



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

SURREY



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 Surrey 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 Surrey 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Surrey is 37,564 hectares. This represents 22.4% of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 53.1 % of all woodland. Conifer woodland represents 15.1 %, Mixed woodland 22.1 % and Open Space within woodlands 6.0 %. (Table 2)
- The main conifer species is pine covering 6,847 hectares or 78 % of all conifer species. The main broadleaved species is oak covering 7,350 hectares or 29.1 % of all broadleaved species. (Table 3)
- 1,588 hectares or 4 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 35,206 hectares or 96 % of woodland is in Other ownership. (Table 6)
- There are a total of 1,436 woods over 2 ha within Surrey with a mean wood area of 26.0 hectares. (Table 7a) There are a total of 1,774 woods from 0.1 - <2.0 hectares with a mean wood area of 0.43 hectares. (Table 14)
- There are 692.0 thousand live trees outside woodland in Surrey. (Table 15)
- Woodland land cover increased by over 5900 hectares from 18.8 % to 22.3 % of the land area between 1980 and 1995. (Table 19)
- The area of broadleaves increased by 24% between 1980 and 1995, with the relative proportion of broadleaves to conifers remaining at 74 %. (Table 20)

INVENTORY REPORTS

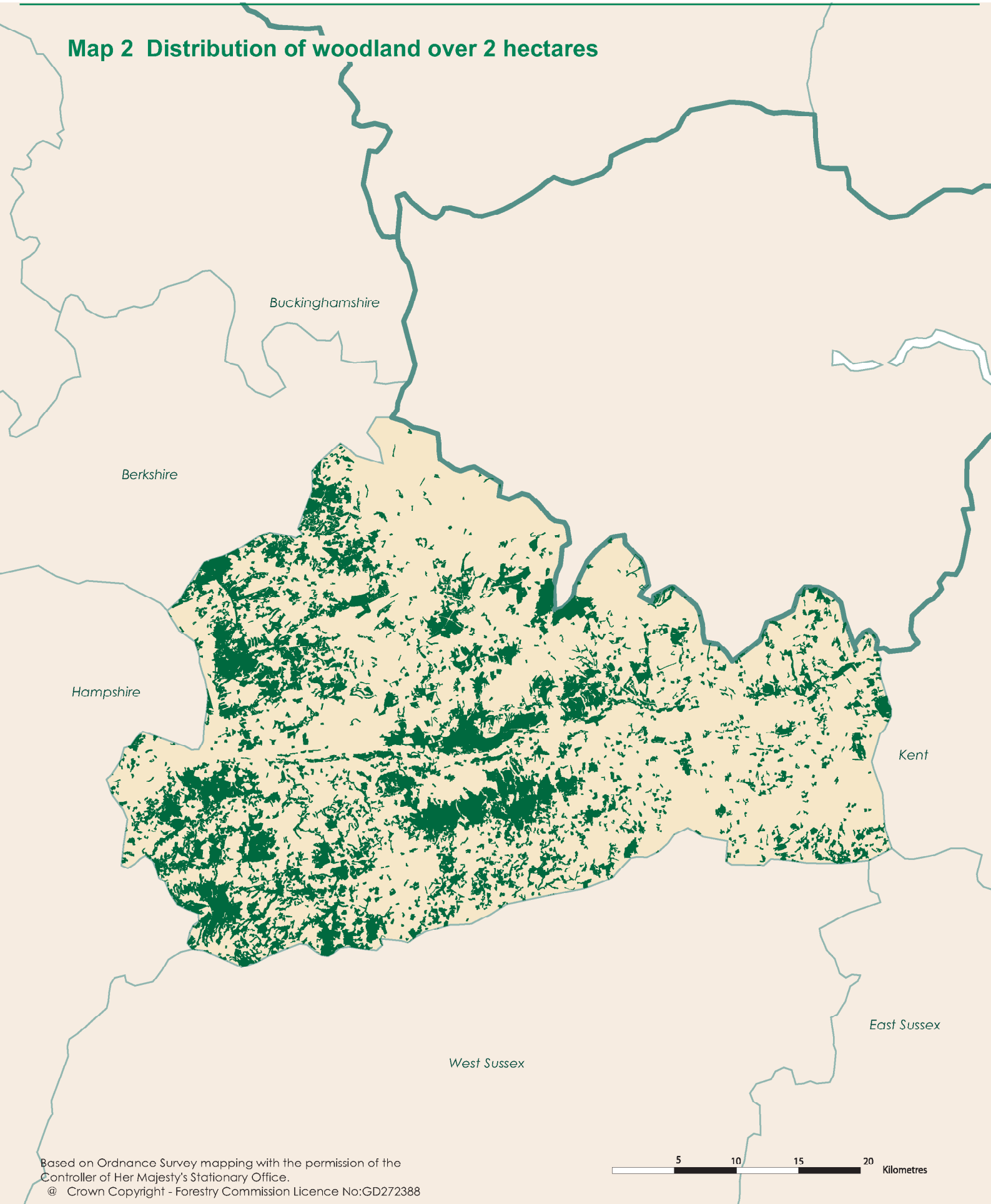
As well as this report for Surrey, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports. Inventory reports can also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

Map 1 Regional and county boundaries



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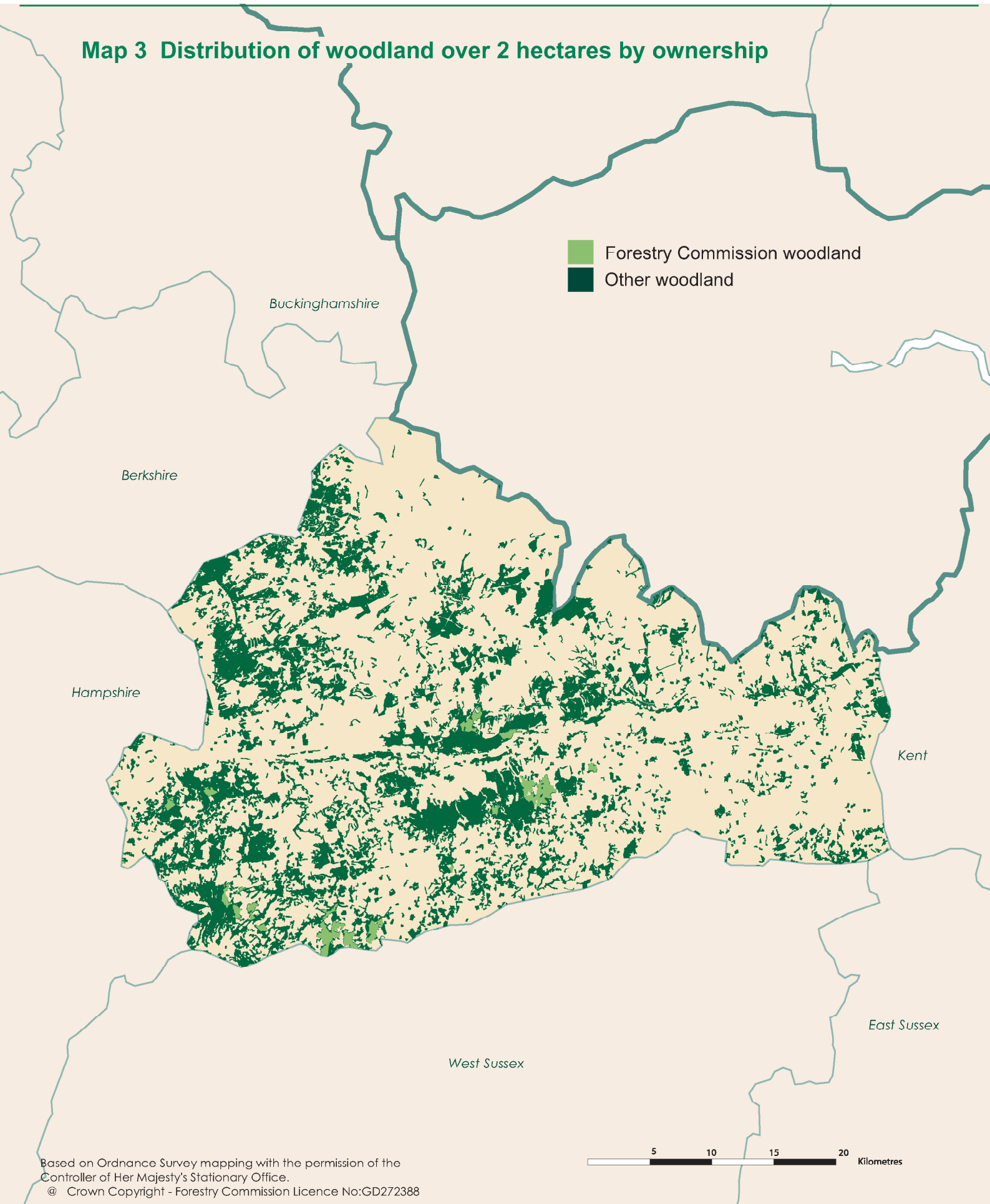
Map 2 Distribution of woodland over 2 hectares



