



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

WEST YORKSHIRE



Forestry Commission

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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 West Yorkshire 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 West Yorkshire 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 England, 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 England was stratified into coastal and inland 1 km x 1 km squares and a random sample of 1 km² 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 km² 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 West Yorkshire is 10,606 hectares. This represents 5.2% of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 68.5 % of all woodland. Conifer woodland represents 12.8 %, Mixed woodland 14.6 % and Open Space within woodlands 3.3 %. (Table 2)
- The main conifer species is larch covering 707 hectares or 33.1 % of all conifer species. The main broadleaved species is sycamore covering 1,933 hectares or 24.0 % of all broadleaved species. (Table 3)
- There are a total of 917 woods over 2 ha within West Yorkshire with a mean wood area of 11.6 hectares. (Table 7a) There are a total of 305 woods from 0.1 - <2.0 hectares with a mean wood area of 0.51 hectares. (Table 14)
- There are 135.6 thousand live trees outside woodland in West Yorkshire. (Table 15)
- Woodland land cover increased by over 1,200 hectares from 4.6 % to 5.2 % of the land area between 1980 and 1999. (Table 19)
- The area of broadleaves increased by 12% between 1980 and 1999, with the relative proportion of broadleaves to conifers decreasing from 81 % to 79 %. (Table 20)

INVENTORY REPORTS

As well as this report for West Yorkshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



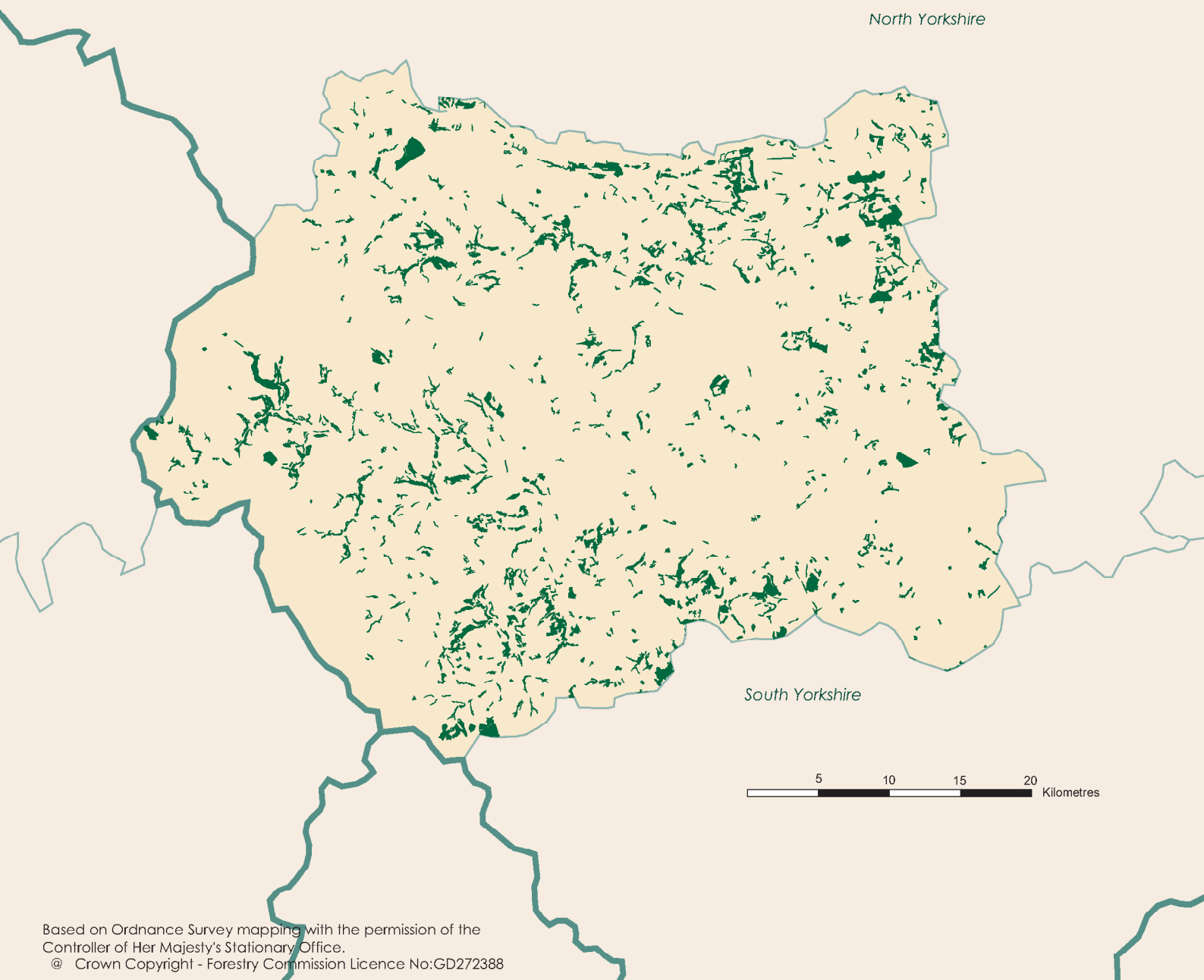
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Map 2 Distribution of woodland over 2 hectares



Map 3 Distribution of woodland over 2 hectares by ownership

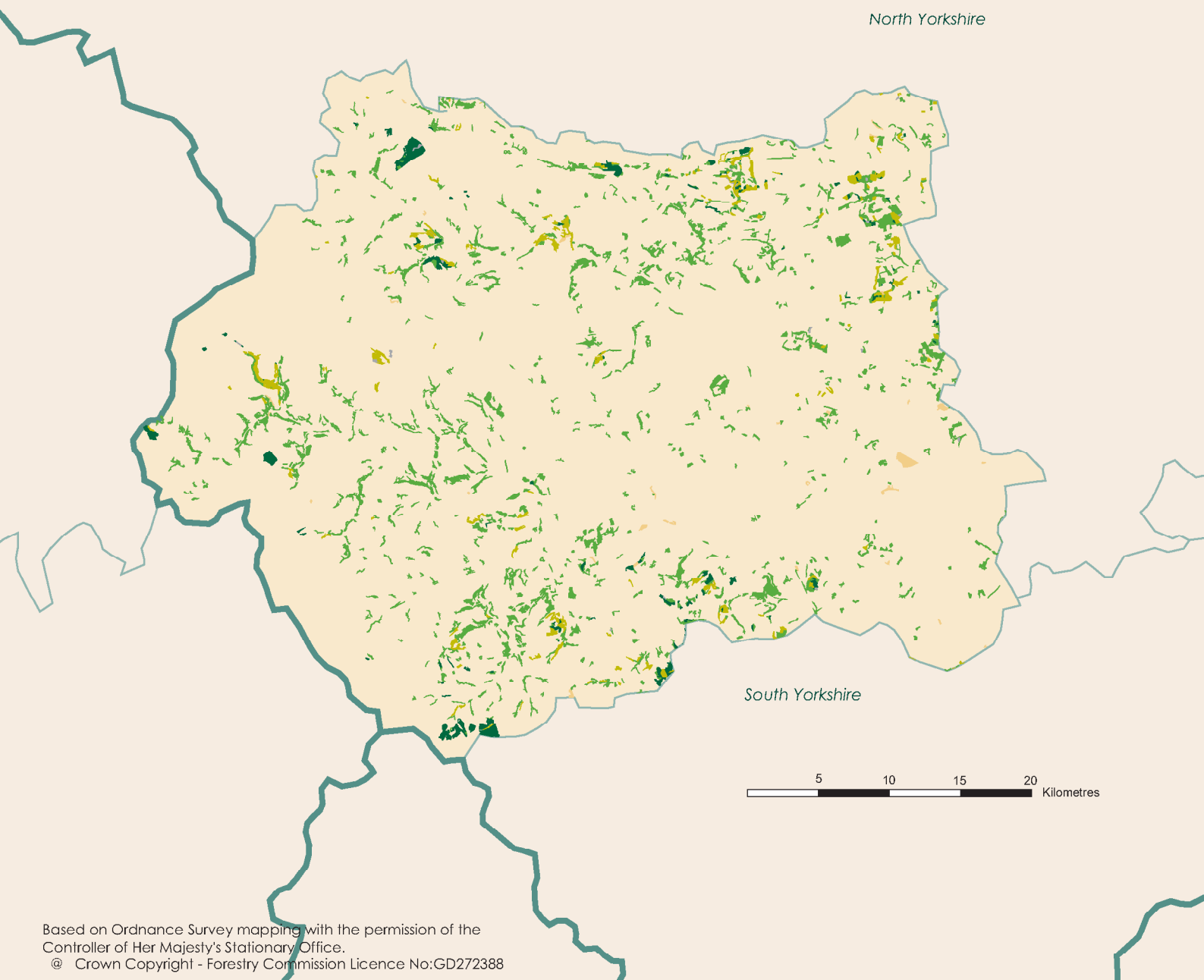
- Forestry Commission woodland (none present)
- Other woodland



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

- Broadleaves
- Conifer
- Mixed
- Felled
- Young trees & shrubs
- Ground prepared for planting (none present)
- Coppice (none present)



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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 West Yorkshire.

