



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

CAMBRIDGESHIRE



Forestry Commission

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Enquiries regarding this report should be directed to:

Head of Woodland Surveys
Forest Research
Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT

Telephone: 0131 314 6122
Email: woodland.surveys@forestry.gsi.gov.uk

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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 Cambridgeshire 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 Cambridgeshire 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Cambridgeshire is 12,325 hectares. This represents 3.6% of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 81.3 % of all woodland. Conifer woodland represents 7.6 %, Mixed woodland 10.8 % and Open Space within woodlands 1.0 %. (Table 2)
- The main conifer species is pine covering 899 hectares or 63.3 % of all conifer species. The main broadleaved species is ash covering 2,916 hectares or 27.3 % of all broadleaved species. (Table 3)
- 523 hectares or 8 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 6,197 hectares or 92 % of woodland is in Other ownership. (Table 6)
- There are a total of 623 woods over 2 ha within Cambridgeshire with a mean wood area of 11.1 hectares. (Table 7a) There are a total of 7,488 woods from 0.1 - <2.0 hectares with a mean wood area of 0.75 hectares. (Table 14)
- There are 2.4 million live trees outside woodland in Cambridgeshire. (Table 15)
- Woodland land cover increased by over 5400 hectares from 1.9 % to 3.5 % of the land area between 1980 and 1998. (Table 19)
- The area of broadleaves increased by 105 % between 1980 and 1998, with the relative proportion of broadleaves to conifers increasing from 82 % to 88 %. (Table 20)

INVENTORY REPORTS

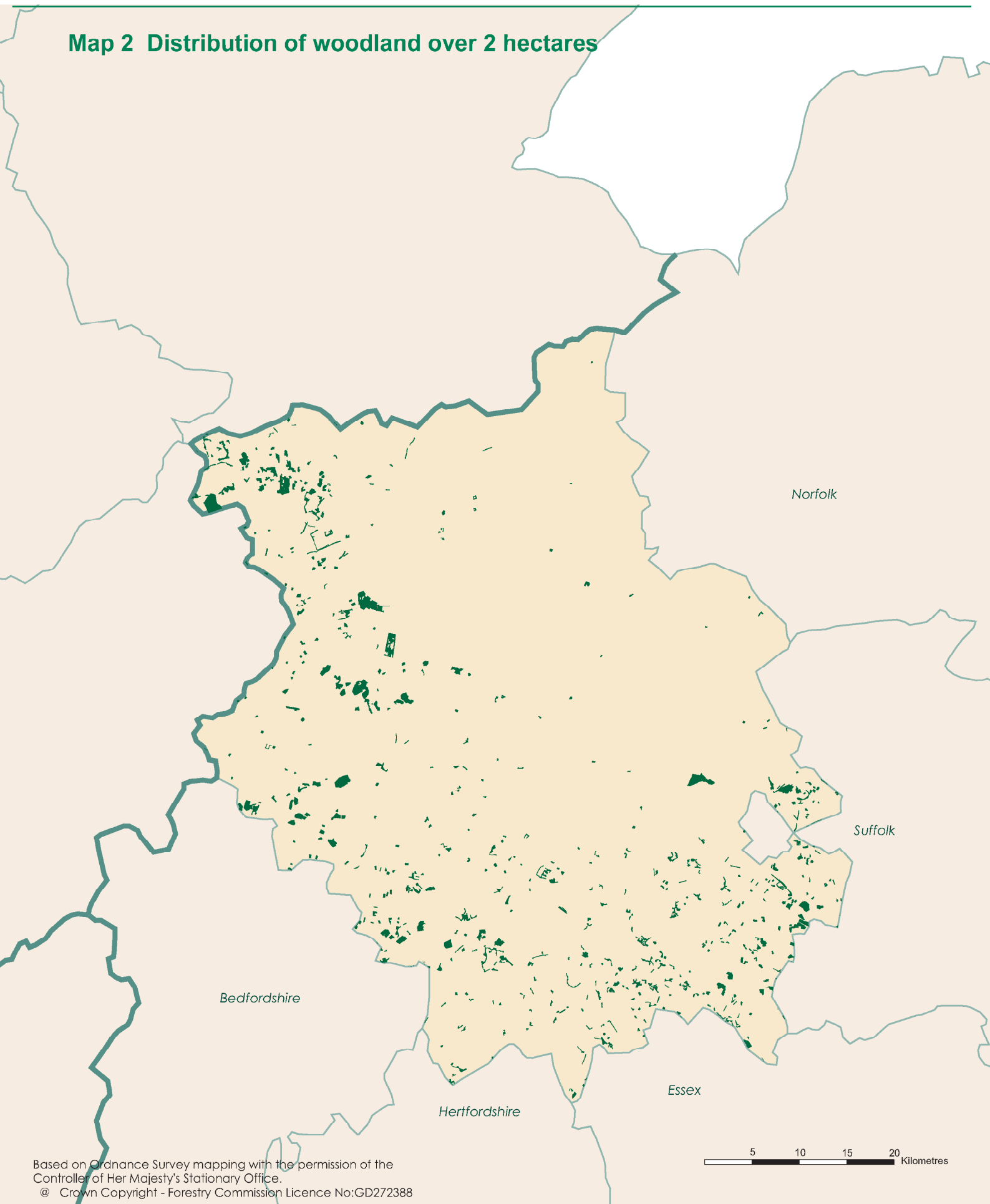
As well as this report for Cambridgeshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