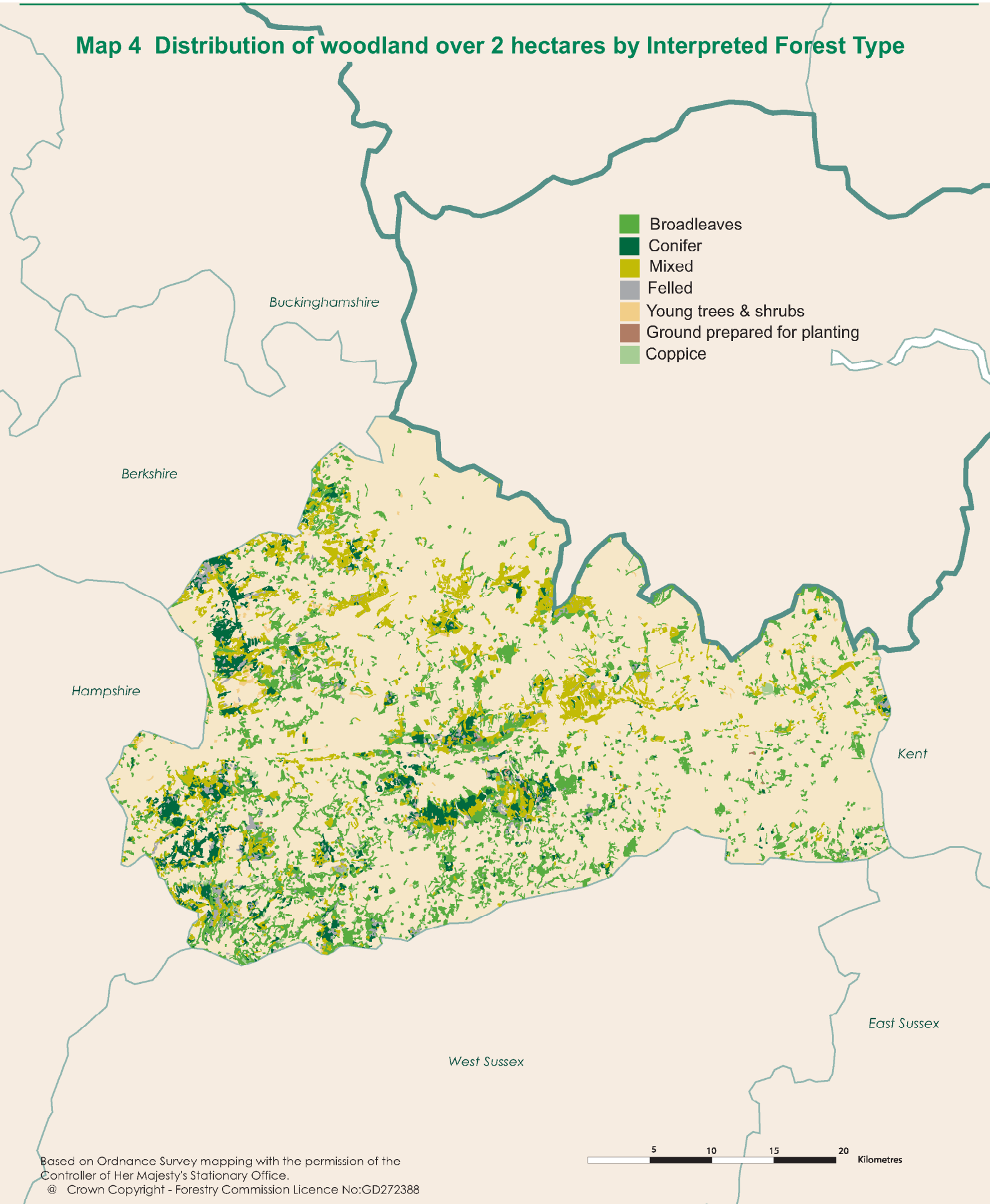
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5 10 15 20 Kilometres

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 Surrey.

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	36,794	98.0
0.25 - < 2.00	688	1.8
0.10 - < 0.25	82	0.2
Total area of woodland	37,564	100.0
% Woodland land cover	22.4	

1. Area of Surrey including inland water, 167,713 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	5,670	7	5,677	15.1
Broadleaved	19,372	590	19,962	53.1
Mixed	8,206	109	8,315	22.1
Coppiced	218	0	218	0.6
Copp-w-standards	699	0	699	1.9
Windblow	78	0	78	0.2
Felled	374	0	374	1.0
Open Space	2,177	64	2,241	6.0
Total	36,794	770	37,564	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	6,826	21	6,847	78.0	20.1
Sitka spruce	49	0	49	0.6	0.1
Larch	637	6	643	7.3	1.9
Other conifers	885	27	912	10.4	2.7
Mixed conifers	314	19	333	3.8	1.0
Total conifers	8,710	73	8,783	100.0	25.8
Oak	7,190	160	7,350	29.1	21.6
Beech	2,039	51	2,090	8.3	6.1
Sycamore	707	28	735	2.9	2.2
Ash	3,138	72	3,210	12.7	9.4
Birch	5,355	0	5,355	21.2	15.7
Elm	78	7	85	0.3	0.2
Other broadleaves	2,895	109	3,004	11.9	8.8
Mixed broadleaves	3,214	204	3,418	13.5	10.0
Total broadleaves	24,615	631	25,246	100.0	74.2
Total all species***	33,325	706	34,031		100.0

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

**Species/group percentage of all species

***Excludes the 3,532ha of Coppice, Felled and Open space areas which were included in Table 2

- 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	7%
Broadleaves	3%
Pine	8%
Oak	6%
Birch	8%

- 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	10,900	48,600	4	29
Narrow Linear Features	11,400	619,000	54	369
Individual Trees	24,300	24,300	1	14
Total		691,900		413

1. Land area used to calculate tree density 167,713ha 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	51%
Narrow Linear Features	62%
Individual Trees	39%
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	11,400	946	564
Total		946	564

1. Land area used to calculate feature density 167,713ha 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	48%
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 .

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	1,588	4
Other	35,206	96
Total area of woodland	36,794	100

1. Woodland area from aerial photographic interpretation map updated to 31 March 1995
2. See Glossary for definitions of ownership types

Woodland area by ownership

- Forestry Commission
- Other ownership

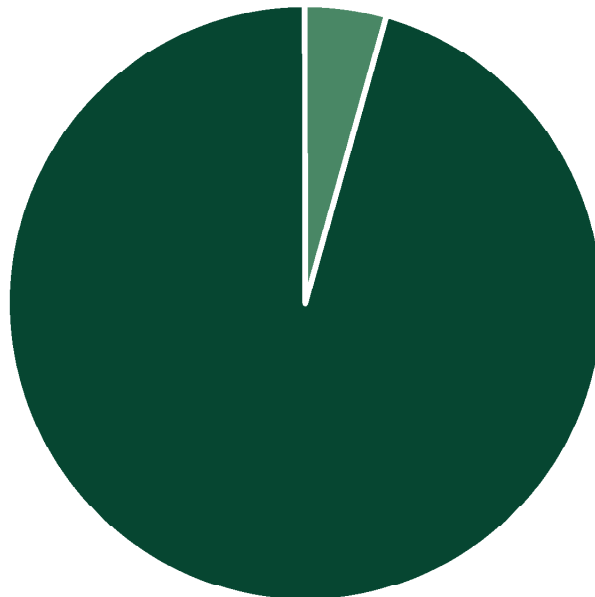


Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	1,050	4,515	12	4.3
10 - <20	180	2,496	7	13.9
20 - <50	119	3,787	10	31.8
50 - <100	28	1,995	5	71.2
<100	1,377	12,793	34	9.3
100 - <500	48	9,235	25	192.4
500 and >	11	15,363	41	1396.7
All woods	1,436	37,391	100	26.0

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	3	8	0	2.7
	O	1,083	4,609	12	4.3
10 - <20	FC	2	29	0	14.7
	O	183	2,545	7	13.9
20 - <50	FC	4	161	0	40.3
	O	122	3,874	10	31.8
50 - <100	FC	6	366	1	60.9
	O	29	2,048	5	70.6
<100	FC	14	564	2	40.3
	O	1,417	13,076	35	9.2
100 - <500	FC	5	1,032	3	206.4
	O	51	9,213	25	180.7
500 and >	FC	0	0	0	0.0
	O	10	13,512	36	1351.2
Total	FC	19	1,597	4	84.1
	O	1,478	35,800	96	24.2

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 597 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	632	39.8	5,038	14.3	5,670	15.4
Broadleaved	545	34.3	18,827	53.5	19,372	52.6
Mixed	274	17.3	7,932	22.5	8,206	22.3
Coppice	0	0.0	218	0.6	218	0.6
Copp-w-Stds	0	0.0	699	2.0	699	1.9
Windblow	0	0.0	78	0.2	78	0.2
Felled	0	0.0	374	1.1	374	1.0
Open Space	137	8.6	2,040	5.8	2,177	5.9
Total	1,588	100.0	35,206	100.0	36,794	100.0