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	10,451	98.5
0.25 - < 2.00	153	1.4
0.10 - < 0.25	3	0.0
Total area of woodland	10,606	100.0
% Woodland land cover	5.2	

1. Area of West Yorkshire, including inland water, 203,417 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	1,339	0	1,339	12.6
Broadleaved	7,138	100	7,238	68.2
Mixed	1,545	51	1,596	15.0
Coppiced	7	0	7	0.1
Copp-w-standards	50	0	50	0.5
Windblow	0	0	0	0.0
Felled	24	0	24	0.2
Open Space	348	5	353	3.3
Total	10,451	155	10,606	100

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	564	5	569	26.7	5.6
Sitka spruce	686	0	686	32.1	6.7
Larch	699	8	707	33.1	7.0
Other conifers	80	0	80	3.7	0.8
Mixed conifers	82	10	92	4.3	0.9
Total conifers	2,112	23	2,135	100.0	21.0
Oak	1,915	5	1,920	23.9	18.9
Beech	1,880	10	1,890	23.5	18.6
Sycamore	1,925	8	1,933	24.0	19.0
Ash	502	13	515	6.4	5.1
Birch	884	31	915	11.4	9.0
Elm	9	0	9	0.1	0.1
Other broadleaves	349	61	410	5.1	4.0
Mixed broadleaves	447	0	447	5.6	4.4
Total broadleaves	7,911	128	8,039	100.0	79.0
Total all species***	10,022	150	10,172		100.0

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

**Species/group percentage of all species

***Excludes the 434ha 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	9%
Broadleaves	4%
Larch	21%
Oak	10%
Sycamore	10%
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	13,200	72,800	6	36
Narrow Linear Features	0	0	0	0
Individual Trees	62,800	62,800	1	31
Total		135,600		67

1. Land area used to calculate tree density 203,417ha 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	37%
Narrow Linear Features	-
Individual Trees	23%
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	0	0	0
Total		0	0

1. In West Yorkshire the field data did not record any trees occurring in these feature types.

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 6 Summary of woodland area by ownership

Ownership	ha	% woodland
Forestry Commission	0	0
Other	10,451	100
Total area of woodland	10,451	100

1. Woodland area from aerial photographic interpretation map updated to 31 March 1999
2. See Glossary for definitions of ownership types

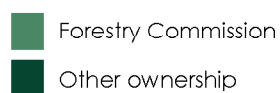
Woodland area by ownership

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	701	2,997	28	4.3
10 - <20	109	1,533	14	14.1
20 - <50	61	1,916	18	31.4
50 - <100	34	2,365	22	69.5
<100	905	8,810	83	9.7
100 - <500	12	1,836	17	153.0
500 and >	0	0	0	0.0
All woods	917	10,646	100	11.6

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	0	0	0	0.0
	O	701	2,997	28	4.3
10 - <20	FC	0	0	0	0.0
	O	109	1,533	14	14.1
20 - <50	FC	0	0	0	0.0
	O	61	1,916	18	31.4
50 - <100	FC	0	0	0	0.0
	O	34	2,365	22	69.5
<100	FC	0	0	0	0.0
	O	905	8,810	83	9.7
100 - <500	FC	0	0	0	0.0
	O	12	1,836	17	153.0
500 and >	FC	0	0	0	0.0
	O	0	0	0	0.0
Total	FC	0	0	0	0.0
	O	917	10,646	100	11.8

1. Table 7a and 7b are based solely on the digital woodland map. The other MWS tables are derived from the field sample data
2. The total area in Tables 7a and 7b is 195 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
3. 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	0	0.0	1,339	12.8	1,339	12.8
Broadleaved	0	0.0	7,138	68.3	7,138	68.3
Mixed	0	0.0	1,545	14.8	1,545	14.8
Coppice	0	0.0	7	0.1	7	0.1
Copp-w-Stds	0	0.0	50	0.5	50	0.5
Windblow	0	0.0	0	0.0	0	0.0
Felled	0	0.0	24	0.2	24	0.2
Open Space	0	0.0	348	3.3	348	3.3
Total	0	0.0	10,451	100.0	10,451	100.0

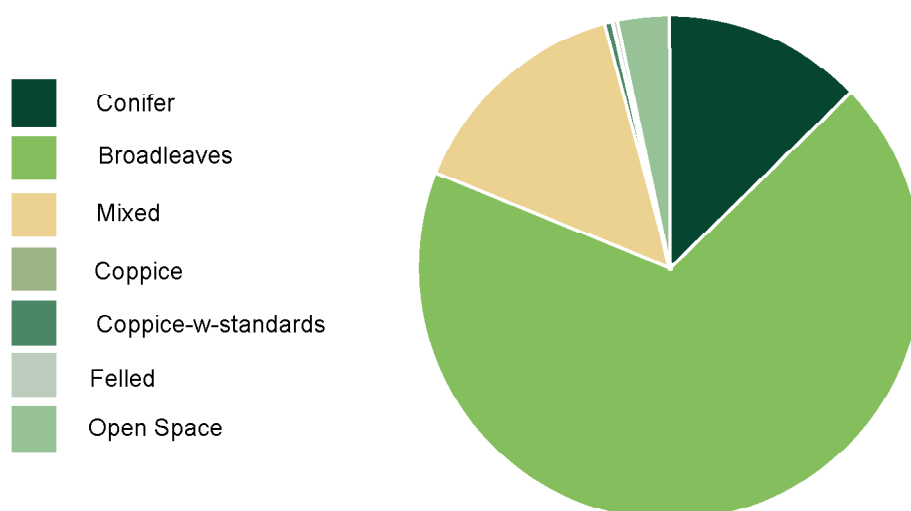
Area of woodland by forest type

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	0	0	0	425	20	4	425	20	4
Corsican pine	0	0	0	93	4	1	93	4	1
Lodgepole pine	0	0	0	46	2	0	46	2	0
Sitka spruce	0	0	0	686	32	7	686	32	7
Norway spruce	0	0	0	37	2	0	37	2	0
European larch	0	0	0	477	23	5	477	23	5
Jap/Hybrid larch	0	0	0	222	11	2	222	11	2
Douglas fir	0	0	0	0	0	0	0	0	0
Other conifers	0	0	0	43	2	0	43	2	0
Mixed conifers	0	0	0	82	4	1	82	4	1
Total conifers	0	0	0	2,112	100	21	2,112	100	21
Oak	0	0	0	1,915	24	19	1,915	24	19
Beech	0	0	0	1,880	24	19	1,880	24	19
Sycamore	0	0	0	1,925	24	19	1,925	24	19
Ash	0	0	0	502	6	5	502	6	5
Birch	0	0	0	884	11	9	884	11	9
Poplar	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0
Elm	0	0	0	9	0	0	9	0	0
Other broadleaves	0	0	0	349	4	3	349	4	3
Mixed broadleaves	0	0	0	447	6	4	447	6	4
Total broadleaves	0	0	0	7,911	100	79	7,911	100	79
Total - all species	0		0	10,022		100	10,022		100
Felled	0			24			24		
Total High Forest	0			10,046			10,046		

*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 348ha 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	9%
Broadleaves	4%
Sitka spruce	17%
Oak	10%
Sycamore	10%
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

