



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

SUFFOLK



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 Suffolk 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 Suffolk 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Suffolk is 31,435 hectares. This represents 8.3 % of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 49.2 % of all woodland. Conifer woodland represents 32.8 %, Mixed woodland 11.2 % and Open Space within woodlands 5.7 %. (Table 2)
- The main conifer species is pine covering 11,197 hectares or 91.4 % of all conifer species. The main broadleaved species is oak covering 4,795 hectares or 28.1 % of all broadleaved species. (Table 3)
- 9,656 hectares or 35 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 17,676 hectares or 65 % of woodland is in Other ownership. (Table 6)
- There are a total of 1,859 woods over 2 ha within Suffolk with a mean wood area of 14.8 hectares. (Table 7a) There are a total of 7,424 woods from 0.1 - <2.0 hectares with a mean wood area of 0.55 hectares. (Table 14)
- There are 5.1 million live trees outside woodland in Suffolk. (Table 15)
- Woodland land cover increased by over 2,800 hectares from 7.4 % to 8.2 % of the land area between 1980 and 1998. (Table 19)
- The area of broadleaves increased by 30 % between 1980 and 1998, with the relative proportion of broadleaves to conifers increasing from 50 % to 58 %. (Table 20)

INVENTORY REPORTS

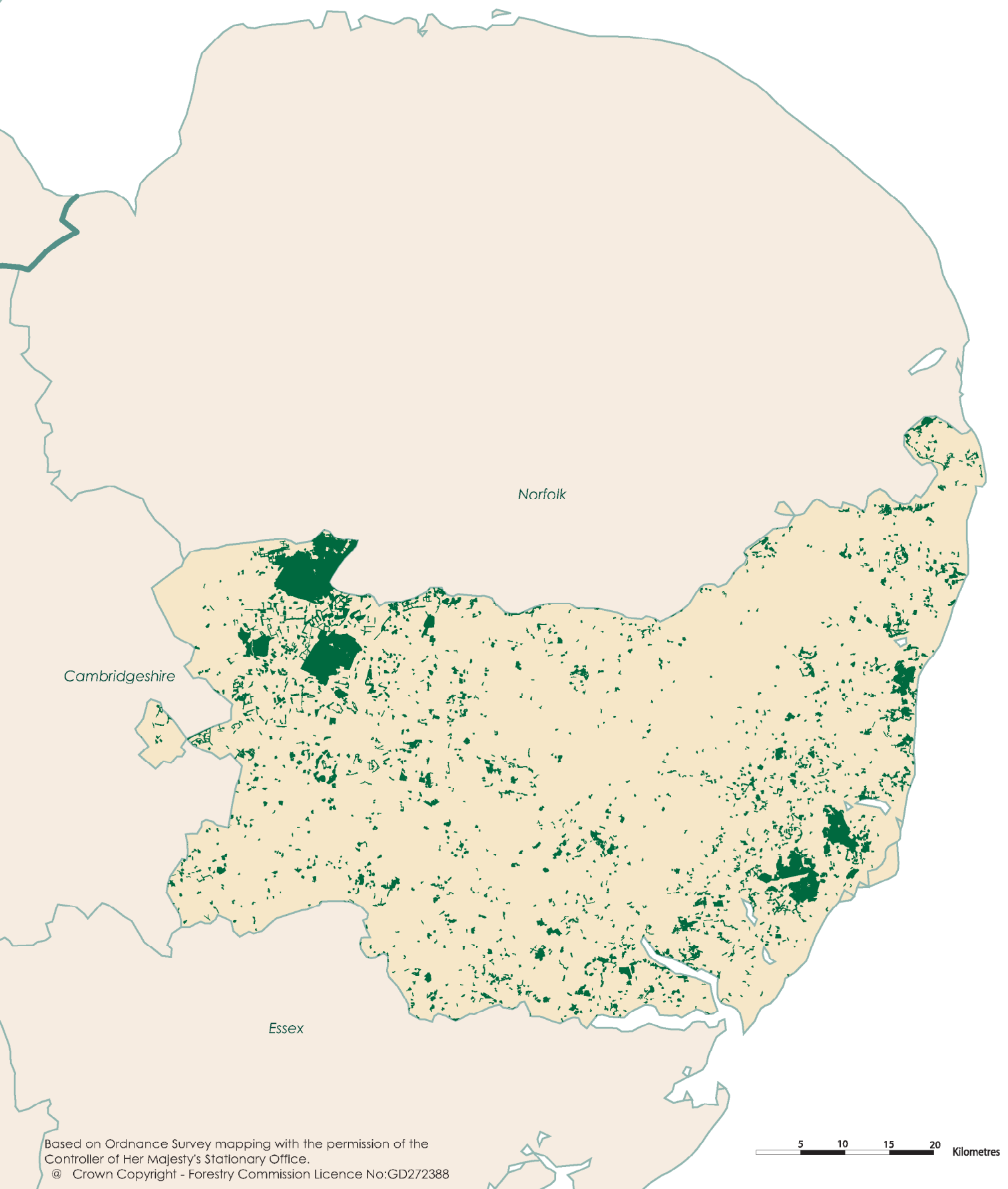
As well as this report for Suffolk, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries