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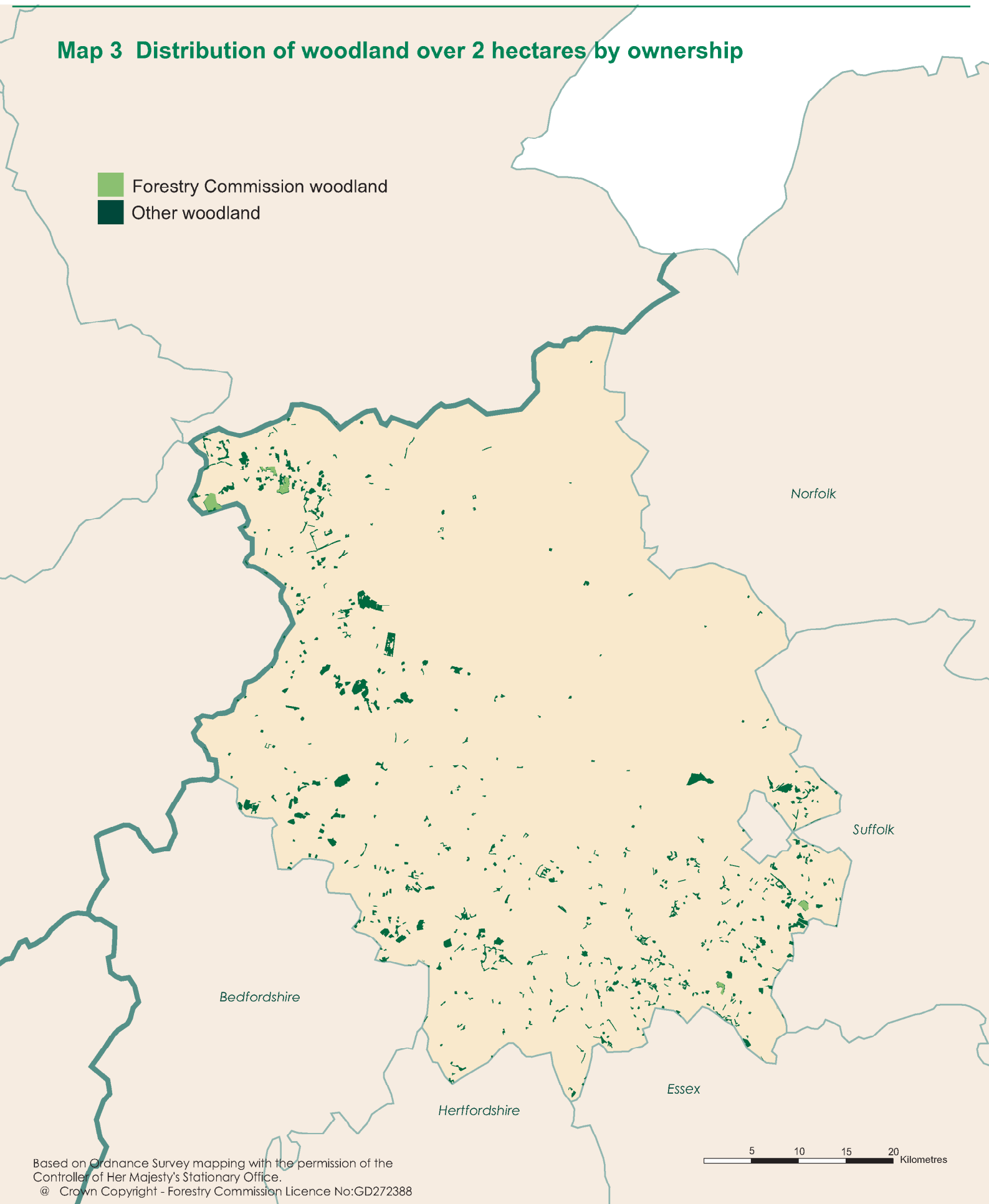
Map 2 Distribution of woodland over 2 hectares