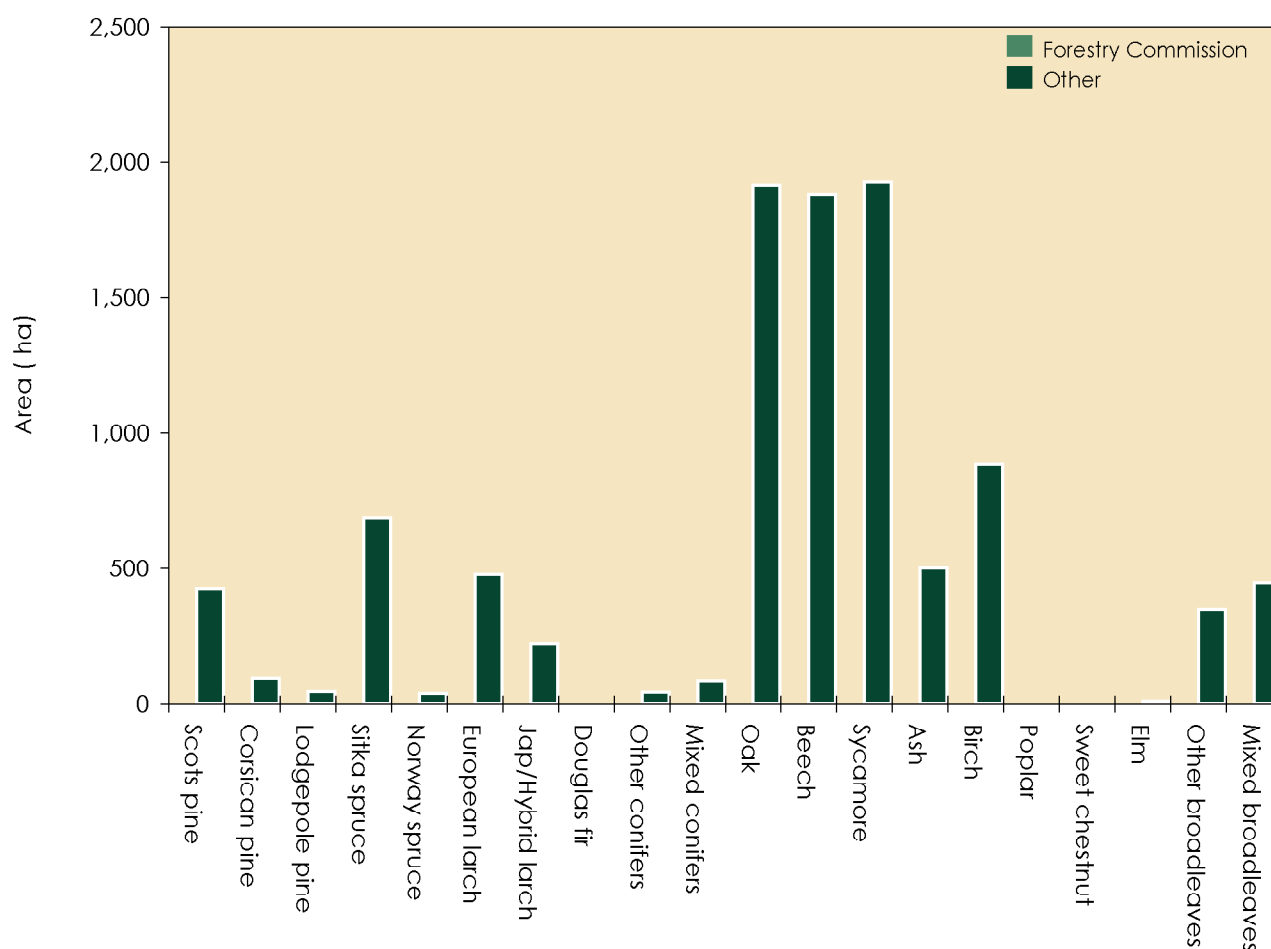


Table 9b Area of High Forest by principal species,ownership and category

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	0	0	0	375	50	425	375	50	425
Corsican pine	0	0	0	93	0	93	93	0	93
Lodgepole pine	0	0	0	46	0	46	46	0	46
Sitka spruce	0	0	0	686	0	686	686	0	686
Norway spruce	0	0	0	37	0	37	37	0	37
European larch	0	0	0	472	5	477	472	5	477
Jap/Hybrid larch	0	0	0	222	0	222	222	0	222
Douglas fir	0	0	0	0	0	0	0	0	0
Other conifers	0	0	0	43	0	43	43	0	43
Mixed conifers	0	0	0	82	0	82	82	0	82
Total conifers	0	0	0	2,057	55	2,112	2,057	55	2,112
Oak	0	0	0	1,686	229	1,915	1,686	229	1,915
Beech	0	0	0	1,736	144	1,880	1,736	144	1,880
Sycamore	0	0	0	1,769	156	1,925	1,769	156	1,925
Ash	0	0	0	502	0	502	502	0	502
Birch	0	0	0	712	171	884	712	171	884
Poplar	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0
Elm	0	0	0	9	0	9	9	0	9
Other broadleaves	0	0	0	306	43	349	306	43	349
Mixed broadleaves	0	0	0	389	58	447	389	58	447
Total broadleaves	0	0	0	7,109	802	7,911	7,109	802	7,911
Total - all species	0	0	0	9,166	856	10,022	9,166	856	10,022

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

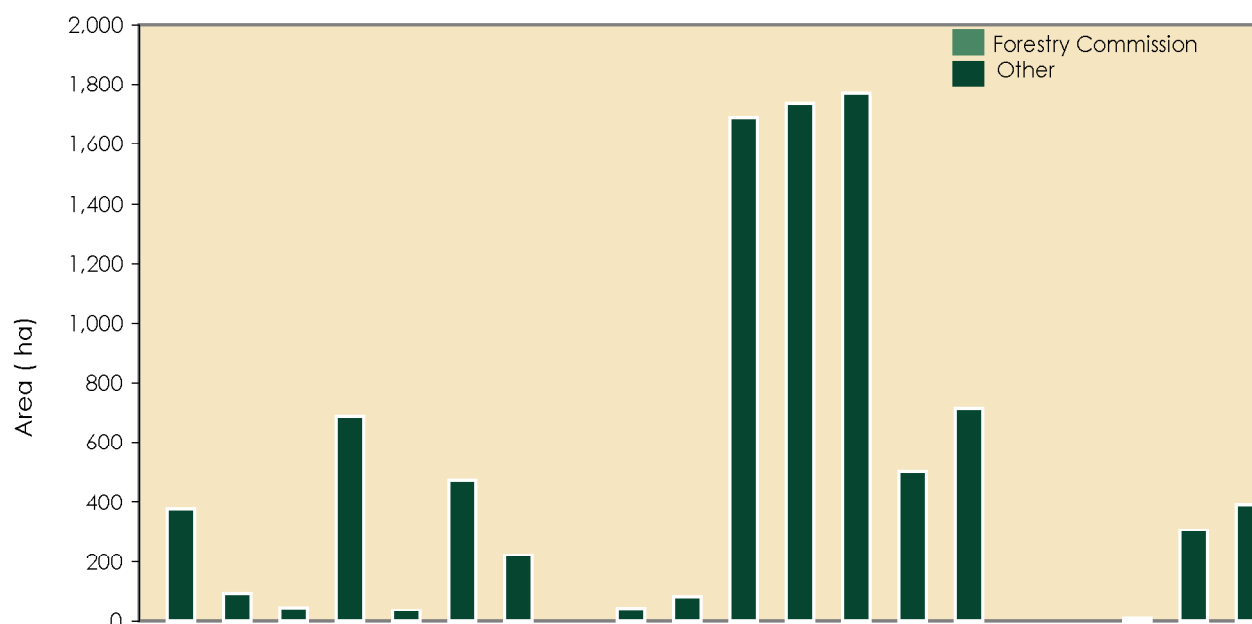
	Category 1*	Category 2*	Total High Forest
Conifers	9%	61%	9%
Broadleaves	4%	13%	4%
Sitka spruce	17%	-	17%
Oak	10%	32%	10%
Sycamore	11%	33%	10%