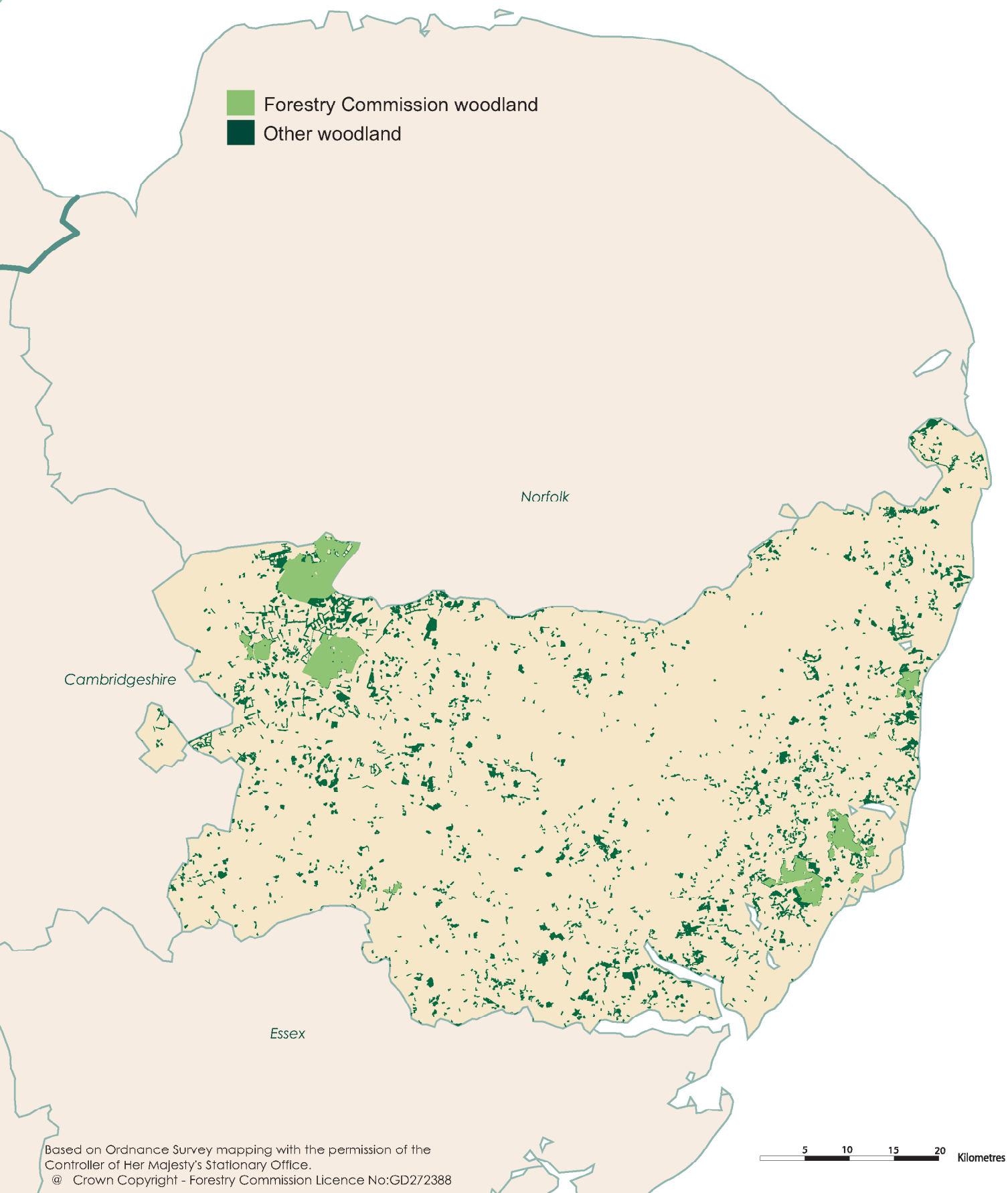


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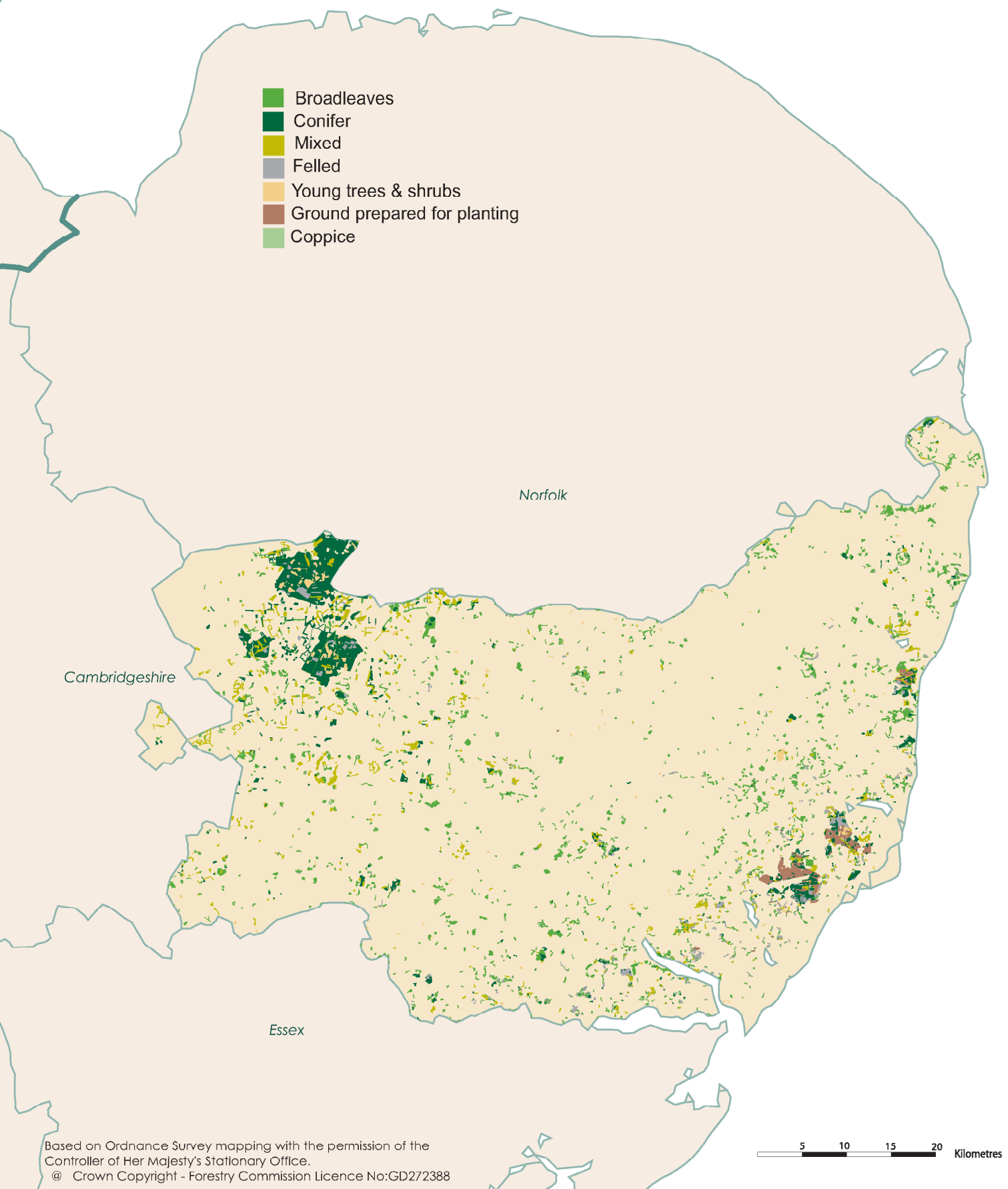
Map 2 Distribution of woodland over 2 hectares



Map 3 Distribution of woodland over 2 hectares by ownership



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



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 Suffolk.

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	27,332	86.9
0.25 - < 2.00	3,751	11.9
0.10 - < 0.25	352	1.1
Total area of woodland	31,435	100.0
% Woodland land cover	8.3	

1. Area of Suffolk, including inland water, 379,839 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	9,883	430	10,313	32.8
Broadleaved	12,282	3,184	15,466	49.2
Mixed	3,155	371	3,526	11.2
Coppiced	6	0	6	0.0
Copp-w-standards	43	98	141	0.4
Windblow	0	0	0	0.0
Felled	192	0	192	0.6
Open Space	1,772	20	1,792	5.7
Total	27,332	4,103	31,435	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	10,894	303	11,197	91.4	38.2
Sitka spruce	0	0	0	0.0	0.0
Larch	202	59	261	2.1	0.9
Other conifers	513	235	748	6.1	2.6
Mixed conifers	43	0	43	0.4	0.1
Total conifers	11,653	597	12,250	100.0	41.8
Oak	4,072	723	4,795	28.1	16.4
Beech	746	78	824	4.8	2.8
Sycamore	1,361	117	1,478	8.7	5.0
Ash	2,698	361	3,059	17.9	10.4
Birch	1,681	10	1,691	9.9	5.8
Elm	128	49	177	1.0	0.6
Other broadleaves	2,590	1,182	3,772	22.1	12.9
Mixed broadleaves	392	869	1,261	7.4	4.3
Total broadleaves	13,666	3,389	17,055	100.0	58.2
Total all species***	25,320	3,985	29,305		100.0

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

**Species/group percentage of all species

***Excludes the 2,131ha 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	3%
Broadleaves	3%
Pine	5%
Oak	8%
Ash	9%
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	231,100	1,470,200	6	387
Narrow Linear Features	67,500	3,292,100	49	867
Individual Trees	303,700	303,700	1	80
Total		5,066,000		1,334

1. Land area used to calculate tree density 379,839ha 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	20%
Narrow Linear Features	28%
Individual Trees	13%
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	67,500	5,022	1,322
Total		5,022	1,322

1. Land area used to calculate tree density 379,839ha 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	22%
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	9,656	35
Other	17,676	65
Total area of woodland	27,332	100

1. Woodland area from aerial photographic interpretation map updated to 31 March 1998
2. See Glossary for definitions of ownership types

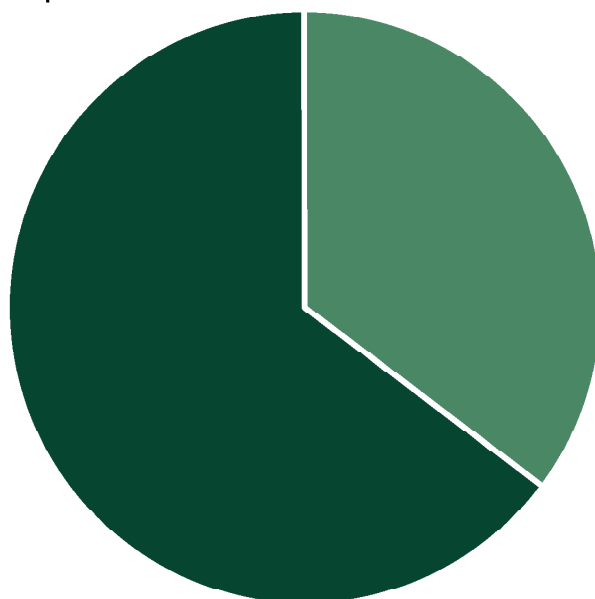
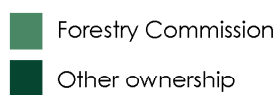
Woodland area by ownership

Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	1,475	6,221	23	4.2
10 - <20	208	2,834	10	13.6
20 - <50	120	3,645	13	30.4
50 - <100	38	2,802	10	73.7
<100	1,841	15,501	56	8.4
100 - <500	13	2,098	8	161.4
500 and >	5	9,868	36	1973.5
All woods	1,859	27,467	100	14.8

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	11	0	3.7
	O	1,543	6,353	23	4.1
10 - <20	FC	1	18	0	18.0
	O	216	2,960	11	13.7
20 - <50	FC	3	87	0	29.1
	O	122	3,704	13	30.4
50 - <100	FC	4	271	1	67.8
	O	37	2,730	10	73.8
<100	FC	11	387	1	35.2
	O	1,918	15,747	57	8.2
100 - <500	FC	4	1,126	4	281.4
	O	14	2,048	7	146.3
500 and >	FC	4	8,158	30	2039.6
	O	0	0	0	0.0
Total	FC	19	9,672	35	509.1
	O	1,932	17,795	65	9.2

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 135 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	7,774	80.5	2,109	11.9	9,883	36.2
Broadleaved	434	4.5	11,848	67.0	12,282	44.9
Mixed	935	9.7	2,220	12.6	3,155	11.5
Coppice	0	0.0	6	0.0	6	0.0
Copp-w-Stds	0	0.0	43	0.2	43	0.2
Windblow	0	0.0	0	0.0	0	0.0
Felled	146	1.5	45	0.3	192	0.7
Open Space	368	3.8	1,404	7.9	1,772	6.5
Total	9,656	100.0	17,676	100.0	27,332	100.0