Area of woodland by forest type

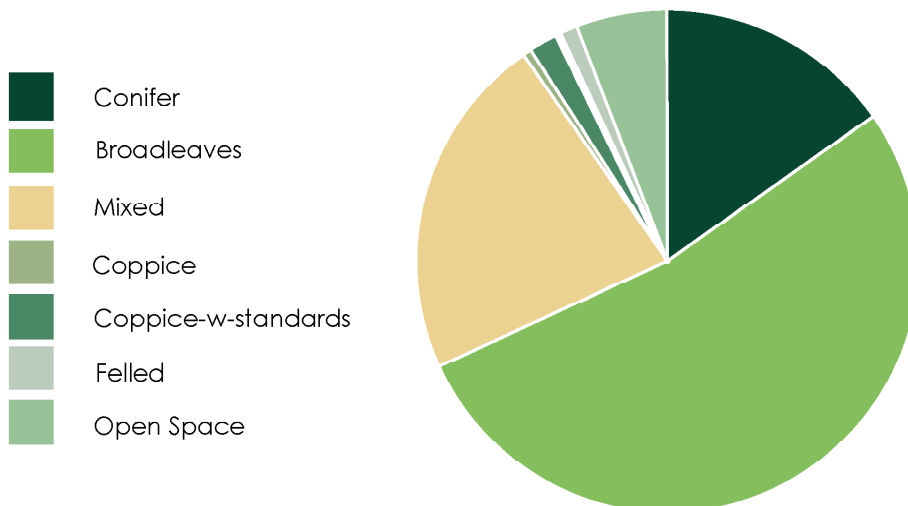


Table 9a Area of High Forest by principal species and ownership

Species	Forestry Commission			Other			All ownerships		
	area (ha)	cat* %	spp** %	area (ha)	cat* %	spp** %	area (ha)	cat* %	spp** %
Scots pine	285	44	20	5,949	74	19	6,234	72	19
Corsican pine	269	41	19	311	4	1	580	7	2
Lodgepole pine	0	0	0	12	0	0	12	0	0
Sitka spruce	0	0	0	49	1	0	49	1	0
Norway spruce	5	1	0	341	4	1	346	4	1
European larch	42	6	3	70	1	0	112	1	0
Jap/Hybrid larch	0	0	0	525	7	2	525	6	2
Douglas fir	0	0	0	82	1	0	82	1	0
Other conifers	44	7	3	413	5	1	457	5	1
Mixed conifers	9	1	1	304	4	1	314	4	1
Total conifers	654	100	45	8,056	100	25	8,710	100	26
Oak	201	25	14	6,989	29	22	7,190	29	22
Beech	76	10	5	1,964	8	6	2,039	8	6
Sycamore	27	3	2	680	3	2	707	3	2
Ash	147	18	10	2,991	13	9	3,138	13	9
Birch	227	28	16	5,129	22	16	5,355	22	16
Poplar	0	0	0	30	0	0	30	0	0
Sweet chestnut	28	4	2	590	2	2	619	3	2
Elm	0	0	0	78	0	0	78	0	0
Other broadleaves	28	4	2	2,218	9	7	2,246	9	7
Mixed broadleaves	62	8	4	3,152	13	10	3,214	13	10
Total broadleaves	797	100	55	23,819	100	75	24,615	100	74
Total - all species	1,451		100	31,875		100	33,325		100
Felled	0			374			374		
Total High Forest	1,451			32,249			33,699		

*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 2,177ha 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	7%
Broadleaves	3%
Scots pine	9%
Oak	6%
Birch	8%
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

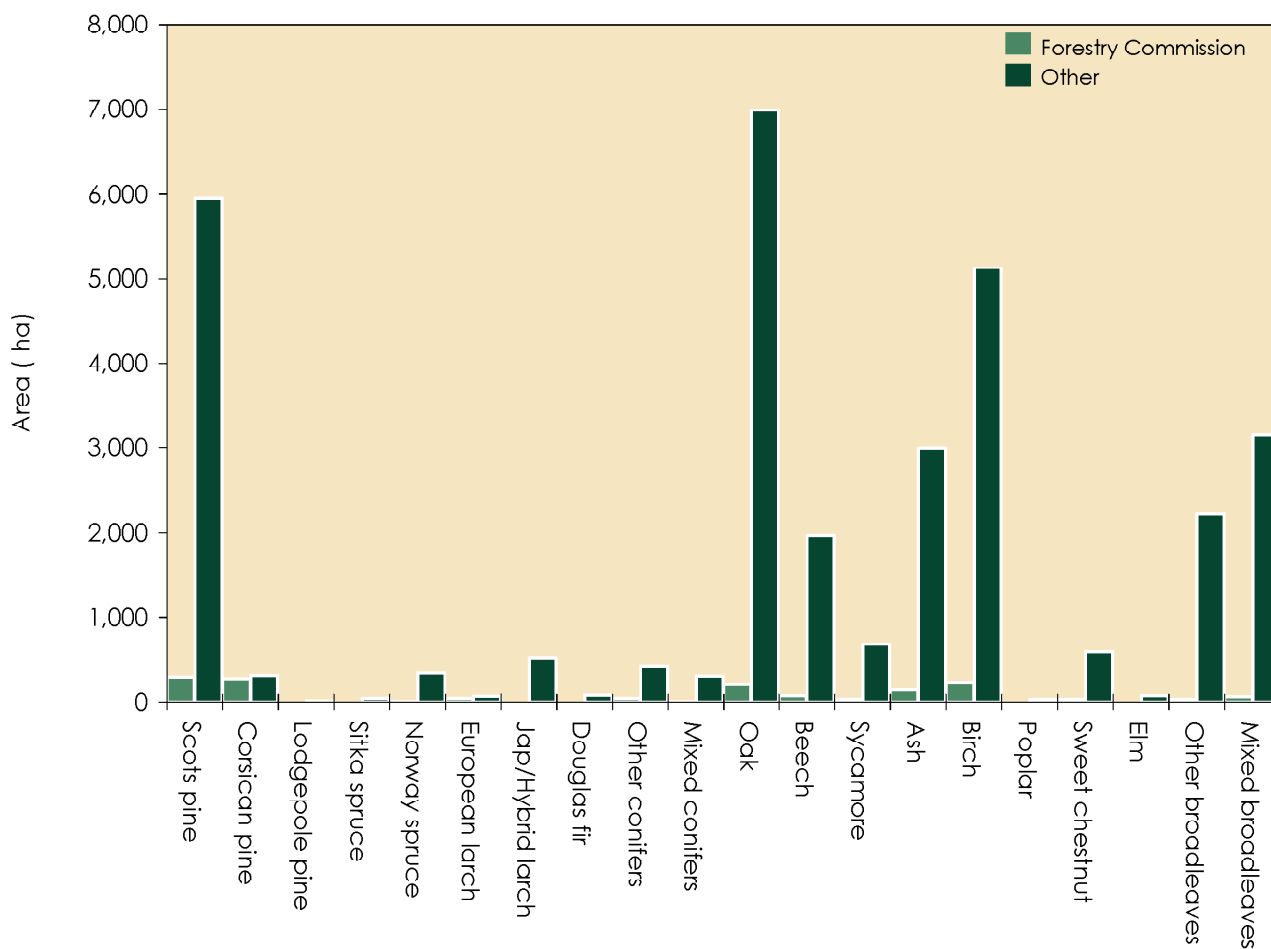


Table 9b Area of High Forest by principal species,ownership and category

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	285	0	285	5,936	13	5,949	6,221	13	6,234
Corsican pine	269	0	269	303	8	311	572	8	580
Lodgepole pine	0	0	0	12	0	12	12	0	12
Sitka spruce	0	0	0	49	0	49	49	0	49
Norway spruce	5	0	5	316	25	341	321	25	346
European larch	42	0	42	70	0	70	112	0	112
Jap/Hybrid larch	0	0	0	525	0	525	525	0	525
Douglas fir	0	0	0	82	0	82	82	0	82
Other conifers	44	0	44	377	36	413	421	36	457
Mixed conifers	9	0	9	275	29	304	285	29	314
Total conifers	654	0	654	7,945	111	8,056	8,599	111	8,710
Oak	192	9	201	6,063	925	6,989	6,255	935	7,190
Beech	66	9	76	1,799	165	1,964	1,865	174	2,039
Sycamore	27	0	27	671	8	680	699	8	707
Ash	147	0	147	2,765	225	2,991	2,912	225	3,138
Birch	227	0	227	4,474	655	5,129	4,700	655	5,355
Poplar	0	0	0	25	5	30	25	5	30
Sweet chestnut	28	0	28	535	55	590	564	55	619
Elm	0	0	0	41	37	78	41	37	78
Other broadleaves	24	5	28	1,025	1,192	2,218	1,049	1,197	2,246
Mixed broadleaves	62	0	62	2,645	507	3,152	2,707	507	3,214
Total broadleaves	773	24	797	20,045	3,774	23,819	20,818	3,798	24,615
Total - all species	1,427	24	1,451	27,990	3,885	31,875	29,417	3,908	33,325