*See Glossary for Category 1 and Category 2 descriptions

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

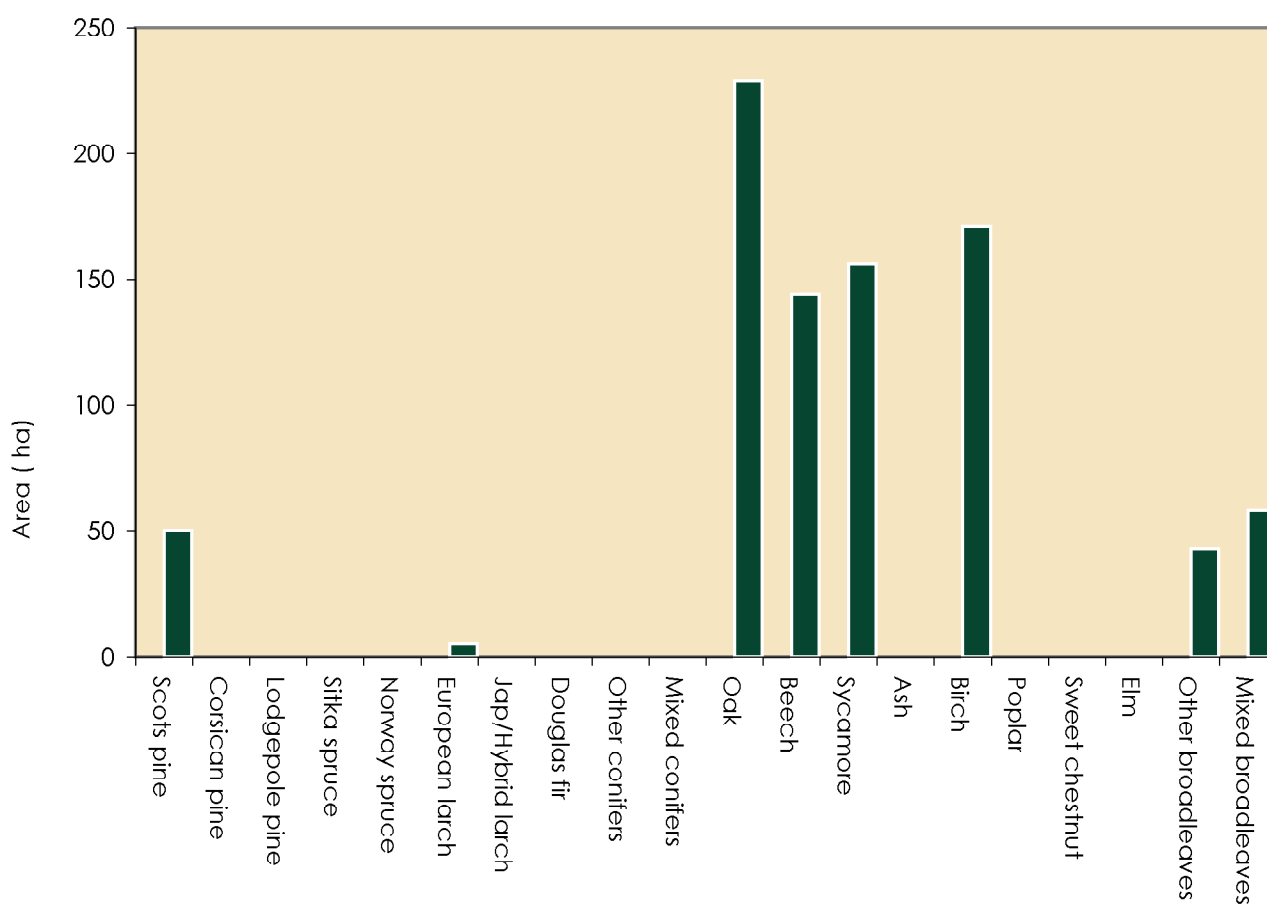
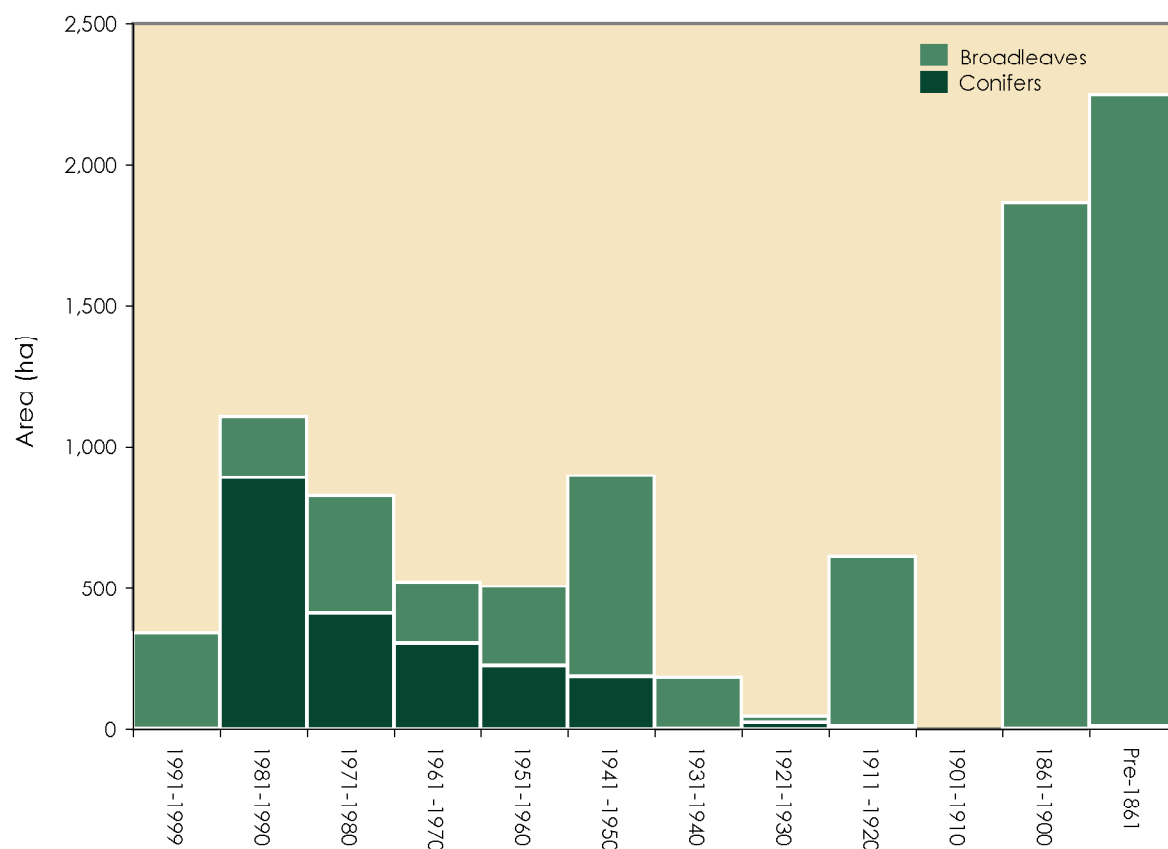


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1999	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	32	72	88	124	56	0	0	5	0	0	0	375
Corsican pine	0	36	16	3/	0	0	0	0	5	0	0	0	93
Lodgepole pine	0	0	46	0	0	0	0	0	0	0	0	0	46
Sitka spruce	0	686	0	0	0	0	0	0	0	0	0	0	686
Norway spruce	0	14	23	0	0	0	0	0	0	0	0	0	37
European larch	0	38	123	114	72	125	0	0	0	0	0	0	472
Jap/Hybrid larch	0	69	88	37	28	0	0	0	0	0	0	0	222
Douglas fir	0	0	0	0	0	0	0	0	0	0	0	0	0
Other conifers	0	0	7	27	0	0	0	0	0	0	0	9	43
Mixed conifers	0	18	37	0	0	5	0	23	0	0	0	0	82
Total conifers	0	892	411	302	225	185	0	23	9	0	0	9	2,057
Oak	79	0	26	0	22	42	0	0	52	0	452	1,013	1,686
Beech	9	5	28	118	0	38	0	0	197	0	352	990	1,736
Sycamore	0	51	105	34	220	361	170	18	174	0	603	32	1,769
Ash	65	0	17	9	0	56	0	5	85	0	197	69	502
Birch	0	67	133	49	15	162	13	0	83	0	191	0	712
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	9	0	0	0	9
Other broadleaves	20	33	17	0	18	20	0	0	5	0	57	137	306
Mixed broadleaves	170	63	91	9	7	35	0	0	0	0	13	0	389
Total broadleaves	343	218	418	219	281	713	183	23	604	0	1,865	2,240	7,109
Total - all species	343	1,110	829	521	506	899	183	45	614	0	1,865	2,250	9,166

*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, 1991-1999 is 9 years, and the classes prior to 1901 are 40 years or more.