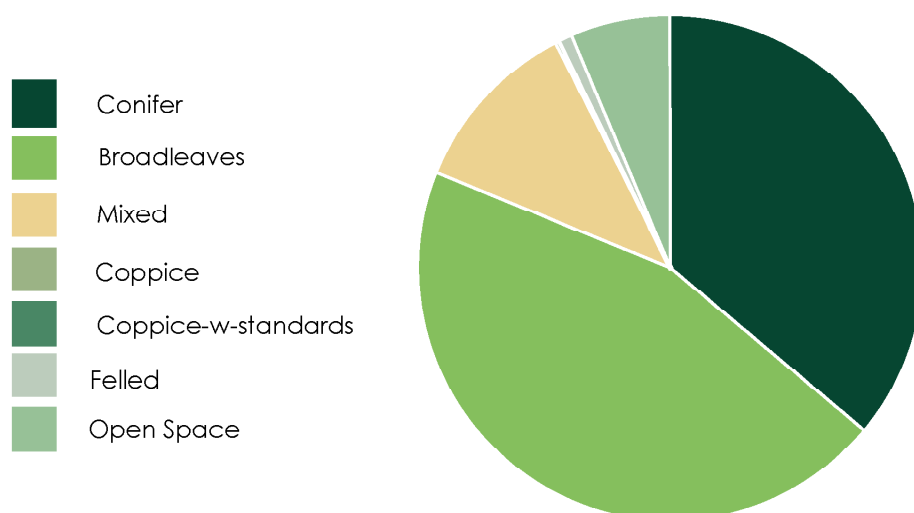
Area of woodland by forest type

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	1,691	20	18	1,894	57	12	3,585	31	14
Corsican pine	6,560	79	72	741	22	5	7,301	63	29
Lodgepole pine	0	0	0	8	0	0	8	0	0
Sitka spruce	0	0	0	0	0	0	0	0	0
Norway spruce	5	0	0	197	6	1	203	2	1
European larch	47	1	1	106	3	1	153	1	1
Jap/Hybrid larch	5	0	0	44	1	0	49	0	0
Douglas fir	16	0	0	169	5	1	185	2	1
Other conifers	21	0	0	105	3	1	125	1	0
Mixed conifers	5	0	0	38	1	0	43	0	0
Total conifers	8,350	100	91	3,303	100	20	11,653	100	46
Oak	120	15	1	3,952	31	24	4,072	30	16
Beech	141	18	2	605	5	4	746	5	3
Sycamore	0	0	0	1,361	11	8	1,361	10	5
Ash	0	0	0	2,698	21	17	2,698	20	11
Birch	409	52	4	1,271	10	8	1,681	12	7
Poplar	52	7	1	246	2	2	298	2	1
Sweet chestnut	26	3	0	387	3	2	413	3	2
Elm	0	0	0	128	1	1	128	1	1
Other broadleaves	28	4	0	1,851	14	11	1,879	14	7
Mixed broadleaves	16	2	0	377	3	2	392	3	2
Total broadleaves	793	100	9	12,874	100	80	13,666	100	54
Total - all species	9,143		100	16,177		100	25,320		100
Felled	146			45			192		
Total High Forest	9,289			16,222			25,512		

*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 1,772 ha 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	3%
Broadleaves	3%
Corsican pine	6%
Oak	8%
Ash	9%
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 Hlgh Forest by principal species and ownership

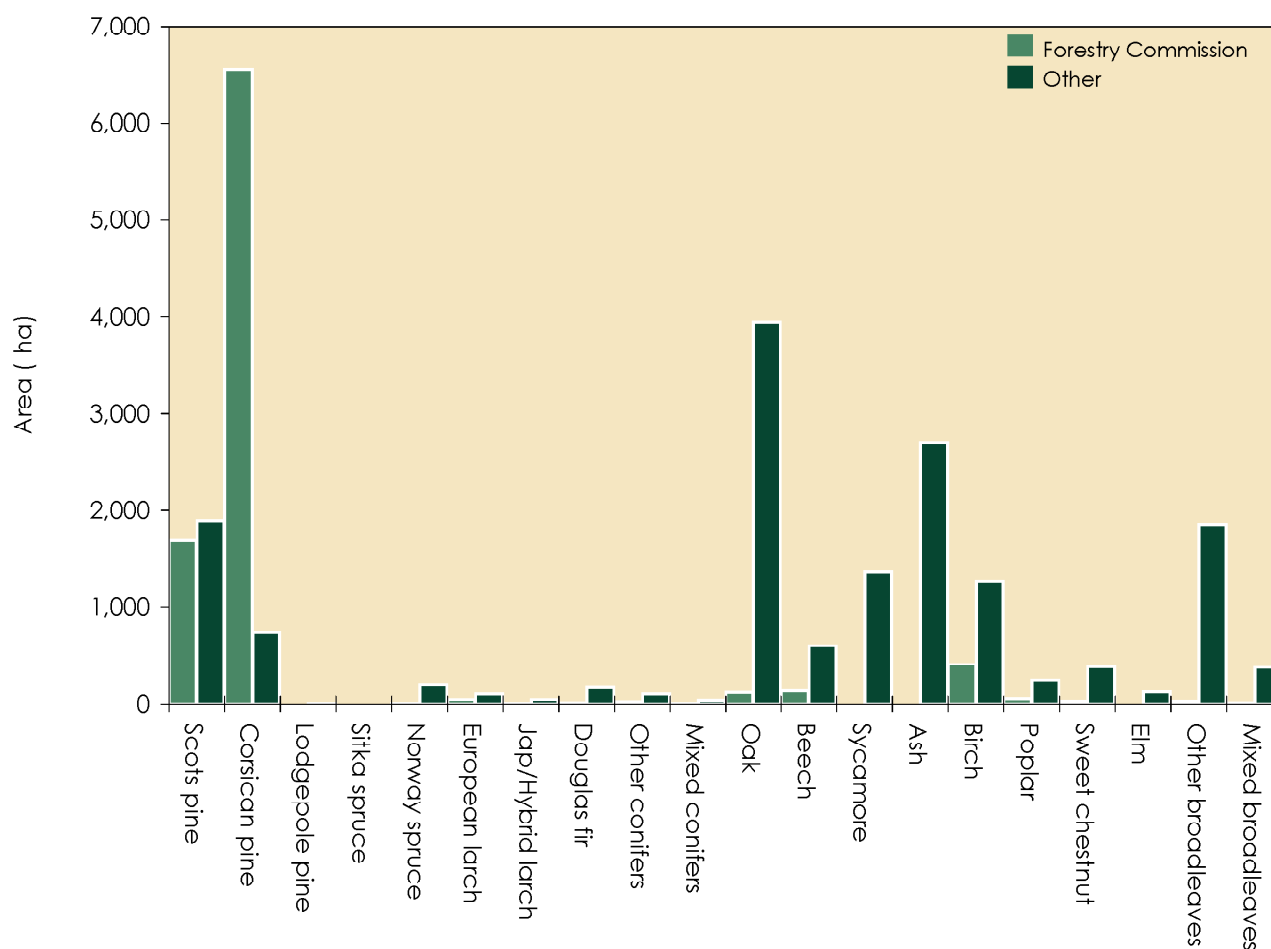


Table 9b Area of High Forest by principal species,ownership and category

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	1,675	16	1,691	1,806	88	1,894	3,481	104	3,585
Corsican pine	6,560	0	6,560	741	0	741	7,301	0	7,301
Lodgepole pine	0	0	0	8	0	8	8	0	8
Sitka spruce	0	0	0	0	0	0	0	0	0
Norway spruce	5	0	5	197	0	197	203	0	203
European larch	47	0	47	106	0	106	153	0	153
Jap/Hybrid larch	0	5	5	44	0	44	44	5	49
Douglas fir	16	0	16	169	0	169	185	0	185
Other conifers	21	0	21	92	13	105	113	13	125
Mixed conifers	5	0	5	38	0	38	43	0	43
Total conifers	8,329	21	8,350	3,202	101	3,303	11,531	122	11,653
Oak	84	37	120	3,723	229	3,952	3,806	266	4,072
Beech	68	73	141	605	0	605	673	73	746
Sycamore	0	0	0	1,361	0	1,361	1,361	0	1,361
Ash	0	0	0	2,641	56	2,698	2,641	56	2,698
Birch	399	10	409	1,271	0	1,271	1,670	10	1,681
Poplar	31	21	52	246	0	246	277	21	298
Sweet chestnut	26	0	26	383	4	387	409	4	413
Elm	0	0	0	113	15	128	113	15	128
Other broadleaves	23	5	28	1,243	608	1,851	1,266	613	1,879
Mixed broadleaves	16	0	16	377	0	377	392	0	392
Total broadleaves	646	146	793	11,962	912	12,874	12,608	1,058	13,666
Total - all species	8,975	167	9,143	15,164	1,013	16,177	24,139	1,180	25,320