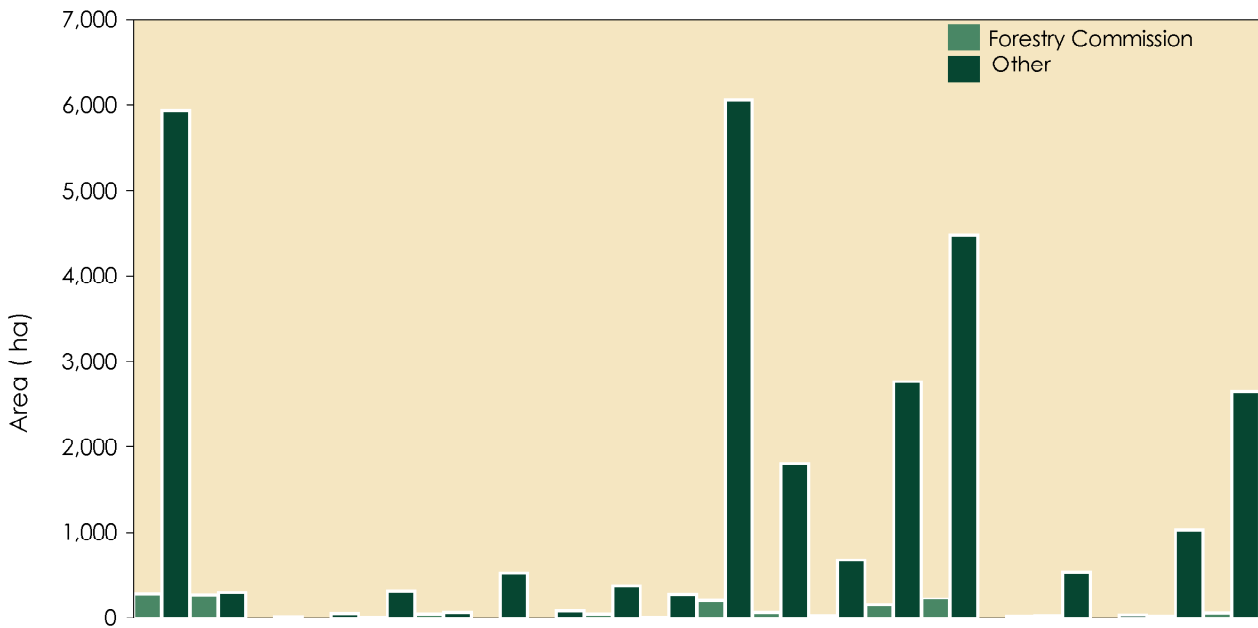
1. The standard errors of the all ownerships area estimates for the most common species or species groups (in all woodland types) are as follows

	Category 1*	Category 2*	Total High Forest	
Conifers	7%	49%	7%	
Broadleaves	3%	8%	3%	
Scots pine	9%	-	9%	
Oak	6%	19%	6%	*See Glossary for Category 1 and Category 2 descriptions
Birch	8%	24%	8%	

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

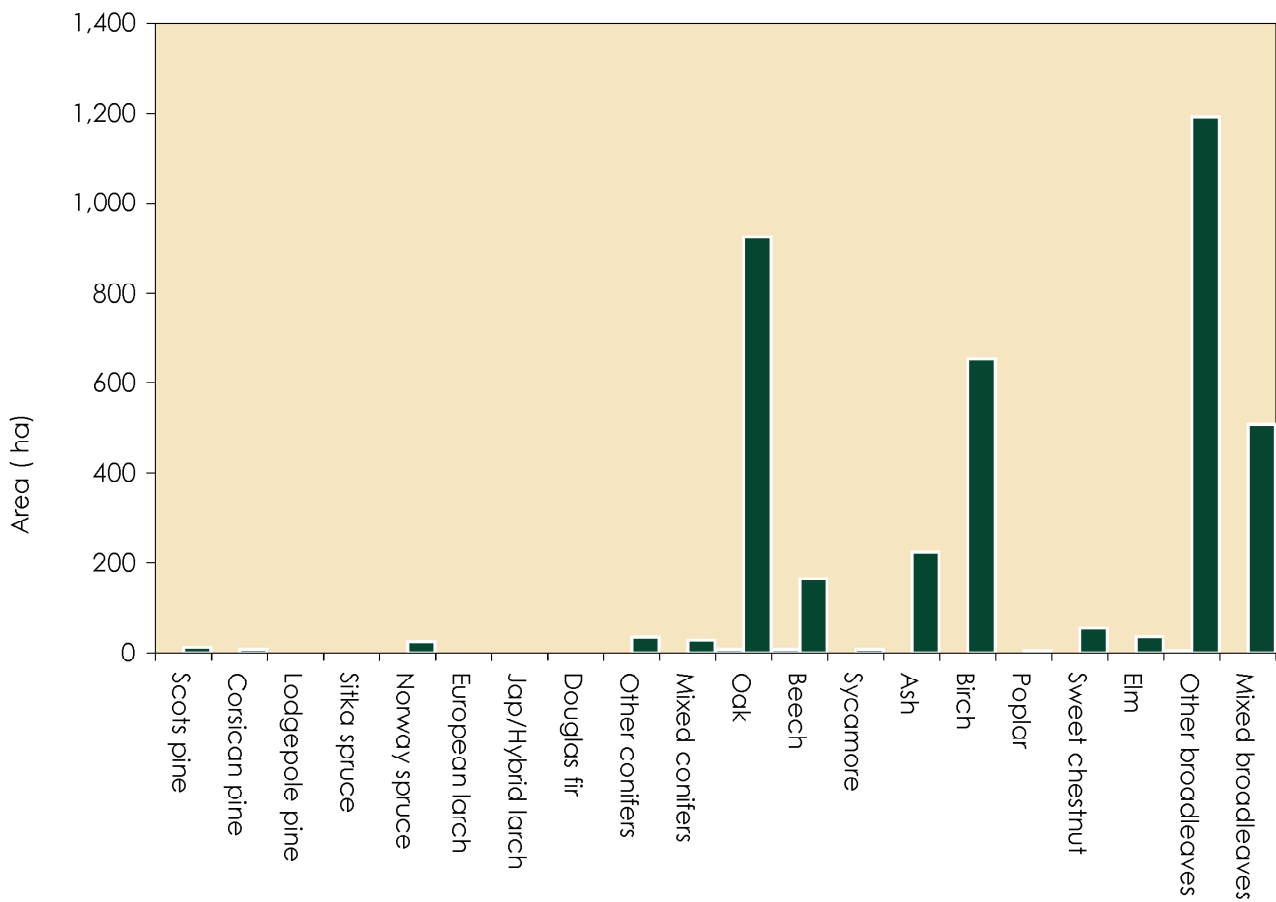
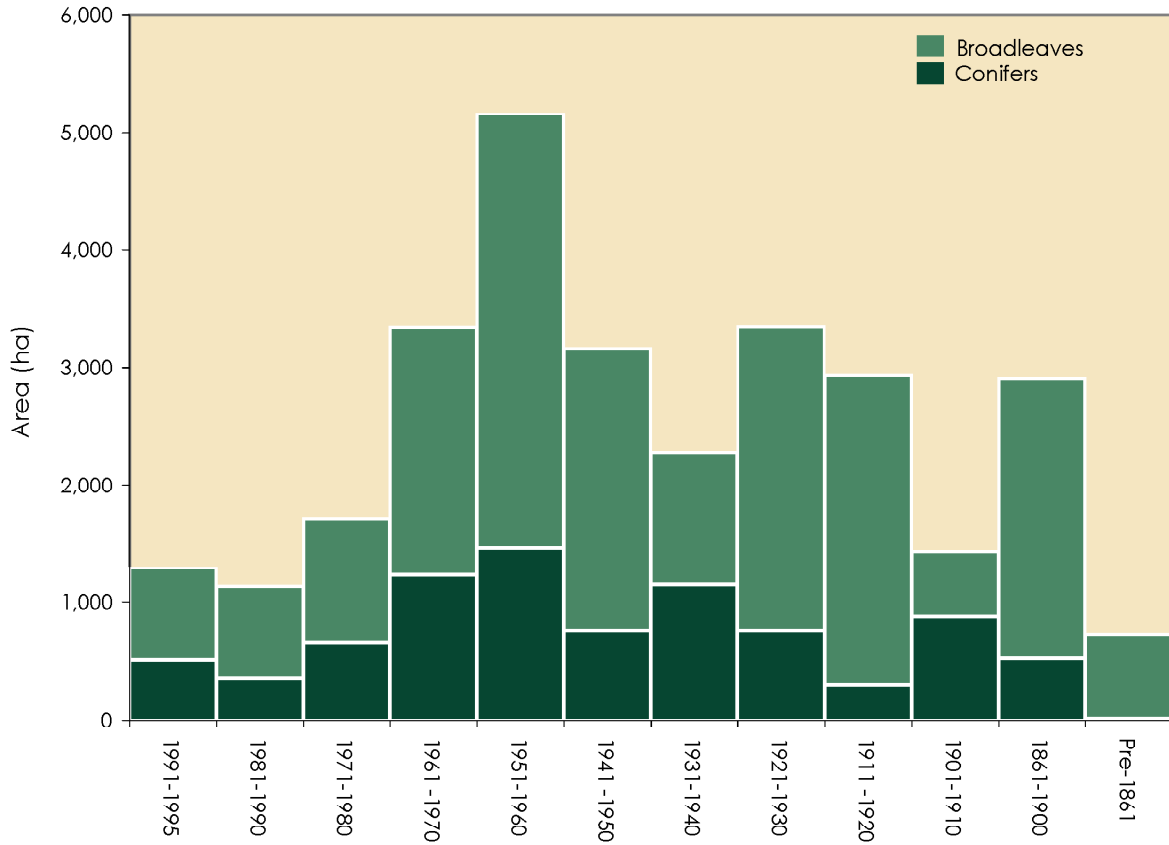