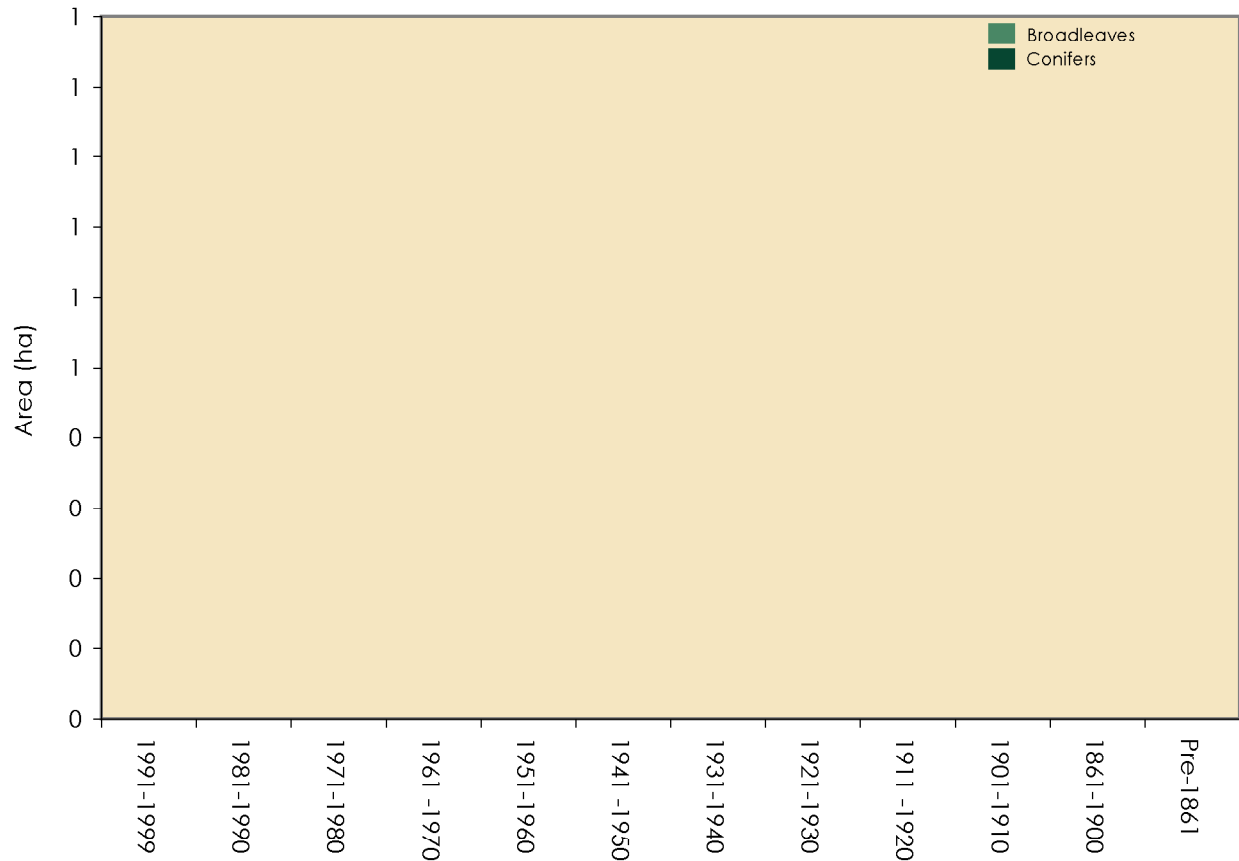
Table 10b High Forest Category 1 - Forestry Commission : area by principal species and planting year classes

Species	Planting year class*												Total (ha)
	1991-1999	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	0	0	0	0	0	0	0	0	0	0	0
Corsican pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas fir	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
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Sycamore	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Birch	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Total broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Total - all species	0	0	0	0	0	0	0	0	0	0	0	0	0

*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.

1. In West Yorkshire there was no Forestry Commission woodland at the date of survey.

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



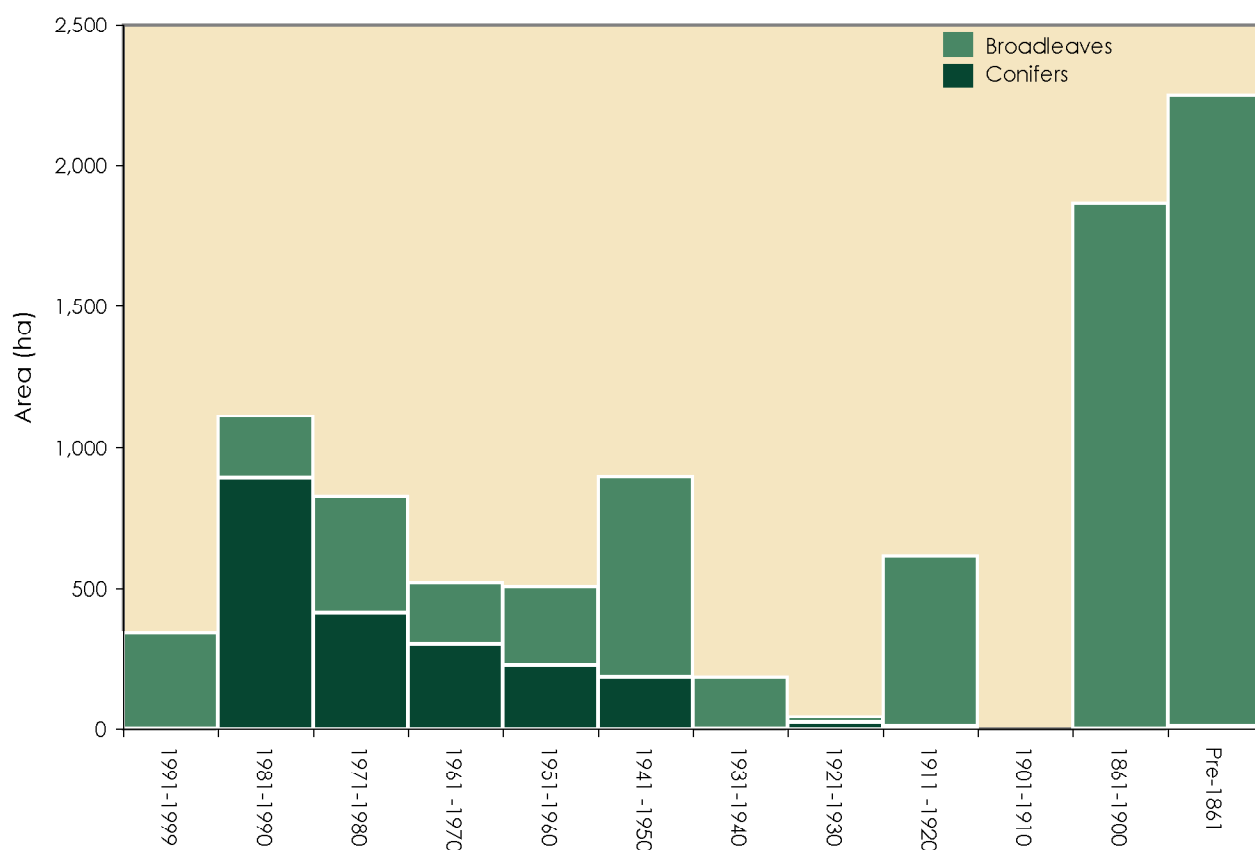
1. Most of the planting year classes cover 10 years, 1991-1999 is 9 years, and the classes prior to 1901 are 40 years or more.
2. In West Yorkshire there was no Forestry Commission woodland at the date of survey.

