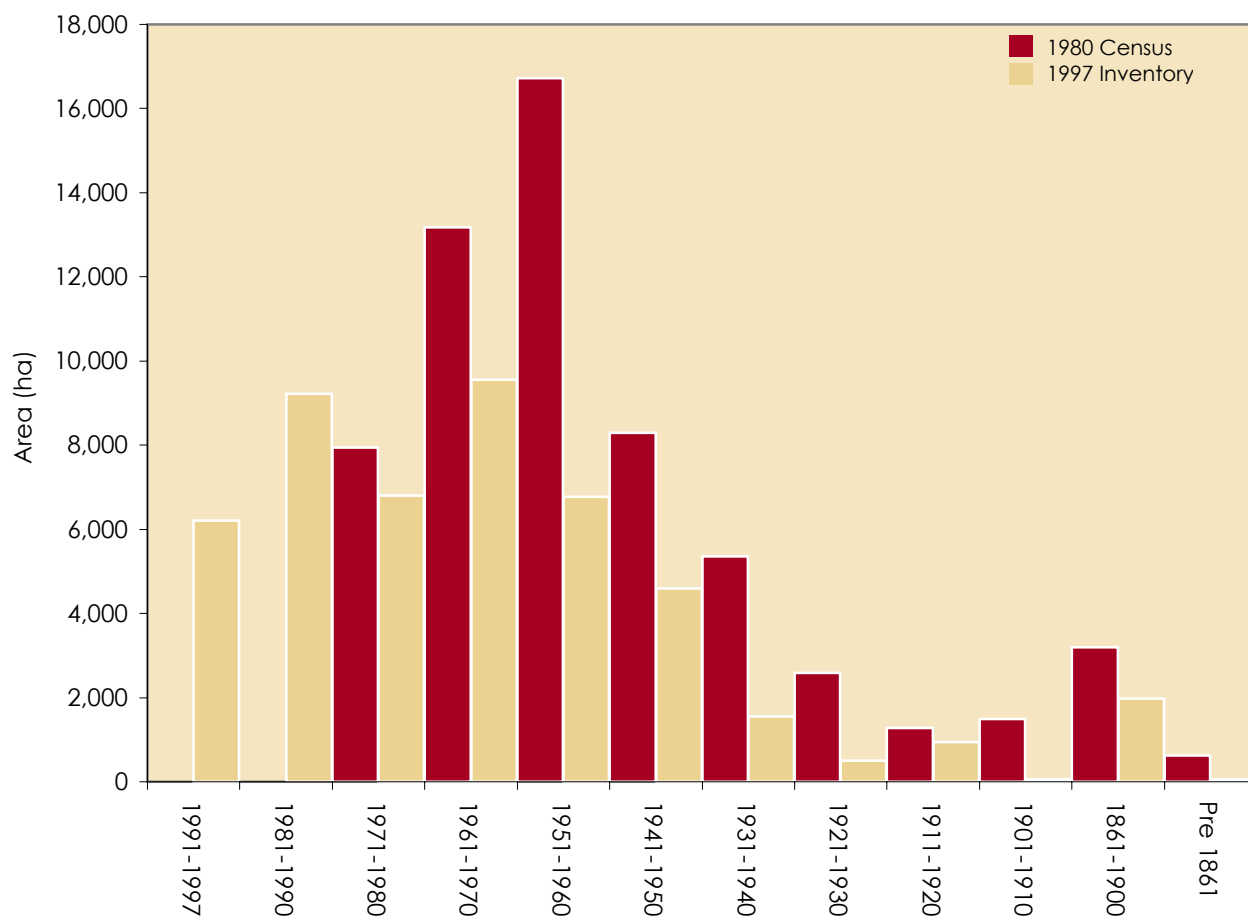


Table 21 Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory

Planting year class	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
1991-1997	0	6,203	see note
1981-1990	0	9,225	see note
1971-1980	7,935	6,794	-14
1961-1970	13,178	9,554	-28
1951-1960	16,719	6,777	-59
1941-1950	8,288	4,589	-45
1931-1940	5,357	1,550	-71
1921-1930	2,579	501	-81
1911-1920	1,280	936	-27
1901-1910	1,486	59	-96
1861-1900	3,198	1,975	-38
Pre 1861	622	60	-90
<b>Total all years</b>	<b>60,643</b>	<b>48,222</b>	<b>-20</b>

1. The first two classes, 1991-1997 and 1981-1990, cover the period since the 1980 Census and no comparison is therefore available.
2. The definition of High Forest Category 1 in the Inventory does not fully coincide with High Forest as defined in the 1980 Census.

**Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory**

1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

**Table 22** Comparison of numbers of live trees outside woodland between 1980 Census and 1997 Inventory (000's)

Feature type	1980 Census	1997 Inventory	Change (%)
Boundary Tree	221	88	-60
Middle Tree	119	64	-46
Total Individual Trees	340	152	-55
Groups	1,118	1,028	-8
Linear Features	1,476	1,339	-9
<b>Total</b>	<b>2,934</b>	<b>2,519</b>	<b>-14</b>

1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded, the 1997 Inventory figures have been adjusted accordingly. The 1997 figures above will therefore not match those in the previous sections of the report.
3. Changes stated in this table are indicative only. Even with adjustments to the 1997 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1997 used 2m height, as minimum criteria for inclusion.
4. See Glossary for definitions of feature type.

**Table 23** Comparison of density of non-woodland features between 1980 Census and 1997 Inventory

Feature type	1980 Census	1997 Inventory	Change (%)
Individual Trees (per sq km)	67.0	30.0	-55
Groups (per sq km)	37.6	31.4	-17
Linear Features (m per sq km)	559.3	619.7	11

1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded, the 1997 Inventory figures have been adjusted accordingly. The 1997 figures above will therefore not match those in the previous sections of the report.
3. Changes stated in this table are indicative only. Even with adjustments to the 1997 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1997 used 2m height, as minimum criteria for inclusion.
4. See Glossary for definitions of feature type.