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1995	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	229	99	523	704	1,129	600	939	640	162	874	321	0	6,221
Corsican pine	109	48	17	204	6	0	127	55	6	0	0	0	572
Lodgepole pine	12	0	0	0	0	0	0	0	0	0	0	0	12
Sitka spruce	24	0	25	0	0	0	0	0	0	0	0	0	49
Norway spruce	0	137	37	76	64	0	0	0	6	0	0	0	321
European larch	0	23	0	0	68	18	0	4	0	0	0	0	112
Jap/Hybrid larch	101	17	0	106	95	119	81	0	5	0	0	0	525
Douglas fir	0	0	0	30	0	18	0	0	23	0	12	0	82
Other conifers	6	0	34	56	61	0	5	12	47	0	189	13	421
Mixed conifers	33	29	24	54	41	5	0	50	50	0	0	0	285
Total conifers	514	352	659	1,230	1,463	760	1,153	761	298	874	522	13	8,599
Oak	137	43	106	85	380	285	374	1,079	1,534	329	1,432	470	6,255
Beech	0	12	21	72	47	205	173	227	339	88	476	206	1,865
Sycamore	0	49	67	48	16	193	142	44	56	13	72	0	699
Ash	132	172	51	458	467	411	160	653	290	26	92	0	2,912
Birch	293	234	542	815	2,073	599	38	72	35	0	0	0	4,700
Poplar	0	12	0	5	0	0	0	0	0	0	8	0	25
Sweet chestnut	48	25	0	15	74	43	39	92	76	83	32	36	564
Elm	0	0	0	41	0	0	0	0	0	0	0	0	41
Other broadleaves	18	6	61	166	282	228	44	105	99	6	31	5	1,049
Mixed broadleaves	148	239	200	409	356	441	144	314	203	14	238	0	2,707
Total broadleaves	776	792	1,049	2,112	3,694	2,405	1,115	2,585	2,631	560	2,381	717	20,818
Total - all species	1,290	1,143	1,708	3,343	5,157	3,165	2,268	3,346	2,929	1,434	2,903	730	29,417

*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



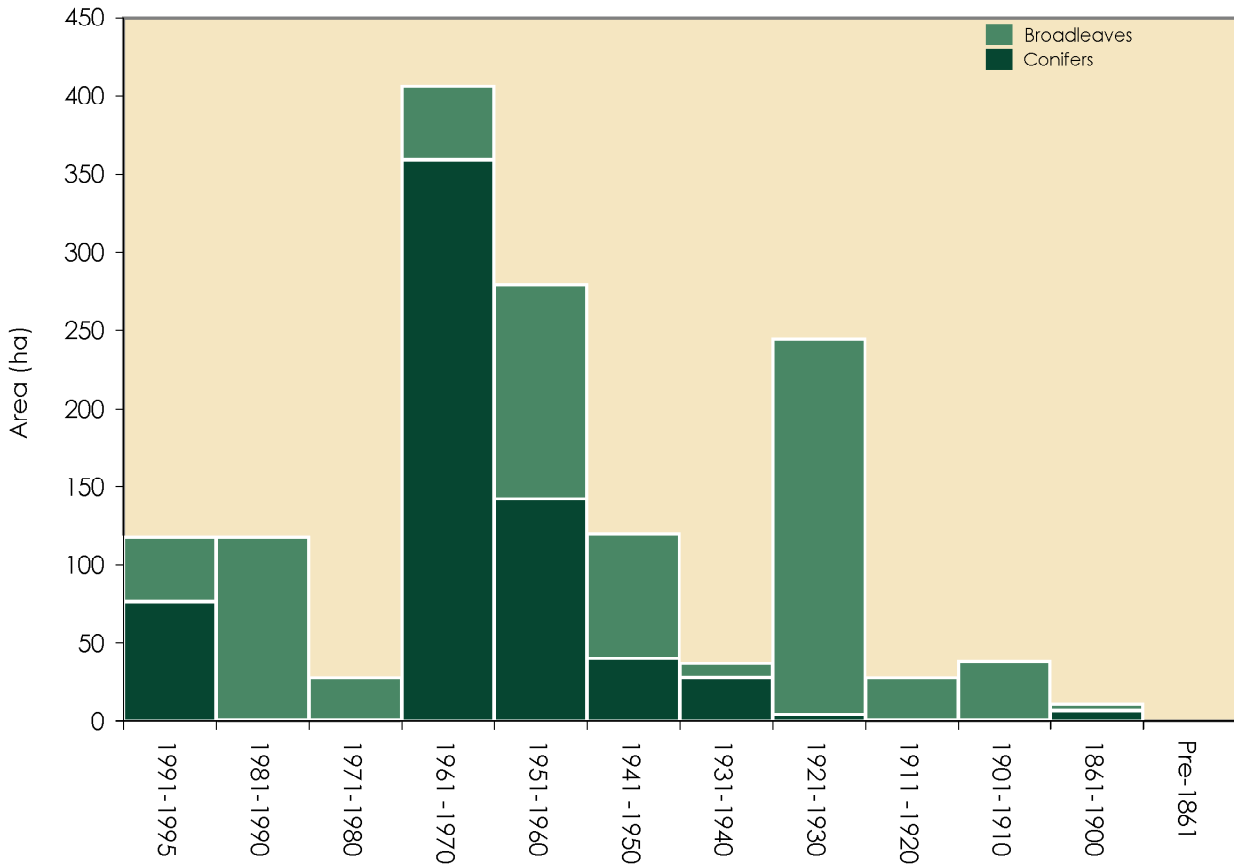
1. Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1995	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	14	0	0	156	61	40	14	0	0	0	0	0	285
Corsican pine	61	0	0	193	0	0	14	0	0	0	0	0	269
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	5	0	0	0	0	0	0	0	5
European larch	0	0	0	0	38	0	0	4	0	0	0	0	42
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	38	0	0	0	0	0	7	0	44
Mixed conifers	0	0	0	9	0	0	0	0	0	0	0	0	9
Total conifers	76	0	0	359	142	40	28	4	0	0	7	0	654
Oak	0	4	0	5	0	5	0	109	28	38	4	0	192
Beech	0	0	0	0	0	0	0	66	0	0	0	0	66
Sycamore	0	0	0	0	0	27	0	0	0	0	0	0	27
Ash	0	72	5	5	0	0	0	66	0	0	0	0	147
Birch	42	0	24	19	94	38	9	0	0	0	0	0	227
Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	9	19	0	0	0	0	0	0	0	28
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	0	0	5	19	0	0	0	0	0	0	0	24
Mixed broadleaves	0	42	0	5	5	10	0	0	0	0	0	0	62
Total broadleaves	42	118	28	47	137	80	9	241	28	38	4	0	773
Total - all species	118	118	28	406	278	120	38	244	28	38	10	0	1,427