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

Species	Planting year class*												Total (ha)
	1991-1999	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	32	72	88	124	56	0	0	5	0	0	0	375
Corsican pine	0	36	16	37	0	0	0	0	5	0	0	0	93
Lodgepole pine	0	0	46	0	0	0	0	0	0	0	0	0	46
Sitka spruce	0	686	0	0	0	0	0	0	0	0	0	0	686
Norway spruce	0	14	23	0	0	0	0	0	0	0	0	0	37
European larch	0	38	123	114	72	125	0	0	0	0	0	0	472
Jap/Hybrid larch	0	69	88	37	28	0	0	0	0	0	0	0	222
Douglas fir	0	0	0	0	0	0	0	0	0	0	0	0	0
Other conifers	0	0	7	27	0	0	0	0	0	0	0	9	43
Mixed conifers	0	18	37	0	0	5	0	23	0	0	0	0	82
Total conifers	0	892	411	302	225	185	0	23	9	0	0	9	2,057
Oak	79	0	26	0	22	42	0	0	52	0	452	1,013	1,686
Beech	9	5	28	118	0	38	0	0	197	0	352	990	1,736
Sycamore	0	51	105	34	220	361	170	18	174	0	603	32	1,769
Ash	65	0	17	9	0	56	0	5	85	0	197	69	502
Birch	0	67	133	49	15	162	13	0	83	0	191	0	712
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	9	0	0	0	9
Other broadleaves	20	33	17	0	18	20	0	0	5	0	57	137	306
Mixed broadleaves	170	63	91	9	7	35	0	0	0	0	13	0	389
Total broadleaves	343	218	418	219	281	713	183	23	604	0	1,865	2,240	7,109
Total - all species	343	1,110	829	521	506	899	183	45	614	0	1,865	2,250	9,166

*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, 1991-1999 is 9 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	%
1991-99	Mixed broadleaves	50	Oak	23	Ash	19
1981-90	Sitka spruce	62	Jap/Hybrid larch	6	Mixed broadleaves	6
1971-80	Birch	21	Mixed broadleaves	14	European larch	13
1961-70	Beech	22	European larch	21	Scots pine	16
1951-60	Sycamore	42	Scots pine	23	European larch	13
1941-50	Sycamore	38	Birch	18	European larch	13
1931-40	Sycamore	65	Birch	34	-	
1921-30	Sycamore	72	Mixed conifers	15	Mixed broadleaves	7
1911-20	Beech	29	Sycamore	29	Oak	13
1901-10	-		-		-	
1861-1900	Sycamore	29	Oak	26	Beech	20
Pre 1861	Oak	46	Beech	44	Other broadleaves	6
All years	Sycamore	19	Oak	19	Beech	19

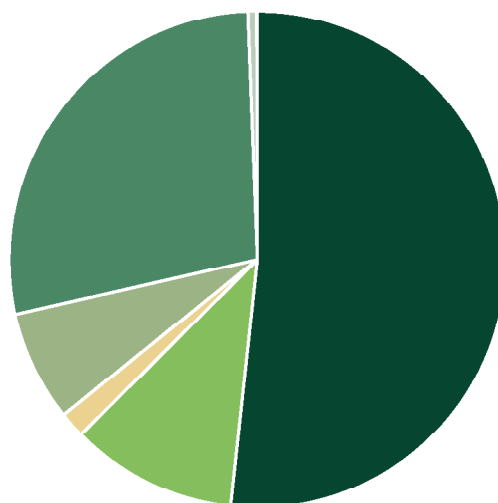
1. Principal species as a percentage of area in the planting year class.

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	5,411	51.8
Business	1,121	10.7
Forestry or timber business	180	1.7
Charity	737	7.1
Local Authority	2,958	28.3
Other public (not FC)	45	0.4
Forestry Commission	0	0.0
Community ownership or common land	0	0.0
Unidentified	0	0.0
Total	10,451	100.0

* 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 England was stratified into coastal and inland 1 km x 1 km squares and a random sample of 1 km² 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 km² 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	305	155	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	0	0	Length (Km)
Narrow Linear Features	0	0	Number of live trees
Groups	13,200	72,800	Number of live trees
Individual Trees	62,800	62,800	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	3	153	155	305	0.51
Wide Linear Features	0	0	0	0	0.00
Total	3	153	155	305	0.51

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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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
Total conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oak	10.1	3.1	20.9	0.0	34.1	25.2	25.1
Beech	0.0	0.8	0.0	0.0	0.8	0.6	0.6
Sycamore	11.6	1.5	12.4	0.0	25.5	18.8	18.8
Ash	13.9	0.0	5.4	0.0	19.3	14.2	14.2
Birch	1.5	0.8	7.0	0.0	9.3	6.9	6.9
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	9.3	0.0	9.3	6.9	6.9
Other broadleaves	15.5	3.9	17.8	0.0	37.2	27.5	27.4
Total broadleaves	52.7	10.1	72.8	0.0	135.5	100.0	100.0
Total - all species	52.7	10.1	72.8	0.0	135.6		100.0

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 23%
 Groups 37%
 Narrow Linear Features -

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	0.0	0.0	0.0	0.0
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
Total conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oak	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beech	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sycamore	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Birch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0
Other broadleaves	0.8	0.0	0.0	0.0	0.8	100.0	100.0
Total broadleaves	0.8	0.0	0.0	0.0	0.8	100.0	100.0
Total - all species	0.8	0.0	0.0	0.0	0.8		100.0

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	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.0	0.0	0.0
Larch	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	0.0	0.0
Other conifers	0.0	0.0	0.0	0.0	0.0
Total conifers	0.0	0.0	0.0	0.0	0.0
Oak	7.0	25.6	1.5	0.0	34.1
Beech	0.0	0.8	0.0	0.0	0.8
Sycamore	13.2	11.6	0.8	0.0	25.6
Ash	3.9	11.6	3.9	0.0	19.4
Birch	5.4	3.9	0.0	0.0	9.3
Poplar	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0
Alder	0.0	0.0	0.0	0.0	0.0
Lime	0.0	0.0	0.0	0.0	0.0
Elm	0.0	0.0	0.0	0.0	0.0
Willow	1.5	7.7	0.0	0.0	9.2
Other broadleaves	24.0	13.2	0.0	0.0	37.2
Total broadleaves	55.0	74.4	6.2	0.0	135.6
Total - all species	55.0	74.4	6.2	0.0	135.6

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	2
3-5	3
6-10	5
11-20	3
21-50	0
51-100	0
>100	0
Total	13

*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 1999 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 1999 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1999 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1999 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1999 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1999 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1999 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1999 Inventory

Woodland cover

Chart	Change in woodland cover through time (1890 – 2000)
Maps:	Woodland by county through time (1895 – 1998)

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

Table 19 Comparison of woodland area between 1980 Census and 1999 Inventory

Woodland size (ha)	1980 Census woodland area		1999 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	8,120	86.8	10,451	98.6	29
0.25 - <2.0	1,230	13.2	153	1.4	-88
Total	9,350		10,604		13
% Woodland land cover	4.6		5.2		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1999 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1999 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1999), 203,417 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 203,912ha, (Ordnance Survey data)

Table 20 Comparison of High Forest area by species between 1980 Census and 1999 Inventory

Species	1980 Census woodland area (ha)	1999 Inventory woodland area (ha)	Change (%)
Scots pine	279	430	54
Corsican pine	193	93	-52
Lodgepole pine	137	46	-67
Sitka spruce	169	686	305
Norway spruce	73	37	-49
European larch	227	477	110
Jap/Hybrid larch	365	230	-37
Douglas fir	2	0	-100
Other conifers	62	43	-31
Mixed conifers	166	92	-45
Total conifers	1,674	2,134	27
Oak	1,934	1,920	-1
Beech	1,083	1,890	75
Sycamore	1,862	1,930	4
Ash	310	515	66
Birch	860	915	6
Poplar	43	0	-100
Sweet chestnut	5	0	-100
Elm	131	9	-93
Other broadleaves	325	410	26
Mixed broadleaves	639	447	-30
Total broadleaves	7,192	8,036	12
Total all species	8,865	10,170	15
Felled	176	24	-86
Total High Forest	9,041	10,194	13