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

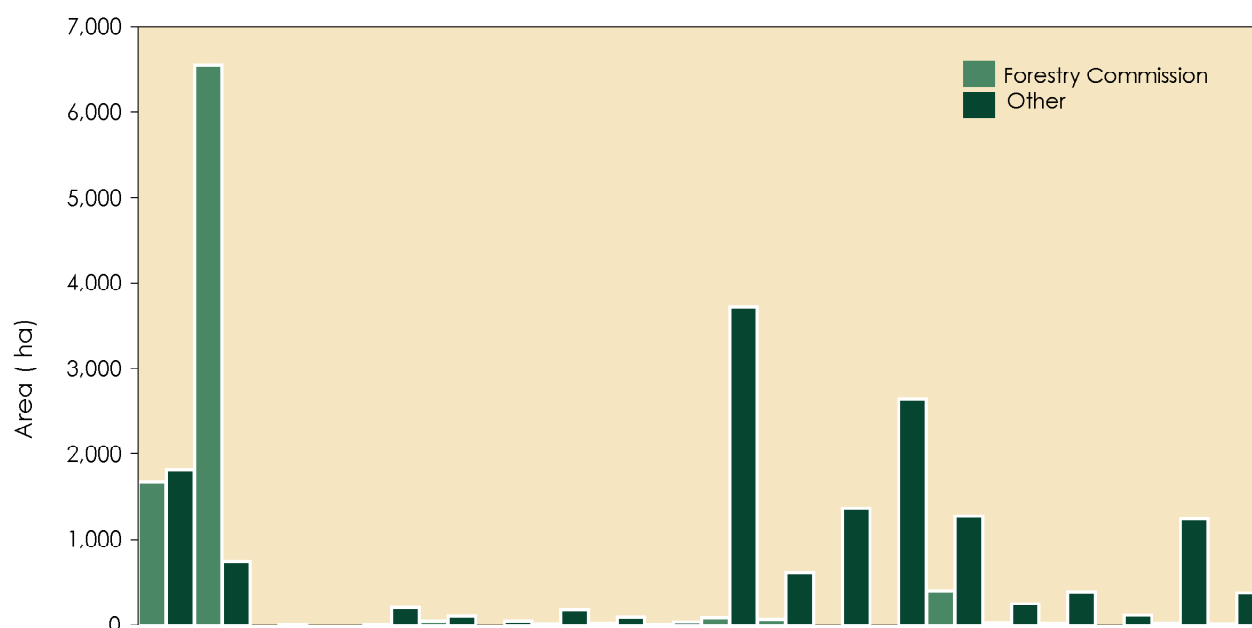
	Category 1*	Category 2*	Total High Forest
Conifers	3%	40%	3%
Broadleaves	4%	15%	3%
Corsican pine	5%	-	6%
Oak	8%	35%	8%
Ash	9%	66%	9%

*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

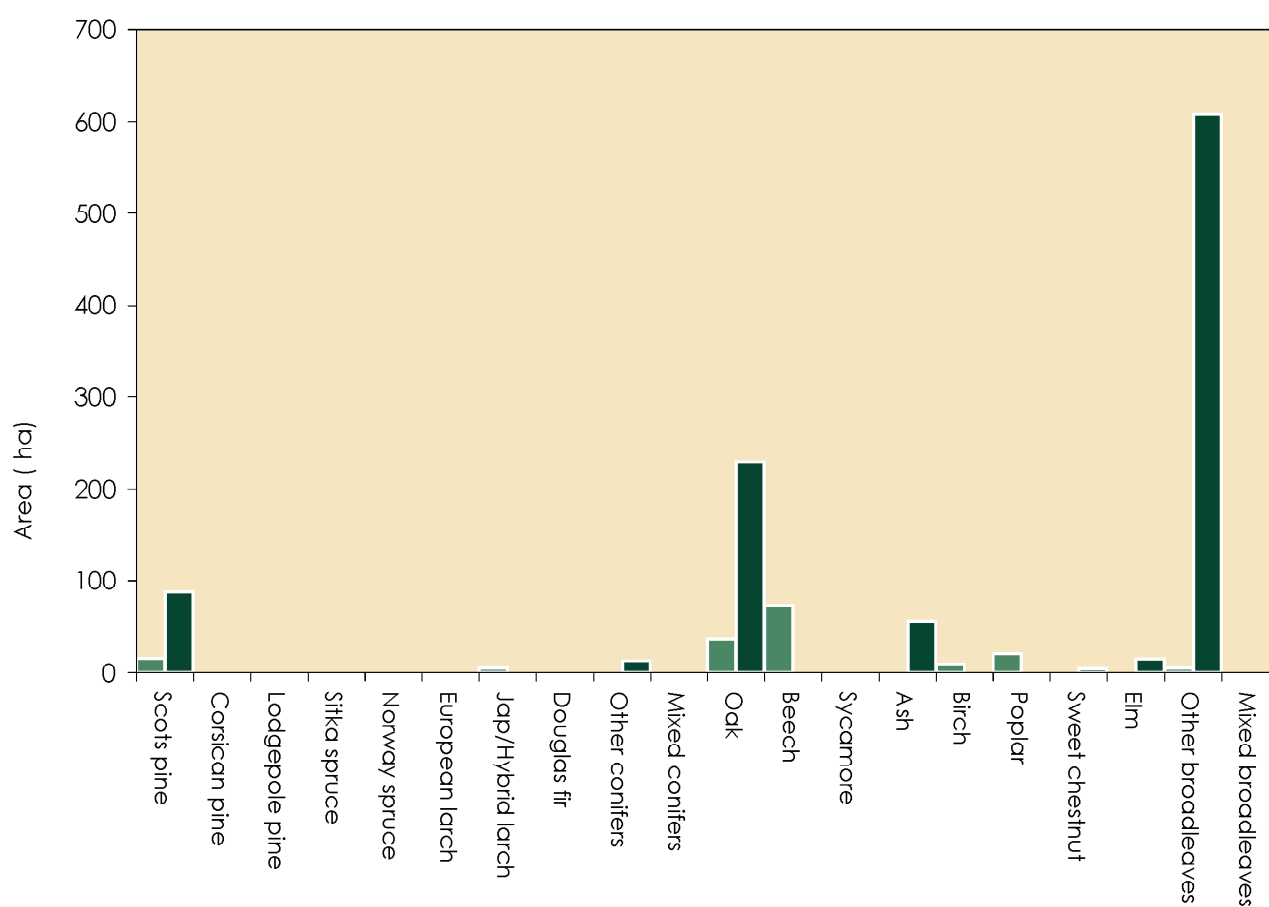
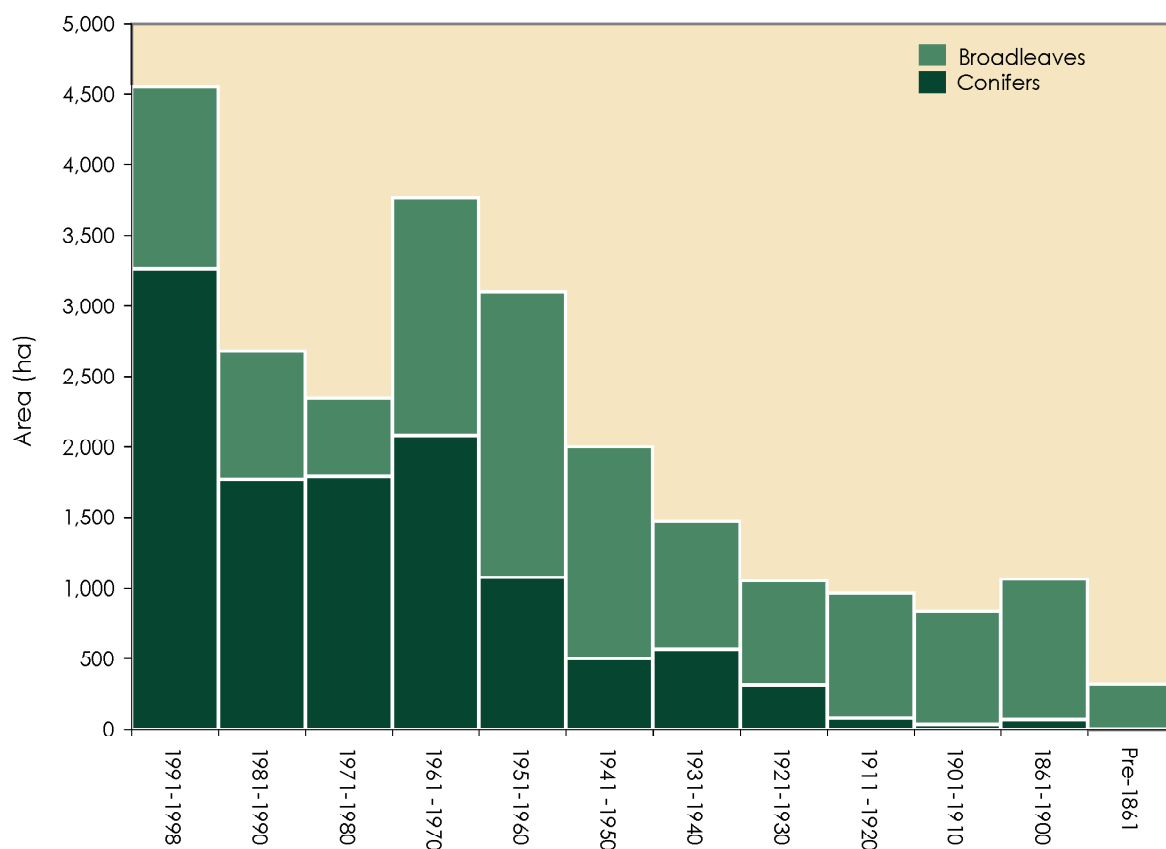