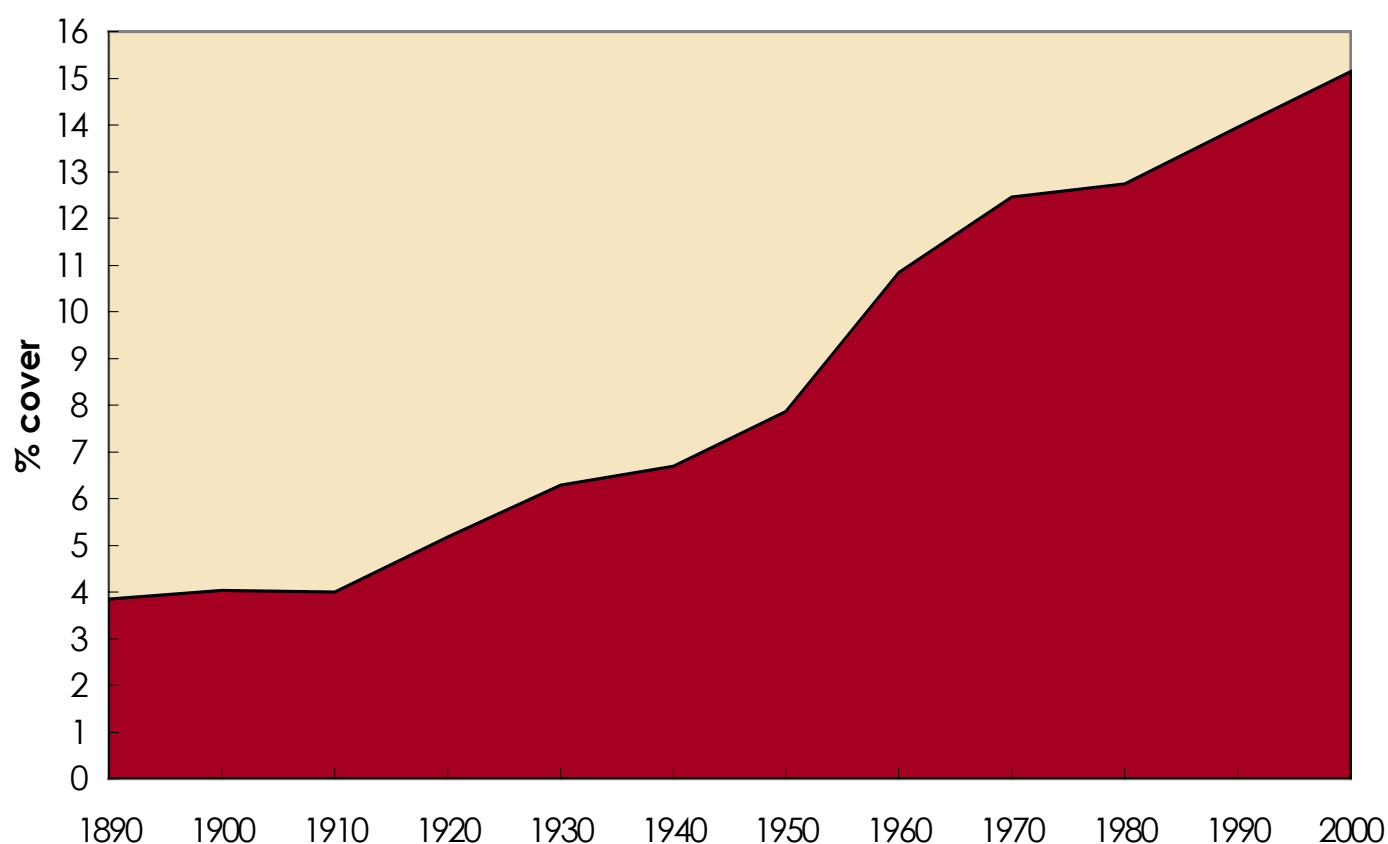


## WOODLAND COVER

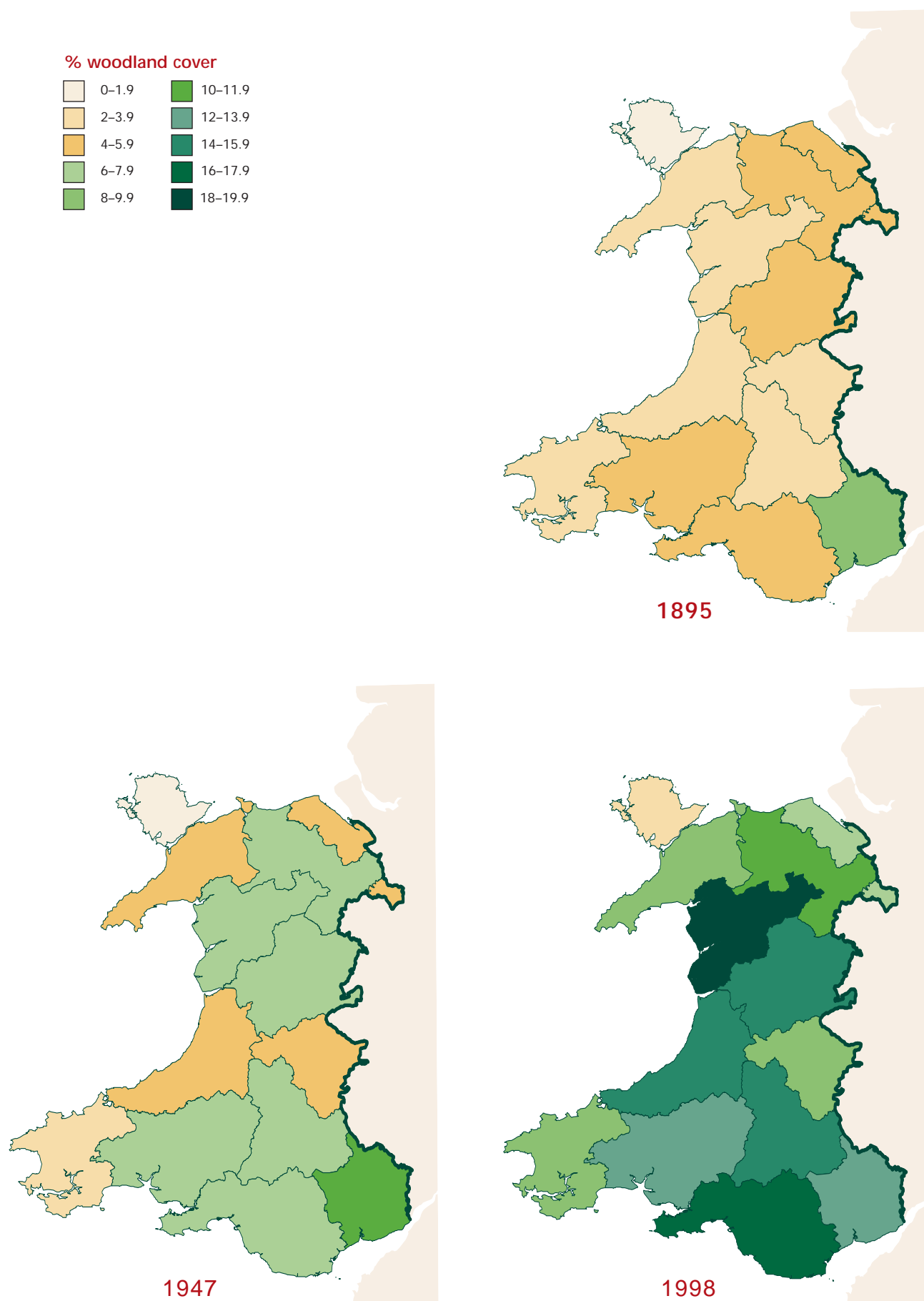
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

The maps use the old County structure data of Wales, as reported on in 1895 and 1947. The data from these counties could not be re-worked for different geographic areas. In contrast, the digital woodland map, which forms the basis of the current inventory, can be analysed for any geographic area.