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 3.3% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 3.3%.
3. The above figures from the 1999 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1999 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 1999 Inventory

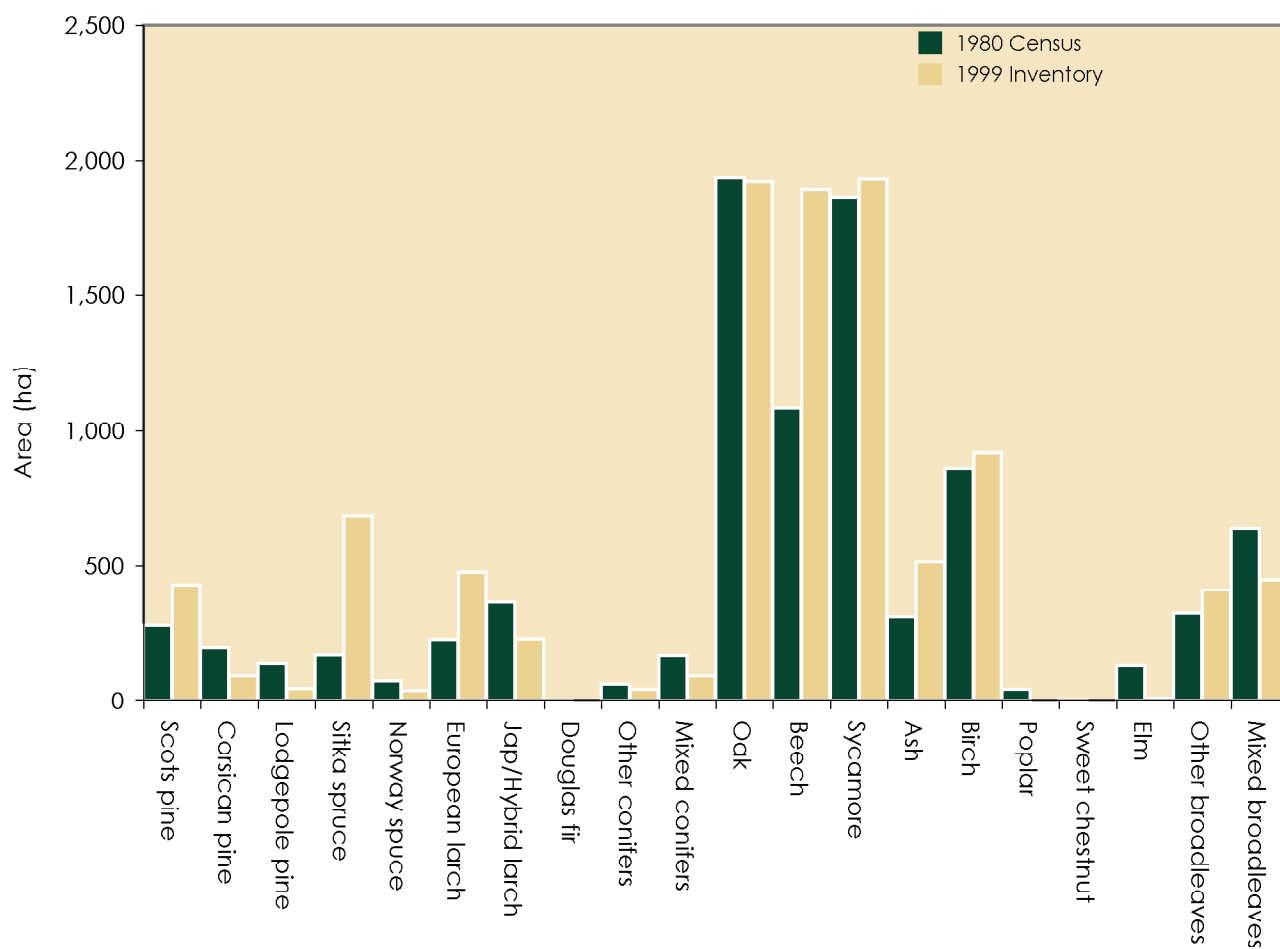


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1999 Inventory

Planting year class	1980 Census woodland area (ha)	1999 Inventory woodland area (ha)	Change (%)
1991-1999	0	371	see note
1981-1990	0	1,130	see note
1971-1980	495	829	67
1961-1970	947	521	-45
1951-1960	910	506	-44
1941-1950	736	929	26
1931-1940	734	183	-75
1921-1930	884	46	-95
1911-1920	368	613	66
1901-1910	1,226	0	-100
1861-1900	1,488	1,865	25
Pre 1861	450	0	-100
Total all years	8,238	6,993	-15

1. The first two classes, 1991-1999 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 1999 Inventory

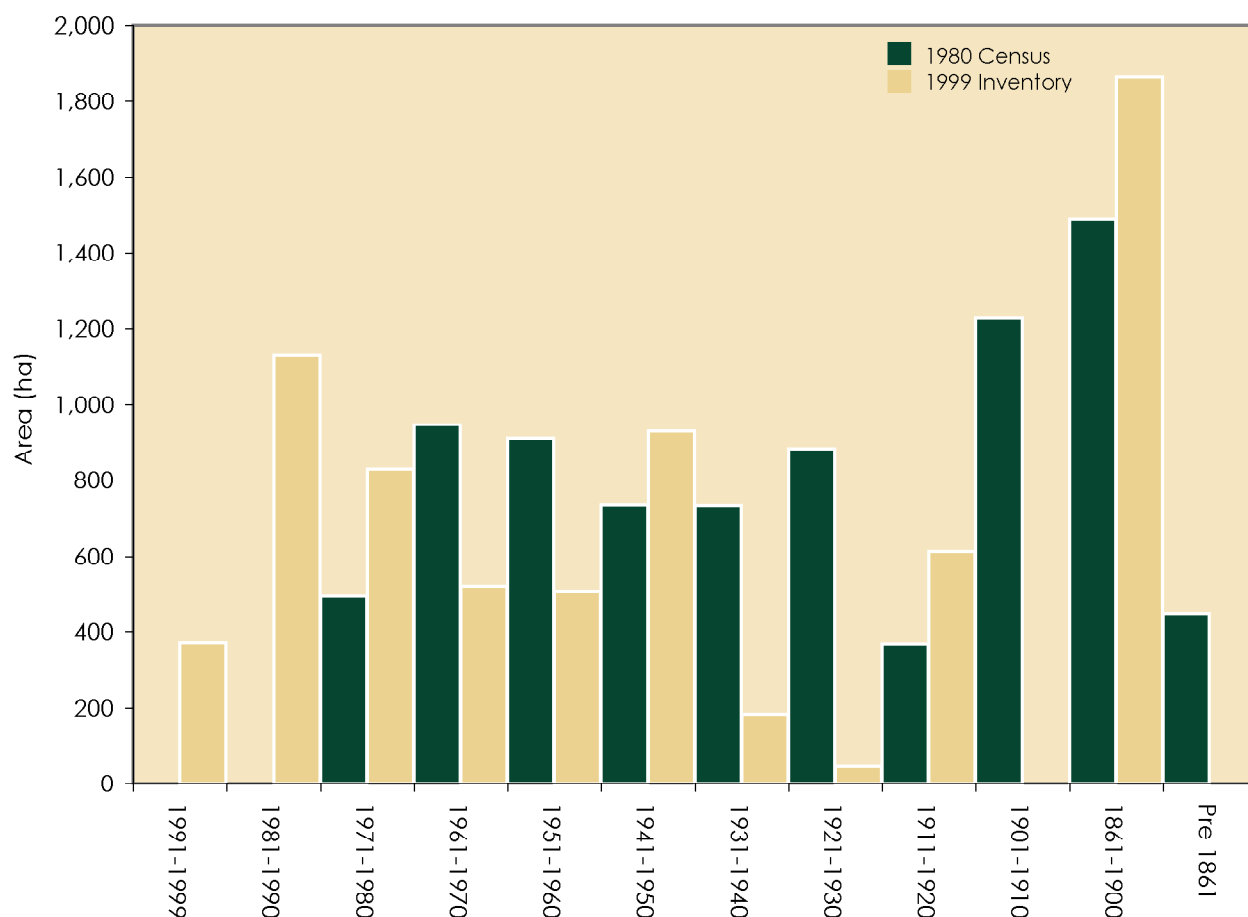


Table 22 Comparison of numbers of live trees outside woodland
between 1980 Census and 1999 Inventory (000's)

Tables 22 and 23 have been excluded from this report. The Survey of Small Woodland and trees does not record information referring to tree features (i.e. Individual trees, Groups and Narrow Linear Features) within developed land. In this respect the survey differs markedly from the 1980 Census. West Yorkshire included a substantial proportion of developed land making comparison inappropriate.