*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



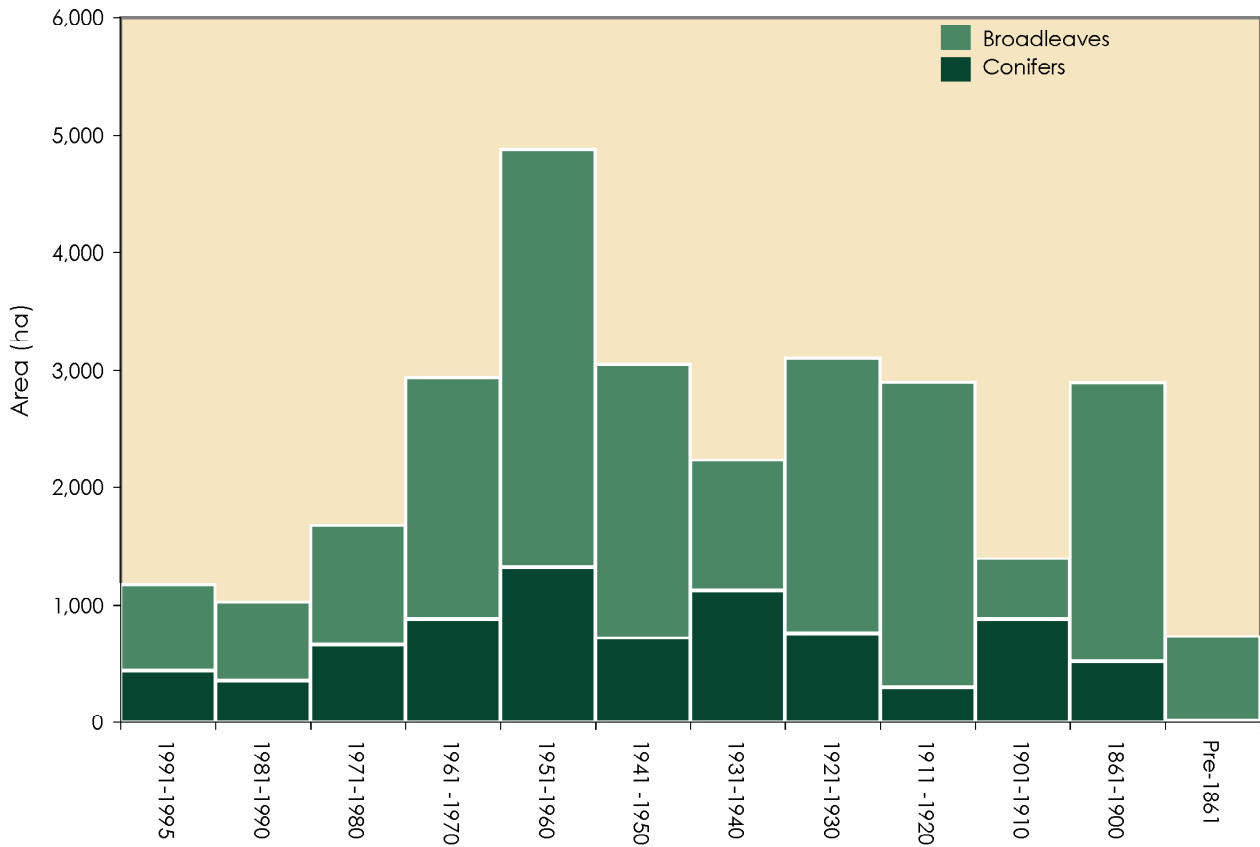
1. Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1995	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	215	99	523	549	1,067	560	925	640	162	874	321	0	5,936
Corsican pine	48	48	17	11	6	0	113	55	6	0	0	0	303
Lodgepole pine	12	0	0	0	0	0	0	0	0	0	0	0	12
Silka spruce	24	0	25	0	0	0	0	0	0	0	0	0	49
Norway spruce	0	137	37	76	60	0	0	0	6	0	0	0	316
European larch	0	23	0	0	30	18	0	0	0	0	0	0	70
Jap/Hybrid larch	101	17	0	106	95	119	81	0	5	0	0	0	525
Douglas fir	0	0	0	30	0	18	0	0	23	0	12	0	82
Other conifers	6	0	34	56	23	0	5	12	47	0	182	13	377
Mixed conifers	33	29	24	44	41	5	0	50	50	0	0	0	275
Total conifers	439	352	659	872	1,321	720	1,124	757	298	874	515	13	7,945
Oak	137	39	106	80	380	280	374	971	1,506	291	1,429	470	6,063
Beech	0	12	21	72	47	205	173	161	339	88	476	206	1,799
Sycamore	0	49	67	48	16	166	142	44	56	13	72	0	671
Ash	132	100	47	453	467	411	160	587	290	26	92	0	2,765
Birch	250	234	519	797	1,978	562	29	72	35	0	0	0	4,474
Poplar	0	12	0	5	0	0	0	0	0	0	8	0	25
Sweet chestnut	48	25	0	6	55	43	39	92	76	83	32	36	535
Elm	0	0	0	41	0	0	0	0	0	0	0	0	41
Other broadleaves	18	6	61	162	263	228	44	105	99	6	31	5	1,025
Mixed broadleaves	148	197	200	404	352	430	144	314	203	14	238	0	2,645
Total broadleaves	733	674	1,021	2,065	3,557	2,325	1,105	2,344	2,603	522	2,378	717	20,045
Total - all species	1,172	1,025	1,680	2,937	4,878	3,045	2,230	3,101	2,901	1,396	2,893	730	27,990

*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, 1991-1995 is 5 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	%
1991-95	Birch	22	Scots pine	17	Mixed broadleaves	12
1981-90	Mixed broadleaves	23	Birch	19	Ash	13
1971-80	Birch	30	Scots pine	27	Mixed broadleaves	14
1961-70	Birch	25	Scots pine	19	Ash	13
1951-60	Birch	39	Scots pine	19	Mixed broadleaves	9
1941-50	Birch	19	Other broadleaves	17	Scots pine	15
1931-40	Scots pine	35	Oak	16	Other broadleaves	9
1921-30	Oak	32	Ash	20	Scots pine	18
1911-20	Oak	51	Mixed broadleaves	11	Beech	10
1901-10	Scots pine	58	Oak	27	Beech	6
1861-1900	Oak	52	Beech	17	Scots pine	10
Pre 1861	Oak	67	Beech	26	Sweet chestnut	4
All years	Oak	22	Scots pine	19	Birch	16

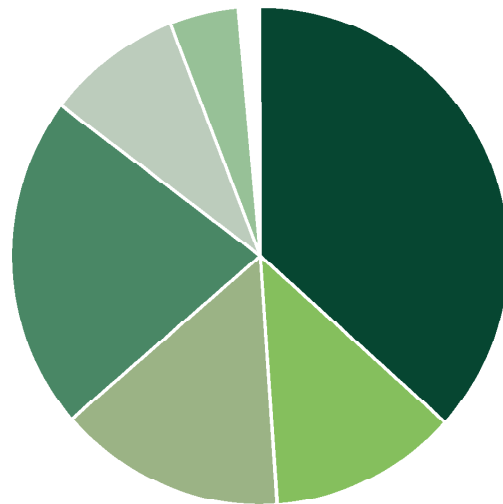
1. Principal species as a percentage of area in the planting year class.

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	13,490	36.7
Business	4,537	12.3
Forestry or timber business	0	0.0
Charity	5,327	14.5
Local Authority	7,984	21.7
Other public (not FC)	3,344	9.1
Forestry Commission	1,588	4.3
Community ownership or common land	63	0.2
Unidentified	461	1.3
Total	36,794	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	1,774	770	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	11,400	946	Length (Km)
Narrow Linear Features	11,400	619,000	Number of live trees
Groups	10,900	48,600	Number of live trees
Individual Trees	24,300	24,300	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	82	688	770	1,774	0.43
Wide Linear Features	0	0	0	0	0.00
Total	82	688	770	1,774	0.43

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	8.4	7.6	16.0	75.5	2.3
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	2.5	0.8	1.9	5.2	24.5	0.8
Total conifers	0.0	2.5	9.2	9.5	21.2	100.0	3.1
Oak	4.2	11.7	22.6	113.9	152.4	22.7	22.0
Beech	0.8	0.0	0.8	0.0	1.6	0.2	0.2
Sycamore	0.0	0.0	1.7	0.0	1.7	0.3	0.2
Ash	1.7	0.0	1.7	77.8	81.2	12.1	11.7
Birch	0.0	0.0	0.8	1.9	2.7	0.4	0.4
Poplar	0.0	0.8	0.0	0.0	0.8	0.1	0.1
Sweet chestnut	0.0	0.0	0.0	15.2	15.2	2.3	2.2
Horse chestnut	0.0	0.0	0.0	22.8	22.8	3.4	3.3
Alder	0.8	0.0	5.0	0.0	5.8	0.9	0.8
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	0.8	0.0	0.8	17.1	18.7	2.8	2.7
Other broadleaves	0.0	0.8	5.9	360.8	367.5	54.8	53.1
Total broadleaves	8.3	13.3	39.4	609.5	670.4	100.0	96.9
Total - all species	8.3	15.8	48.6	619.0	692.0		99.9

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	39%
Groups	51%
Narrow Linear Features	62%

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	0.4	0.4	0.8	0.0	1.6	94.1	94.1
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total broadleaves	0.4	0.4	0.8	0.0	1.7	100.0	100.0
Total - all species	0.4	0.4	0.8	0.0	1.7		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	16.0	0.0	16.0
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	0.8	3.6	0.8	5.2
Total conifers	0.0	0.8	19.6	0.8	21.2
Oak	21.5	79.0	50.3	1.7	152.5
Beech	0.0	0.0	0.8	0.8	1.6
Sycamore	0.0	0.0	0.8	0.8	1.6
Ash	45.6	35.6	0.0	0.0	81.2
Birch	0.0	2.7	0.0	0.0	2.7
Poplar	0.0	0.8	0.0	0.0	0.8
Sweet chestnut	0.0	0.0	15.2	0.0	15.2
Horse chestnut	0.0	0.0	22.8	0.0	22.8
Alder	0.0	5.0	0.8	0.0	5.8
Lime	0.0	0.0	0.0	0.0	0.0
Elm	0.0	0.0	0.0	0.0	0.0
Willow	0.0	17.9	0.8	0.0	18.7
Other broadleaves	361.6	5.9	0.0	0.0	367.5
Total broadleaves	428.7	146.9	91.5	3.3	670.4
Total - all species	428.7	147.9	111.2	4.2	692.0

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	1
3-5	6
6-10	3
11-20	1
21-50	0
51-100	0
>100	0
Total	11

*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 1995 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 1995 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1995 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1995 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1995 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1995 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 1995 Inventory

Woodland size (ha)	1980 Census woodland area		1995 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	28,682	91.0	36,794	98.2	28
0.25 - <2.0	2,849	9.0	688	1.8	-76
Total	31,531		37,482		19
% Woodland land cover	18.8		22.3		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1995 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1995 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1995), 167,713 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 167,924ha, (Ordnance Survey data)

Table 20 Comparison of High Forest area by species between 1980 Census and 1995 Inventory