### Change in county woodland cover through time (1890 – 2000)



Map 5 Woodland cover by county through time (1895–1998)



# GLOSSARY

## Woodland

In the United Kingdom woodland is defined as land with a minimum area of 0.1 ha under stands of trees with, or the potential to achieve, tree crown cover of more than 20%. Areas of open space integral to the woodland are also included. Orchards and urban woodland between 0.1 and 2 ha are excluded. Intervening land-classes such as roads, rivers or pipelines are disregarded if less than 50m in extent. 'Scrubby' vegetation is not included as a separate category but as Conifer, Broadleaved or Mixed tree types. There is additional information on the quality of woodland within the inventory database.

Woodland of 2 ha and over, and with a minimum width of 50m, is included in the Main Woodland Survey; other woodland and trees are assessed in the Survey of Small Woodland and Trees.

## Interpreted Forest Types

The woodland map derived from aerial photographs is differentiated into Interpreted Forest Types (IFTs) which are: Conifer, Broadleaved, Mixed, Coppice, Coppice-with-Standards, Shrubs, Young Trees, Ground Prepared for Planting and Felled. Note that forest types (see below) based on ground survey data are used for reporting purposes because they are more reliable.

## High Forest

All woodland except stands managed as Coppice or Coppice-with-Standards with, or with the potential to achieve a tree cover of more than 20%. Two categories of High Forest are recognised:

- **High Forest Category 1**  
Stands which are, or could become, capable of producing wood of a size and quality suitable for sawlogs.
- **High Forest Category 2**  
Stands of lower quality than High Forest Category 1.

## Mixtures

Where possible the species in mixtures have been separately recorded. Where this has not been possible they were described as 'Mixed conifers' or 'Mixed broadleaves'.

## Forest Types

- **Conifer**  
Woodland containing more than 80% by area of coniferous species.
- **Broadleaved**  
Woodland containing more than 80% by area of broadleaved species.
- **Mixed**  
A combination of broadleaved and coniferous species where each category occupies at least 20% of the canopy (see note on mixtures above.)

- **Coppice**

Crops of marketable broadleaved species that have at least 2 stems per stool and are either being worked or are capable of being worked on rotation. With the exception of hazel coppice more than half the stems should be capable of producing 1m timber lengths of good form.

- **Coppice with Standards**

Two-storey stands where the overstorey consists of at least 25 stems per ha that are older than the understorey of worked coppice by at least one coppice rotation.

- **Felled**

Woodland areas that have been felled or stands where the stocking has been reduced to less than 20% and where it is expected that these areas will be replanted.

- **Windblow**

Areas of blown woodland which remain uncleared and not regenerated.

- **Open Space**

Areas within a woodland that are not covered by trees but are integral to the woodland such as open areas, streamsides, deer glades, rides and forest roads.

### Ownership types

- **Other Ownership**

Woodland other than that owned by, or leased to, the Forestry Commission

- **Personal**

types of private occupation, e.g. individuals, private family trusts and family partnerships.

- **Private forestry or timber business**

owned by wood processing industry. This category does not include forest management companies.

- **Other private business**

occupiers, e.g. companies, partnerships, syndicates and pension funds.

- **Local Authority**

Region, County, District or other Council

- **Other public bodies (not FC)**

Government department/agency, nationalised industry, etc.

- **Charitable organisations**

organisations funded by voluntary public subscription, e.g. National Trust, churches and colleges.

**- Community ownership or common land**

the common property of all members of the community.

- **Forestry Commission**

Land owned by or land leased to the Forestry Commission

**Feature types**

- **Small Wood**

A woodland with an area of 0.1 ha or over but less than 2 ha.

- **Group**

A group containing two or more trees with an area less than 0.1 ha.

- **Individual Tree**

A tree the crown of which has no contact with any other tree crown and which is at least 2m tall. Two types of individual tree are recognised:

- Boundary Tree (an Individual Tree on any boundary)

- Middle Tree (an Individual Tree not on a boundary)

- **Linear Feature**

A feature with a length of 25 m or more, and one which is at least four times as long as it is broad. It can be up to 50m wide or as narrow as a single line of trees. Two types of Linear Features are recognised:

- Narrow Linear Features (with a width of 16 m or less)

- Wide Linear Features (with a width greater than 16 m)

## NOTES