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Map 3 Distribution of woodland over 2 hectares by ownership

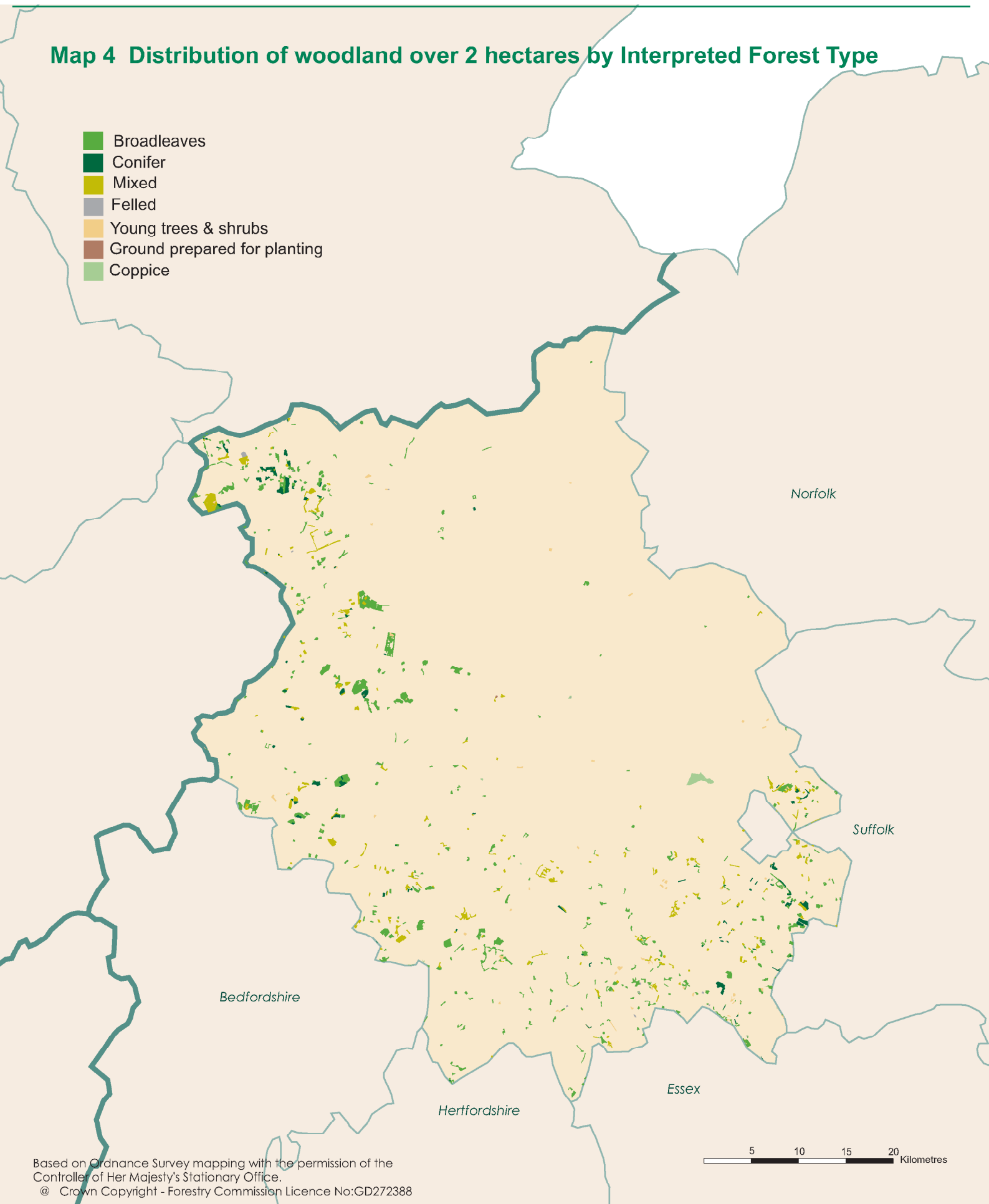
- Forestry Commission woodland
- Other woodland



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

- Broadleaves
- Conifer
- Mixed
- Felled
- Young trees & shrubs
- Ground prepared for planting
- Coppice



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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 Cambridgeshire.