Species	1980 Census woodland area (ha)	1995 Inventory woodland area (ha)	Change (%)
Scots pine	3,559	6,255	76
Corsican pine	564	580	3
Lodgepole pine	16	12	-25
Sitka spruce	20	49	148
Norway spuce	729	346	-53
European larch	350	112	-68
Jap/Hybrid larch	497	531	7
Douglas fir	373	82	-78
Other conifers	683	484	-29
Mixed conifers	243	321	32
Total conifers	7,033	8,772	25
Oak	5,424	7,332	35
Beech	1,716	2,090	22
Sycamore	360	735	104
Ash	1,475	3,206	117
Birch	6,977	5,355	-23
Poplar	332	37	-89
Sweet chestnut	608	619	2
Elm	1	85	8939
Other broadleaves	1,624	2,335	44
Mixed broadleaves	1,749	3,385	94
Total broadleaves	20,267	25,179	24
Total all species	27,300	33,951	24
Felled	709	374	-47
Total High Forest	28,009	34,325	23

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 6.0% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 6.0%.
3. The above figures from the 1995 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1995 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 1995 Inventory

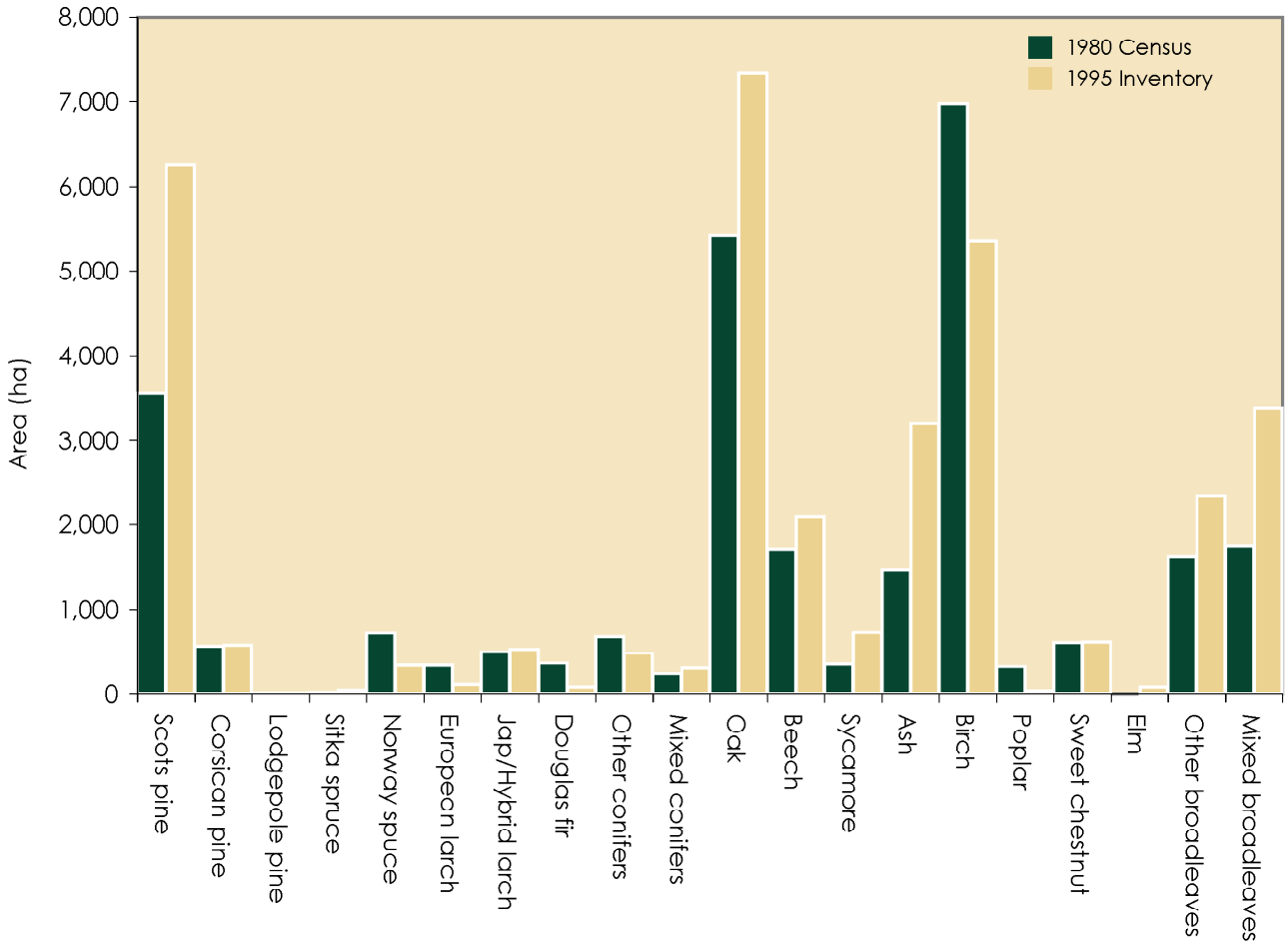


Table 21 Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory

Planting year class	1980 Census woodland area (ha)	1995 Inventory woodland area (ha)	Change (%)
1991-1995	0	1,347	see note
1981-1990	0	1,144	see note
1971-1980	1,235	1,742	41
1961-1970	4,638	3,392	-27
1951-1960	4,808	5,242	9
1941-1950	2,708	3,222	19
1931-1940	836	2,268	171
1921-1930	1,603	3,424	114
1911-1920	343	2,950	759
1901-1910	875	1,434	64
1861-1900	4,128	2,921	-29
Pre 1861	1,083	730	-33
Total all years	22,258	29,816	34

1. The first two classes, 1991-1995 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 1995 Inventory

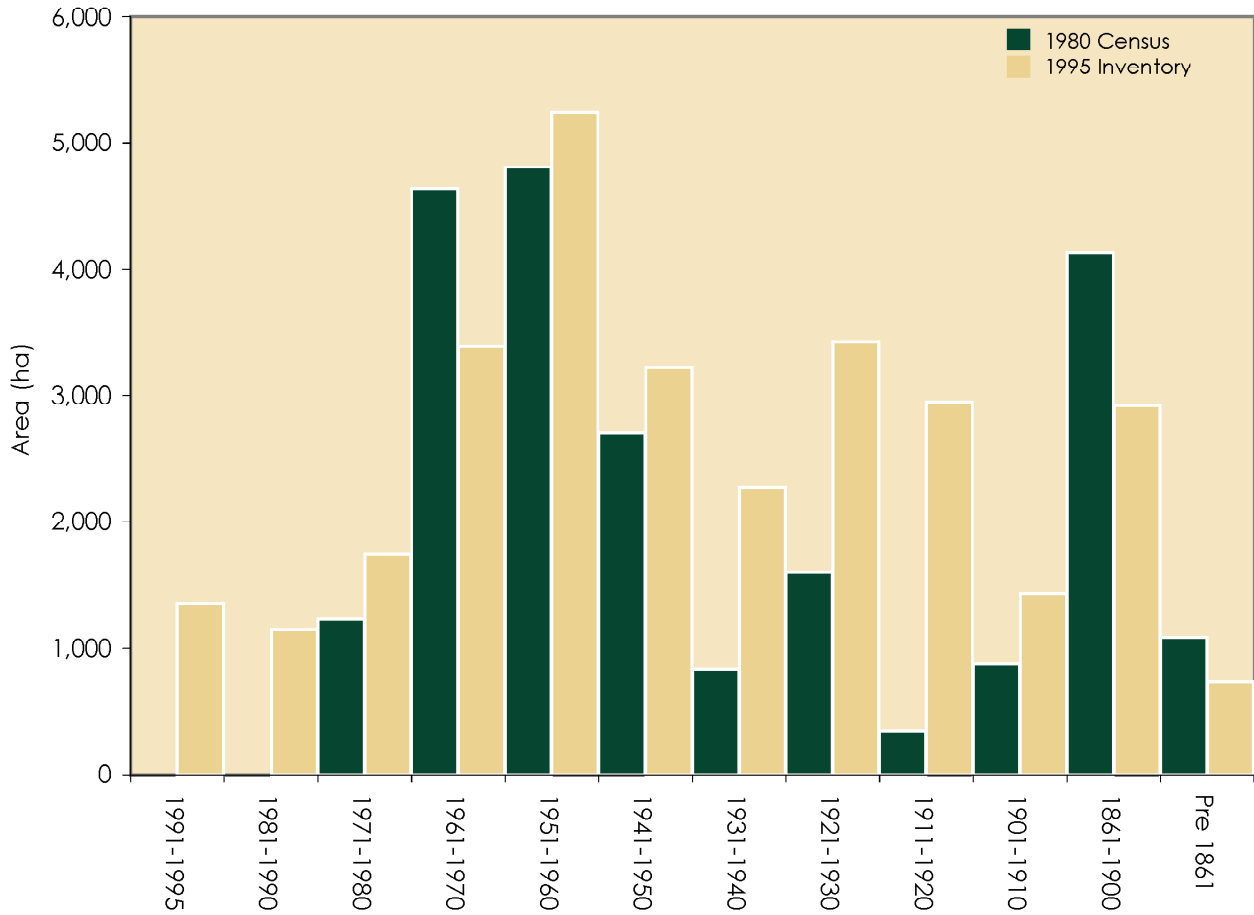


Table 22 Comparison of numbers of live trees outside woodland between 1980 Census and 1995 Inventory (000's)

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. Surrey includes a substantial proportion of developed land making comparison inappropriate.