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1998	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	180	340	436	740	547	458	485	174	52	21	49	0	3,481
Corsican pine	3,079	1,414	1,312	1,000	427	13	21	16	0	0	20	0	7,301
Lodgepole pine	0	0	0	4	5	0	0	0	0	0	0	0	8
Sitka spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway spruce	0	10	6	141	14	4	23	5	0	0	0	0	203
European larch	0	0	0	72	13	9	5	26	21	8	0	0	153
Jap/Hybrid larch	0	4	8	13	0	0	3	13	4	0	0	0	44
Douglas fir	0	0	8	67	36	11	15	48	0	0	0	0	185
Other conifers	0	0	21	44	18	0	17	9	0	4	0	0	113
Mixed conifers	5	0	0	2,084	14	4	0	16	0	0	0	0	43
Total conifers	3,264	1,768	1,791	2,084	1,073	498	567	308	76	33	70	0	11,531
Oak	342	205	104	192	411	281	172	149	535	475	708	231	3,806
Beech	9	11	10	77	130	82	5	36	32	117	89	75	673
Sycamore	18	65	142	374	357	263	55	75	0	4	8	0	1,361
Ash	115	54	15	322	271	585	408	295	256	160	152	10	2,641
Birch	453	193	51	321	319	129	87	39	16	30	33	0	1,670
Poplar	0	18	0	119	83	52	0	5	0	0	0	0	277
Sweet chestnut	114	136	0	0	7	30	31	81	10	0	0	0	409
Elm	22	47	39	0	0	0	0	5	0	0	0	0	113
Other broadleaves	183	153	137	208	348	68	96	35	41	0	0	0	1,266
Mixed broadleaves	32	35	57	73	99	12	47	21	0	16	0	0	392
Total broadleaves	1,286	915	555	1,686	2,025	1,501	901	741	890	802	990	316	12,608
Total - all species	4,550	2,683	2,346	3,770	3,098	1,998	1,469	1,049	966	835	1,060	316	24,139

*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

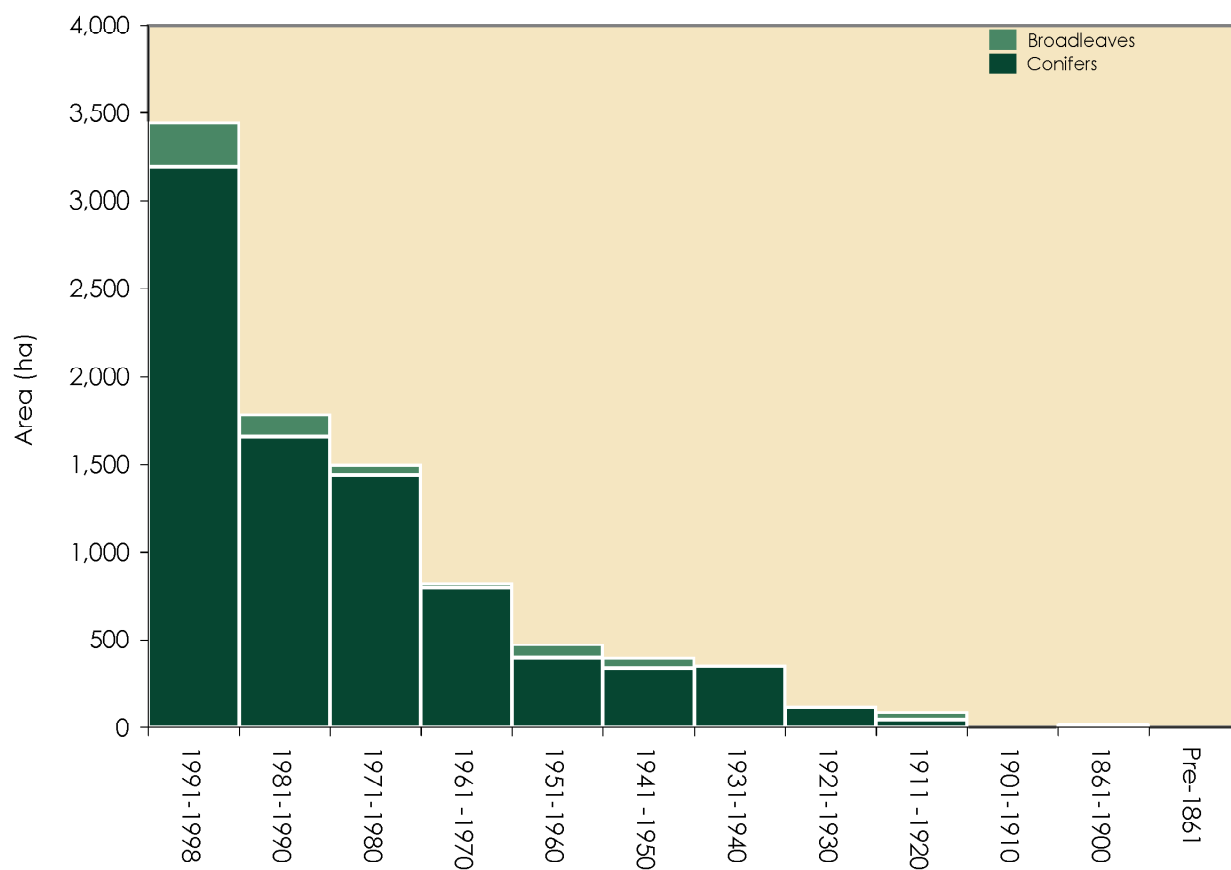


1. Most of the planting year classes cover 10 years, 1991-1998 is 8 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991 - 1998	1981 - 1990	1971 - 1980	1961 - 1970	1951 - 1960	1941 - 1950	1931 - 1940	1921 - 1930	1911 - 1920	1901 - 1910	1861 - 1900	Pre- 1861	
Scots pine	136	319	260	89	110	329	324	84	26	0	0	0	1,675
Corsican pine	3,052	1,336	1,157	705	279	0	21	0	0	0	10	0	6,560
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	5	0	0	0	0	5
European larch	0	0	0	0	0	0	0	26	21	0	0	0	47
Jap/Hybrid larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas fir	0	0	0	0	10	5	0	0	0	0	0	0	16
Other conifers	0	0	21	0	0	0	0	0	0	0	0	0	21
Mixed conifers	5	0	0	0	0	0	0	0	0	0	0	0	5
Total conifers	3,193	1,654	1,438	794	399	334	345	115	47	0	10	0	8,350
Oak	5	5	5	10	10	16	0	0	26	0	5	0	84
Beech	0	0	5	0	47	0	0	0	16	0	0	0	68
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	223	103	36	16	10	10	0	0	0	0	0	0	399
Poplar	0	0	0	0	0	31	0	0	0	0	0	0	31
Sweet chestnut	0	21	0	0	0	5	0	0	0	0	0	0	26
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	23	0	0	0	0	0	0	0	0	0	0	0	23
Mixed broadleaves	0	0	10	0	5	0	0	0	0	0	0	0	16
Total broadleaves	252	129	56	26	73	63	0	0	42	0	5	0	646
Total - all species	3,445	1,784	1,494	820	472	397	345	115	89	0	16	0	8,975