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	6,720	54.5
0.25 - < 2.00	5,324	43.2
0.10 - < 0.25	281	2.3
Total area of woodland	12,325	100.0
% Woodland land cover	3.6	

1. Area of Cambridgeshire, including inland water, 339,963 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	393	344	737	6.0
Broadleaved	5,152	4,871	10,023	81.3
Mixed	1,030	297	1,327	10.8
Coppiced	0	0	0	0.0
Copp-w-standards	0	78	78	0.6
Windblow	0	0	0	0.0
Felled	39	0	39	0.3
Open Space	105	16	121	1.0
Total	6,720	5,605	12,325	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	657	242	899	63.3	7.4
Sitka spruce	0	0	0	0.0	0.0
Larch	24	47	71	5.0	0.6
Other conifers	242	188	430	30.3	3.6
Mixed conifers	19	0	19	1.3	0.2
Total conifers	944	477	1,421	100.0	11.8
Oak	990	578	1,568	14.7	13.0
Beech	348	63	411	3.9	3.4
Sycamore	469	249	718	6.7	5.9
Ash	1,852	1,064	2,916	27.3	24.1
Birch	264	8	272	2.5	2.3
Elm	322	39	361	3.4	3.0
Other broadleaves	1,341	2,184	3,525	33.0	29.2
Mixed broadleaves	45	850	895	8.4	7.4
Total broadleaves	5,632	5,035	10,667	100.0	88.3
Total all species***	6,575	5,512	12,087		100.0

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

**Species/group percentage of all species

***Excludes the 238ha 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	17%
Broadleaves	5%
Pine	27%
Oak	13%
Ash	13%
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	28,800	471,100	16	139
Narrow Linear Features	29,400	1,888,100	64	555
Individual Trees	88,800	88,800	1	26
Total		2,448,000		720

1. Land area used to calculate tree density 339,963ha 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	59%
Narrow Linear Features	50%
Individual Trees	26%
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	1,549	581	171
Narrow Linear Features	29,400	2,423	713
Total		3,003	883

1. Land area used to calculate tree density 339,963ha 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	98%
Narrow Linear Features	37%
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	523	8
Other	6,197	92
Total area of woodland	6,720	100

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

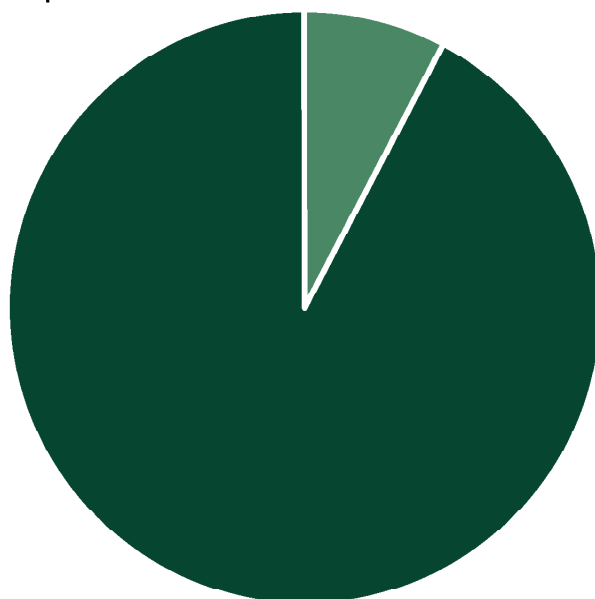
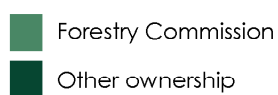
Woodland area by ownership

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	476	2,067	30	4.3
10 - <20	71	1,010	15	14.2
20 - <50	53	1,539	22	29.0
50 - <100	16	1,038	15	64.9
<100	616	5,654	82	9.2
100 - <500	7	1,246	18	178.0
500 and >	0	0	0	0.0
All woods	623	6,900	100	11.1