Table 23 Comparison of density of non-woodland features between 1980
Census and 1999 Inventory

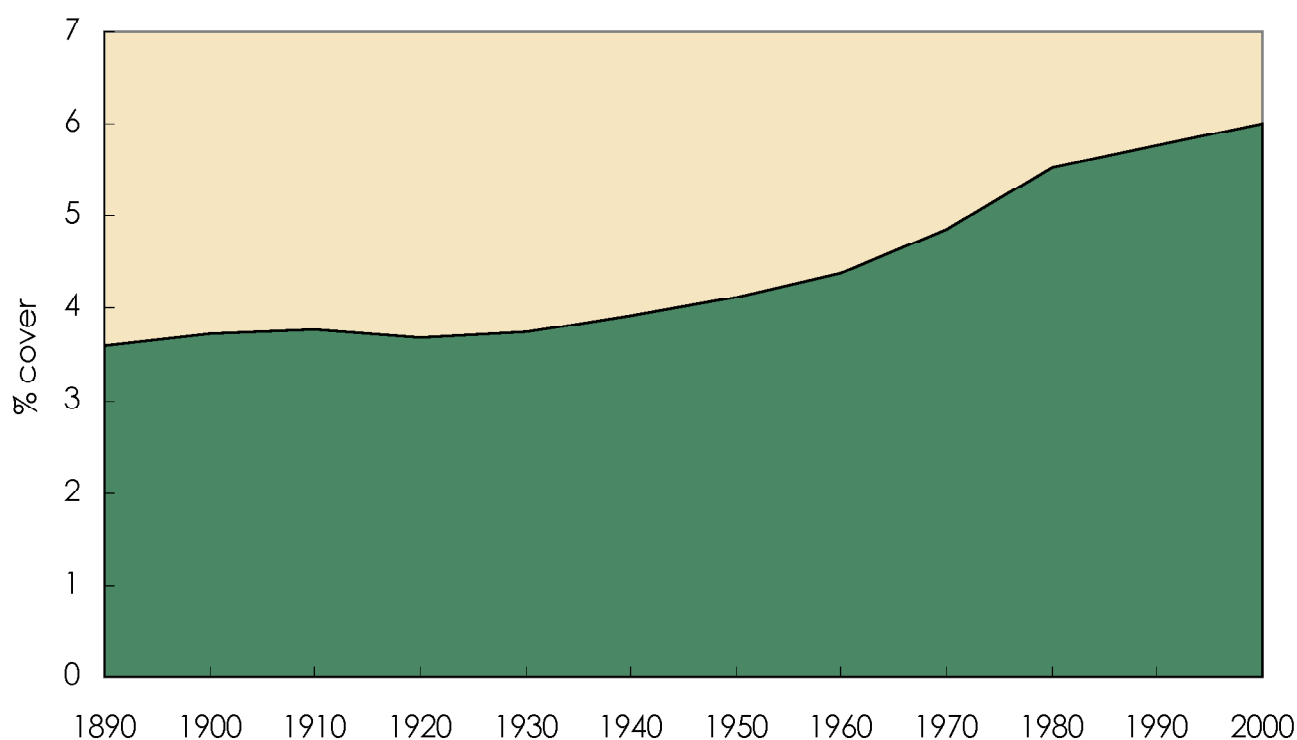
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WOODLAND COVER

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.

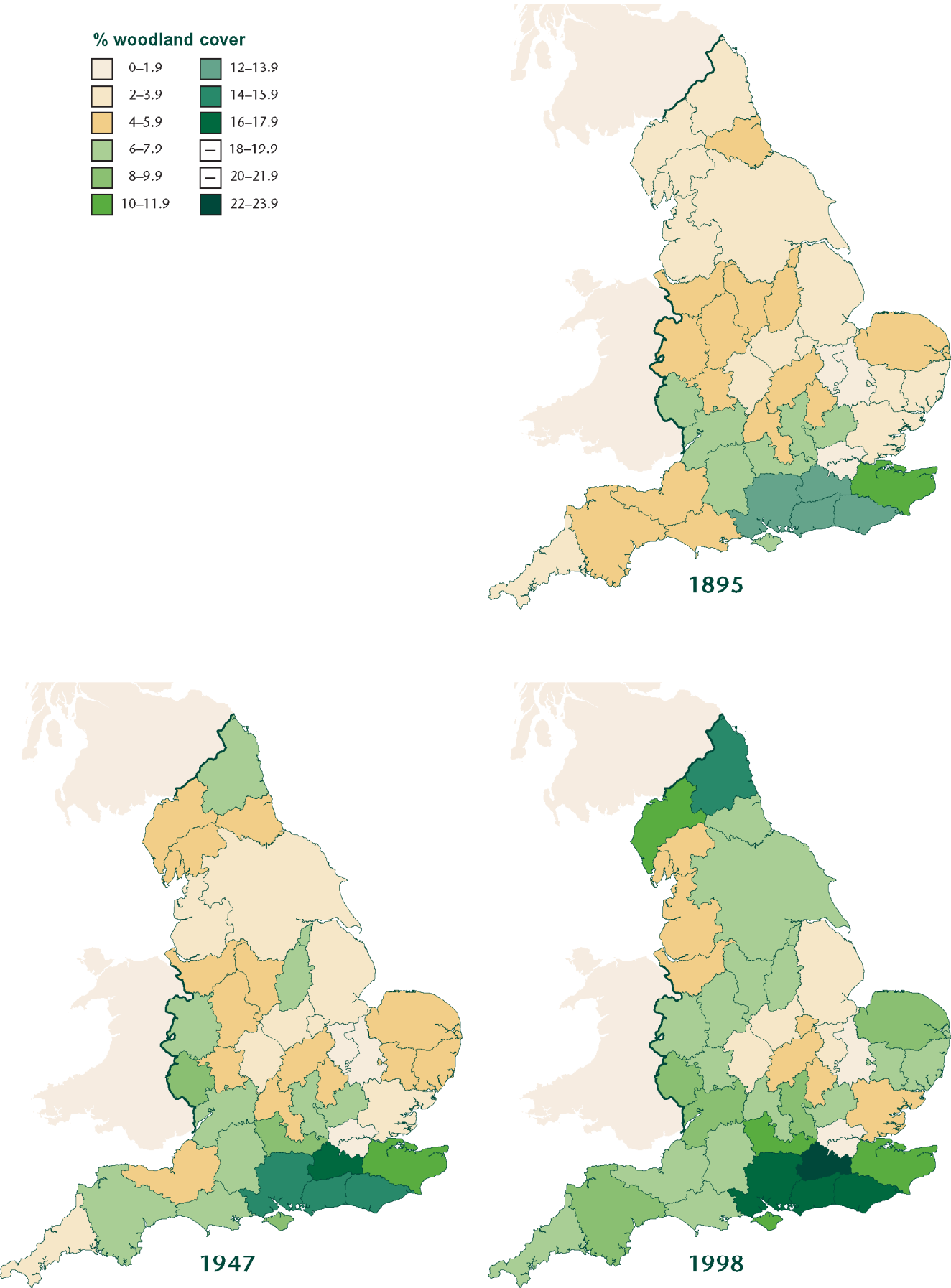
The maps use the old County structure data of England, as reported on in 1895 and 1947. The data from these counties could not be re-worked for different geographic areas. In contrast, the digital woodland map, which forms the basis of the current inventory, can be analysed for any geographic area.

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



1. Following local government reorganisation the boundaries of the county of the report have changed significantly since 1890 and therefore data from a wider geographic area have been used.

Map 5 Woodland Cover in England 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 1.6 m or less)
- Wide Linear Features (with a width greater than 1.6 m)

NOTES



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