*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

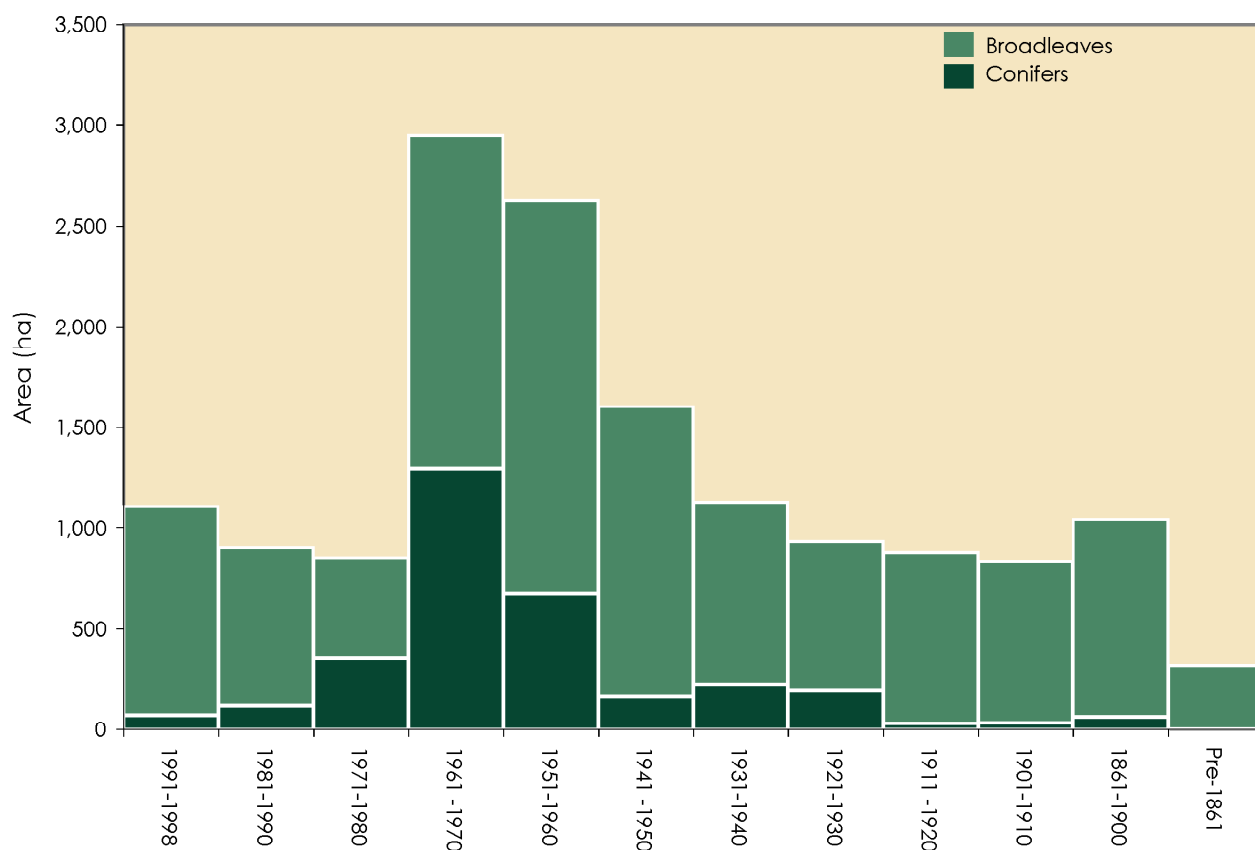
1. Most of the planting year classes cover 10 years, 1991-1998 is 8 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1998	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	45	22	176	651	437	129	161	90	25	21	49	0	1,806
Corsican pine	26	78	155	295	148	13	0	16	0	0	10	0	741
Lodgepole pine	0	0	0	4	5	0	0	0	0	0	0	0	8
Silka spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway spruce	0	10	6	141	14	4	23	0	0	0	0	0	197
European larch	0	0	0	72	13	9	5	0	0	8	0	0	106
Jap/Hybrid larch	0	4	8	13	0	0	3	13	4	0	0	0	44
Douglas fir	0	0	8	67	25	5	15	48	0	0	0	0	169
Other conifers	0	0	0	44	18	0	17	9	0	4	0	0	92
Mixed conifers	0	0	0	5	14	4	0	16	0	0	0	0	38
Total conifers	71	114	353	1,291	674	164	223	193	29	33	59	0	3,202
Oak	337	200	99	182	400	266	172	149	509	475	703	231	3,723
Beech	9	11	5	77	83	82	5	36	16	117	89	75	605
Sycamore	18	65	142	374	357	263	55	75	0	4	8	0	1,361
Ash	115	54	15	322	271	585	408	295	256	160	152	10	2,641
Birch	229	89	15	306	308	118	87	39	16	30	33	0	1,271
Poplar	0	18	0	119	83	21	0	5	0	0	0	0	246
Sweet chestnut	114	116	0	0	7	25	31	81	10	0	0	0	383
Elm	22	47	39	0	0	0	0	5	0	0	0	0	113
Other broadleaves	160	153	137	208	348	68	96	35	41	0	0	0	1,243
Mixed broadleaves	32	35	46	73	94	12	47	21	0	16	0	0	377
Total broadleaves	1,034	786	498	1,660	1,952	1,438	901	741	849	802	985	316	11,962
Total - all species	1,105	899	851	2,950	2,626	1,602	1,124	934	878	835	1,044	316	15,164

*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, 1991-1998 is 8 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	%
1991-98	Corsican pine	67	Birch	10	Oak	7
1981-90	Corsican pine	52	Scots pine	12	Oak	7
1971-80	Corsican pine	55	Scots pine	18	Other broadleaves	6
1961-70	Corsican pine	26	Scots pine	19	Sycamore	10
1951-60	Scots pine	17	Other broadleaves	15	Oak	13
1941-50	Ash	28	Scots pine	24	Oak	14
1931-40	Scots pine	32	Ash	26	Oak	12
1921-30	Ash	28	Oak	16	Scots pine	15
1911-20	Oak	55	Ash	25	Other broadleaves	6
1901-10	Oak	59	Ash	16	Beech	12
1861-1900	Oak	52	Other broadleaves	17	Ash	12
Pre 1861	Oak	72	Beech	22	Ash	4
All years	Corsican pine	29	Oak	16	Scots pine	14

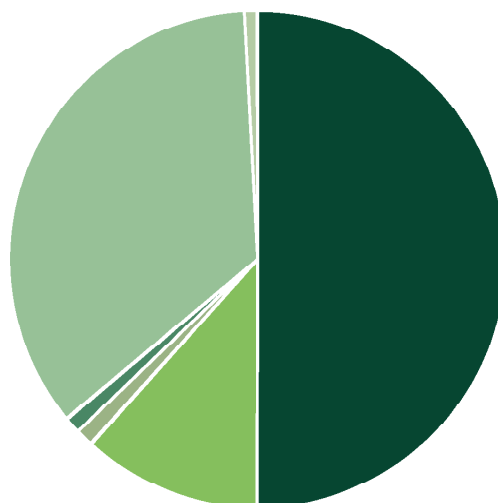
1. Principal species as a percentage of area in the planting year class.

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	13,671	50.0
Business	3,156	11.5
Forestry or timber business	0	0.0
Charity	356	1.3
Local Authority	274	1.0
Other public (not FC)	0	0.0
Forestry Commission	9,656	35.3
Community ownership or common land	219	0.8
Unidentified	0	0.0
Total	27,332	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	7,424	4,103	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	67,500	5,022	Length (Km)
Narrow Linear Features	67,500	3,292,100	Number of live trees
Groups	231,100	1,470,200	Number of live trees
Individual Trees	303,700	303,700	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	352	3,751	4,103	7,424	0.55
Wide Linear Features	0	0	0	0	0.00
Total	352	3,751	4,103	7,424	0.55

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	5.5	0.8	7.0	11.2	24.5	18.0	0.5
Spruce	0.0	0.0	0.8	7.2	8.0	5.9	0.2
Larch	0.0	0.8	0.0	0.0	0.8	0.6	0.0
Cypress	3.1	3.1	4.7	58.3	69.2	50.8	1.4
Other conifers	4.7	1.6	10.1	17.4	33.8	24.8	0.7
Total conifers	13.3	6.3	22.6	94.0	136.3	100.0	2.7
Oak	54.7	14.1	121.0	155.4	345.2	7.0	6.8
Beech	2.3	3.1	5.5	2.0	12.9	0.3	0.3
Sycamore	7.0	2.3	85.9	121.6	216.8	4.4	4.3
Ash	41.4	5.5	223.3	448.7	718.9	14.6	14.2
Birch	0.8	3.1	9.4	6.1	19.4	0.4	0.4
Poplar	2.3	0.0	49.2	8.2	59.7	1.2	1.2
Sweet chestnut	0.8	0.0	0.0	0.0	0.8	0.0	0.0
Horse chestnut	1.6	0.0	5.5	7.2	14.3	0.3	0.3
Alder	3.9	0.0	25.0	7.2	36.1	0.7	0.7
Lime	9.4	0.0	10.9	4.1	24.4	0.5	0.5
Elm	14.1	1.6	245.9	457.9	719.5	14.6	14.2
Willow	17.6	2.6	146.8	109.4	276.4	5.6	5.5
Other broadleaves	72.7	23.2	519.2	1870.4	2485.5	50.4	49.1
Total broadleaves	228.6	55.5	1447.5	3198.1	4929.9	100.0	97.3
Total - all species	241.9	61.8	1470.1	3292.1	5066.0		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 13%
Groups 20%
Narrow Linear Features 28%

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	0.8	1.6	1.6	1.0	5.0	5.1	5.1
Beech	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sycamore	0.0	0.0	0.0	1.0	1.0	1.0	1.0
Ash	0.0	0.0	3.1	0.0	3.1	3.2	3.2
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	0.8	0.8	0.0	1.6	1.6	1.6
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	7.0	0.0	15.6	40.9	63.5	65.1	65.1
Willow	0.0	0.0	4.7	0.0	4.7	4.8	4.8
Other broadleaves	2.3	6.2	3.9	6.1	18.5	19.0	19.0
Total broadleaves	10.1	8.6	29.7	49.1	97.5	100.0	100.0
Total - all species	10.1	8.6	29.7	49.1	97.5		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	2.0	16.0	6.5	0.0	24.5
Spruce	2.8	4.1	1.0	0.0	7.9
Larch	0.8	0.0	0.0	0.0	0.8
Cypress	31.3	37.9	0.0	0.0	69.2
Other conifers	17.3	14.9	0.0	1.6	33.8
Total conifers	54.2	72.9	7.5	1.6	136.2
Oak	55.1	184.7	87.2	18.0	345.0
Beech	4.7	3.1	1.0	4.1	12.9
Sycamore	49.2	143.7	17.2	6.7	216.8
Ash	156.2	505.7	46.5	10.4	718.8
Birch	4.7	14.7	0.0	0.0	19.4
Poplar	18.0	25.1	15.6	1.0	59.7
Sweet chestnut	0.0	0.8	0.0	0.0	0.8
Horse chestnut	1.0	10.8	2.3	0.0	14.1
Alder	21.0	15.1	0.0	0.0	36.1
Lime	6.7	13.0	0.8	3.9	24.4
Elm	367.5	349.9	1.0	1.0	719.4
Willow	137.2	133.8	2.3	3.1	276.4
Other broadleaves	1,344.1	1,131.8	9.0	0.8	2,485.7
Total broadleaves	2,165.4	2,532.2	182.9	49.0	4,929.5
Total - all species	2,219.6	2,605.2	190.5	50.7	5,065.7