Table 23 Comparison of density of non-woodland features between 1980 Census and 1995 Inventory

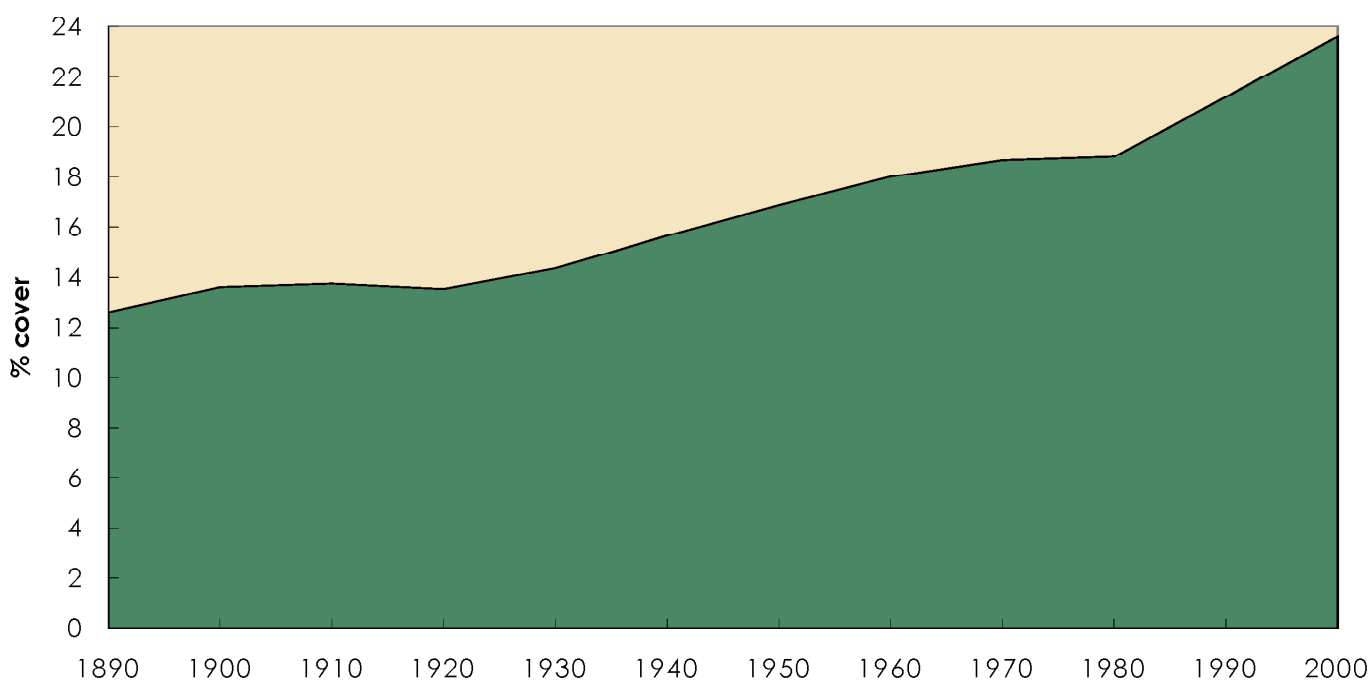
Tables 22 and 23 have been excluded from this report. The Survey of Small Woodland and trees does not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land. In this respect the survey differs markedly from the 1980 Census. Surrey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

WOODLAND COVER

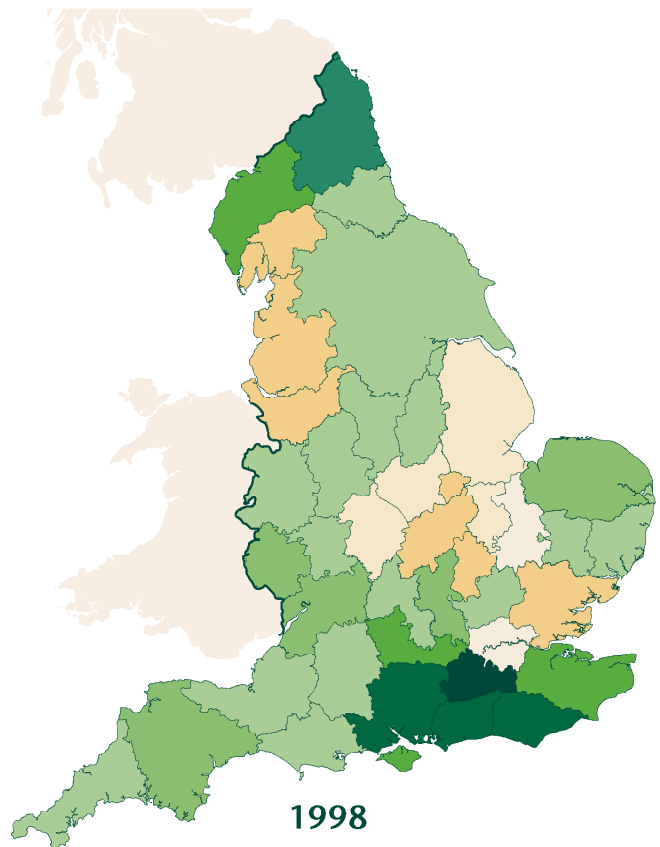
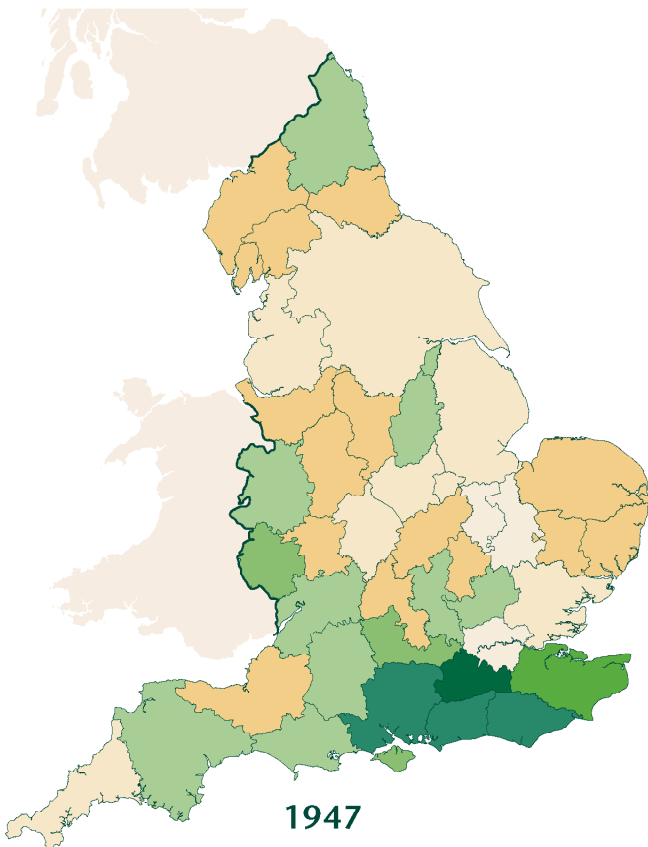
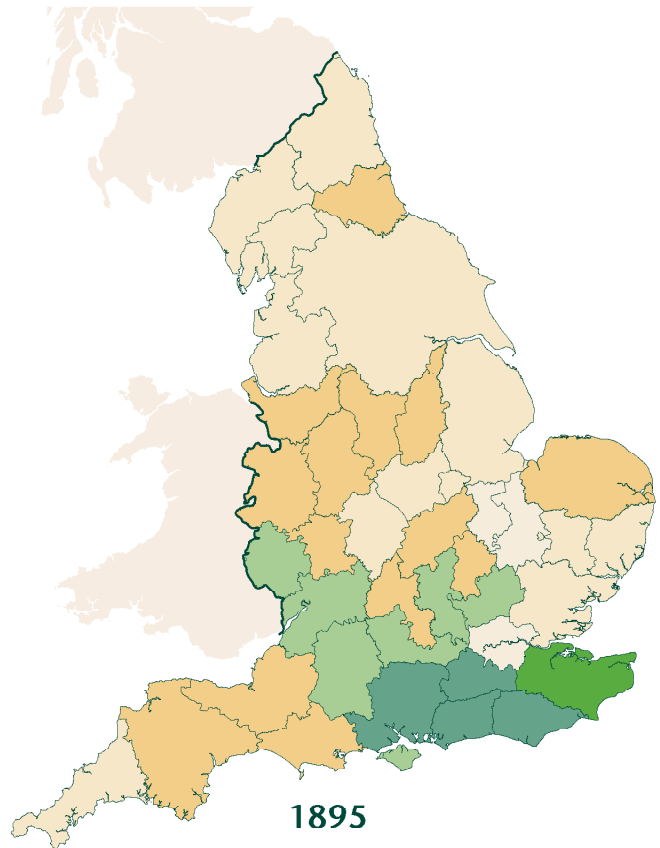
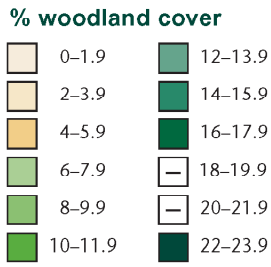
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

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)



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 0.1ha.

- **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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