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	35
3-5	70
6-10	61
11-20	37
21-50	27
51-100	1
>100	1
Total	231

*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 1998 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 1998 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1998 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1998 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1998 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1998 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1998 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1998 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 1998 Inventory

Woodland size (ha)	1980 Census woodland area		1998 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	25,635	90.9	27,332	87.9	7
0.25 - <2.0	2,576	9.1	3,751	12.1	46
Total	28,211		31,083		10
% Woodland land cover	7.4		8.2		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1998 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1998 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1998), 379,839 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 379,667 ha, (Ordnance Survey data)

Table 20 Comparison of High Forest area by species between 1980 Census and 1998 Inventory

Species	1980 Census woodland area (ha)	1998 Inventory woodland area (ha)	Change (%)
Scots pine	6,503	3,653	-44
Corsican pine	4,624	7,516	63
Lodgepole pine	33	8	-76
Sitka spruce	2	0	-100
Norway spruce	472	340	-28
European larch	492	153	-69
Jap/Hybrid larch	41	108	166
Douglas fir	333	185	-44
Other conifers	164	174	6
Mixed conifers	356	43	-88
Total conifers	13,020	12,180	-6
Oak	3,733	4,775	28
Beech	328	795	142
Sycamore	936	1,468	57
Ash	2,224	3,020	36
Birch	1,136	1,691	49
Poplar	840	415	-51
Sweet chestnut	275	647	135
Elm	382	167	-56
Other broadleaves	1,725	2,621	52
Mixed broadleaves	1,333	1,173	-12
Total broadleaves	12,913	16,772	30
Total all species	25,933	28,952	12
Felled	494	192	-61
Total High Forest	26,427	29,144	10

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 5.7% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 5.7%.
3. The above figures from the 1998 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1998 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 1998 Inventory

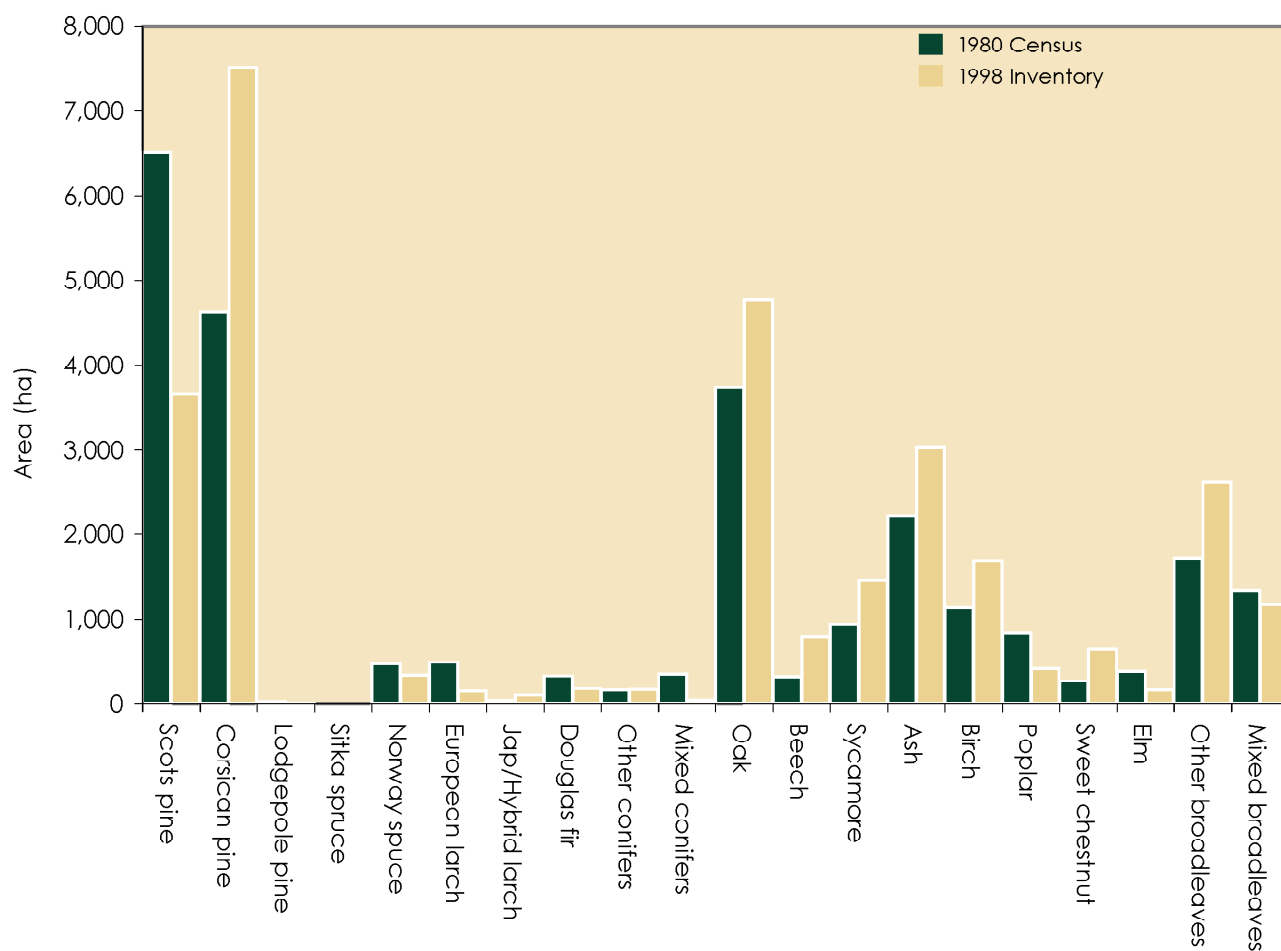


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1998 Inventory

Planting year class	1980 Census woodland area (ha)	1998 Inventory woodland area (ha)	Change (%)
1991-1998	0	5,244	see note
1981-1990	0	3,650	see note
1971-1980	1,525	2,747	80
1961-1970	3,052	3,838	26
1951-1960	3,252	3,098	-5
1941-1950	2,167	2,214	2
1931-1940	4,527	1,566	-65
1921-1930	4,243	1,049	-75
1911-1920	1,166	966	-17
1901-1910	802	874	9
1861-1900	2,358	1,158	-51
Pre 1861	2,286	433	-81
Total all years	25,379	26,837	6

1. The first two classes, 1991-1998 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 1998 Inventory

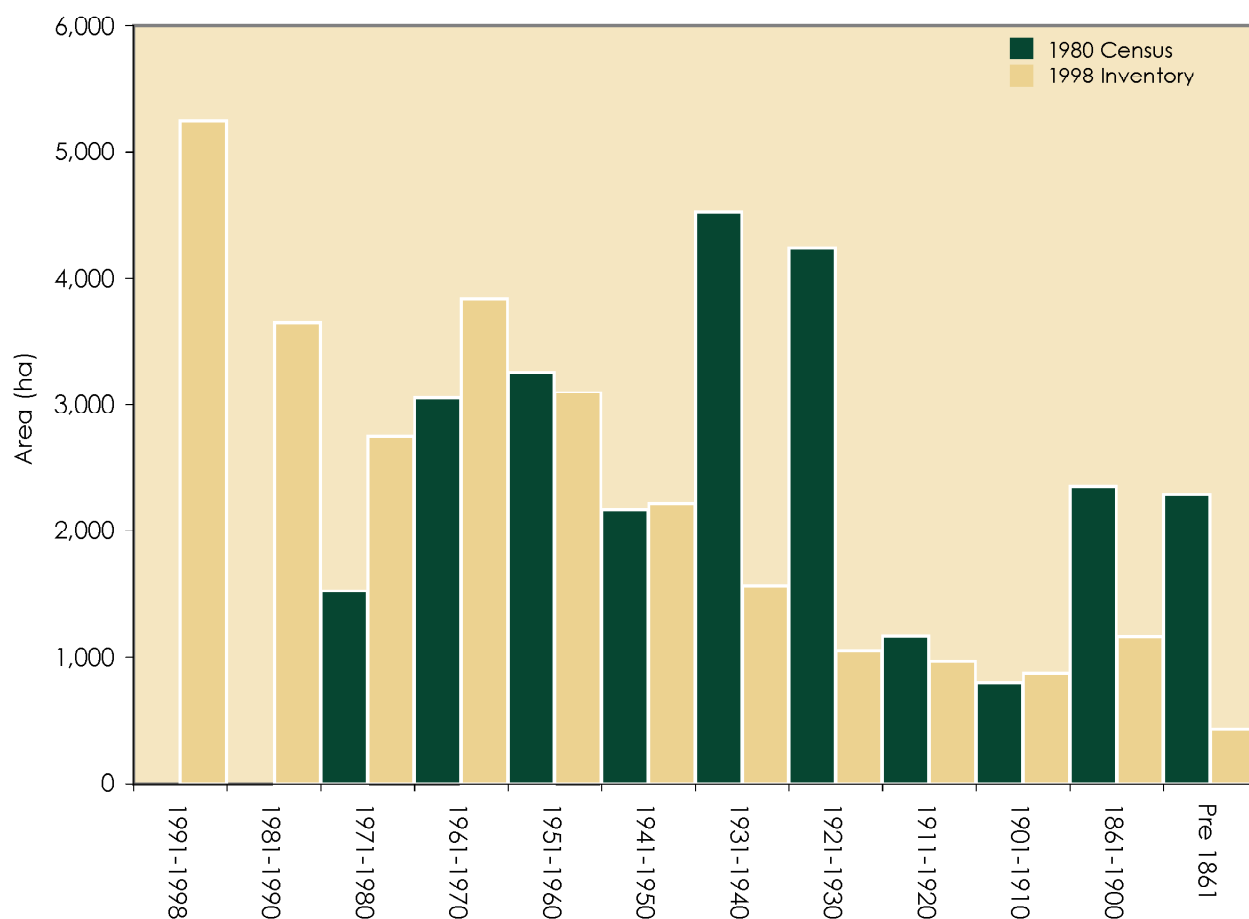


Table 22 Comparison of numbers of live trees outside woodland between 1980 Census and 1998 Inventory (000's)

Feature type	1980 Census	1998 Inventory	Change (%)
Boundary Tree	169	236	40
Middle Tree	220	59	-73
Total Individual Trees	389	295	-24
Groups	791	1,138	44
Linear Features	669	2,270	240
Total	1,848	3,703	100

1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded, the 1998 Inventory figures have been adjusted accordingly. The 1998 figures above will therefore not match those in the previous sections of the report.
3. Changes stated in this table are indicative only. Even with adjustments to the 1998 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1998 used 2m height, as minimum criteria for inclusion.
4. See Glossary for definitions of feature type.

Table 23 Comparison of density of non-woodland features between 1980 Census and 1998 Inventory

Feature type	1980 Census	1998 Inventory	Change (%)
Individual Trees (per sq km)	102.4	77.7	-24
Groups (per sq km)	34.9	51.0	46
Linear Features (m per sq km)	603.2	1,322.2	119

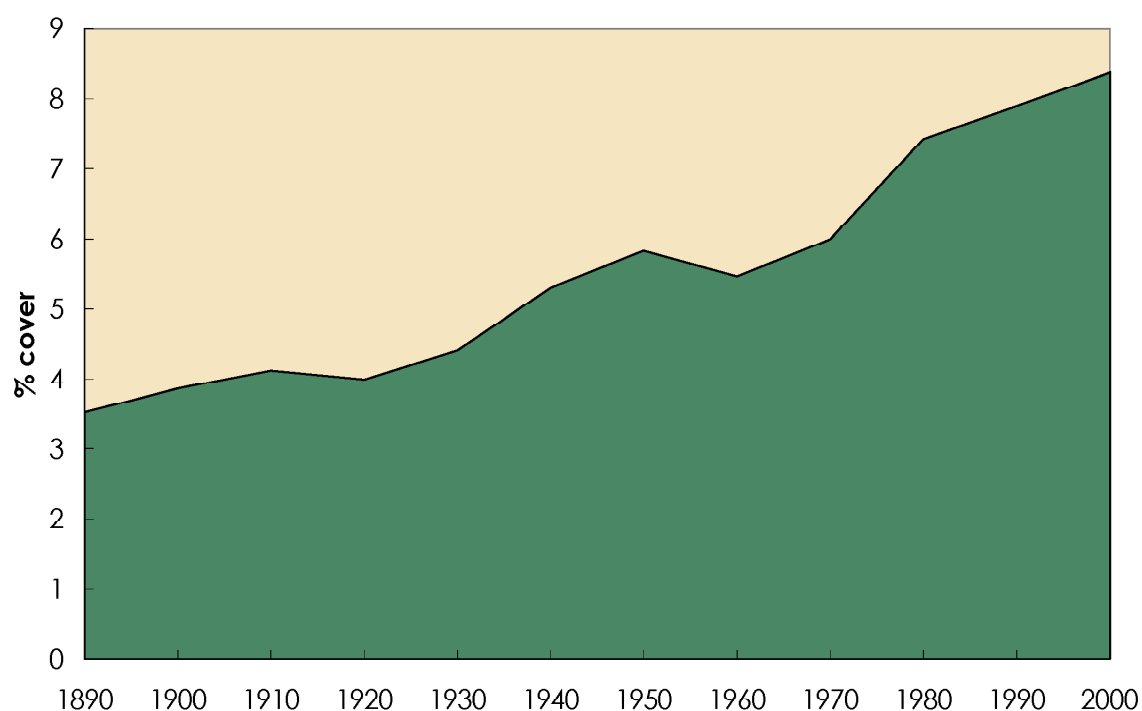
1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded, the 1998 Inventory figures have been adjusted accordingly. The 1998 figures above will therefore not match those in the previous sections of the report.
3. Changes stated in this table are indicative only. Even with adjustments to the 1998 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1998 used 2m height, as minimum criteria for inclusion.
4. See Glossary for definitions of feature type.

WOODLAND COVER

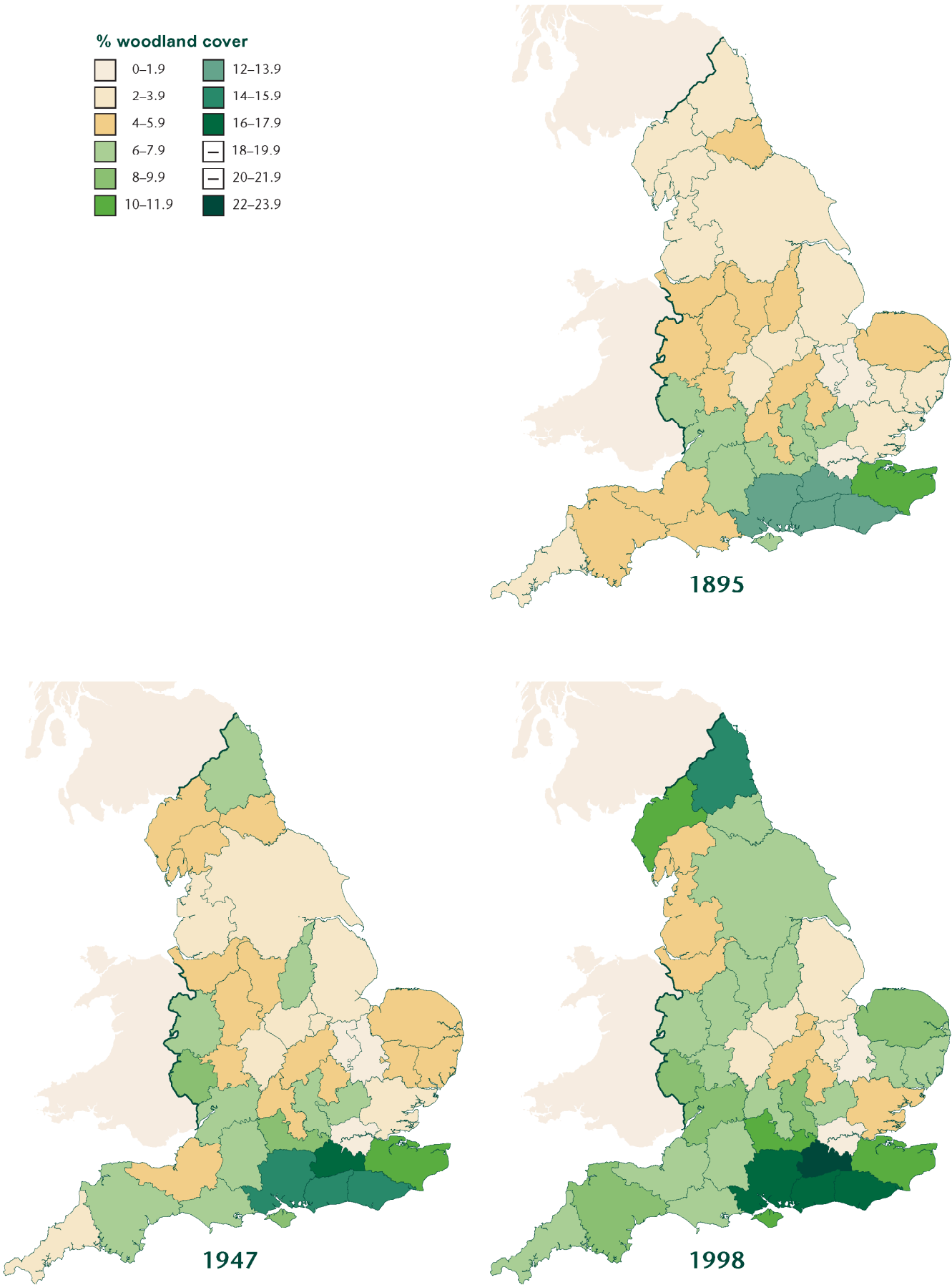
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

The maps use the old County structure data of 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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