Table 7b Size class distribution of woodland by ownership units

Size class (ha)	FC or Other	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	FC	0	0	0	0.0
	O	481	2,082	30	4.3
10 - <20	FC	0	0	0	0.0
	O	72	1,021	15	14.2
20 - <50	FC	0	0	0	0.0
	O	54	1,574	23	29.1
50 - <100	FC	3	195	3	65.0
	O	13	835	12	64.2
<100	FC	3	195	3	65.0
	O	620	5,513	80	8.9
100 - <500	FC	2	328	5	164.0
	O	5	864	13	172.8
500 and >	FC	0	0	0	0.0
	O	0	0	0	0.0
Total	FC	5	523	8	104.6
	O	625	6,377	92	10.2

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 180 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	109	20.8	285	4.6	393	5.8
Broadleaved	326	62.3	4,826	77.9	5,152	76.7
Mixed	32	6.1	998	16.1	1,030	15.3
Coppice	0	0.0	0	0.0	0	0.0
Copp-w-Stds	0	0.0	0	0.0	0	0.0
Windblow	0	0.0	0	0.0	0	0.0
Felled	39	7.5	0	0.0	39	0.6
Open Space	17	3.3	88	1.4	105	1.6
Total	523	100.0	6,197	100.0	6,720	100.0

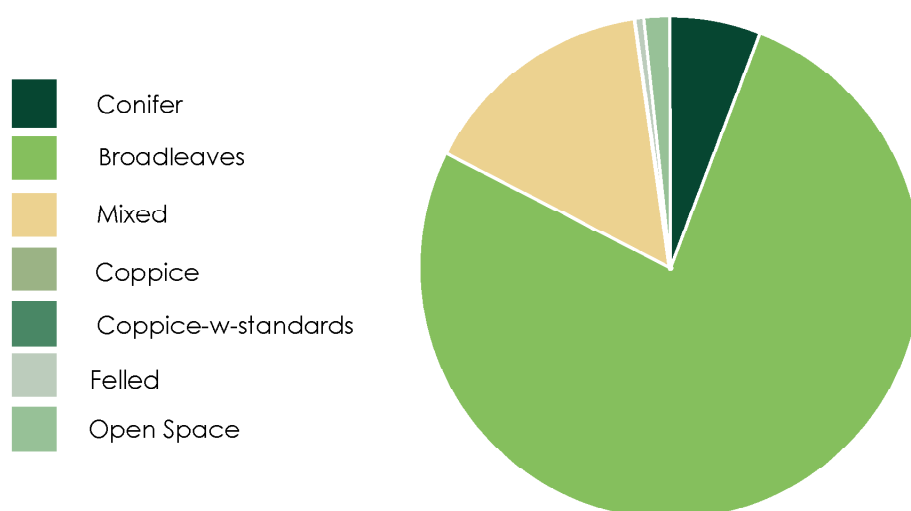
Area of woodland by forest type

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	46	29	10	187	24	3	233	25	4
Corsican pine	84	52	18	340	43	6	424	45	6
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	0	0	0	0	0	0
Norway spruce	16	10	3	142	18	2	158	17	2
European larch	0	0	0	20	3	0	20	2	0
Jap/Hybrid larch	0	0	0	4	1	0	4	0	0
Douglas fir	0	0	0	0	0	0	0	0	0
Other conifers	14	9	3	70	9	1	84	9	1
Mixed conifers	0	0	0	19	2	0	19	2	0
Total conifers	161	100	34	783	100	13	944	100	14
Oak	157	51	34	832	16	14	990	18	15
Beech	21	7	4	326	6	5	348	6	5
Sycamore	17	6	4	452	8	7	469	8	7
Ash	92	30	20	1,760	33	29	1,852	33	28
Birch	6	2	1	259	5	4	264	5	4
Poplar	0	0	0	365	7	6	365	6	6
Sweet chestnut	0	0	0	0	0	0	0	0	0
Elm	0	0	0	322	6	5	322	6	5
Other broadleaves	8	3	2	969	18	16	976	17	15
Mixed broadleaves	6	2	1	40	1	1	45	1	1
Total broadleaves	306	100	66	5,326	100	87	5,632	100	86
Total - all species	467		100	6,109		100	6,575		100
Felled	39			0			39		
Total High Forest	506			6,109			6,614		

*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 105ha 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	17%
Broadleaves	5%
Corsican pine	36%
Oak	13%
Ash	13%
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

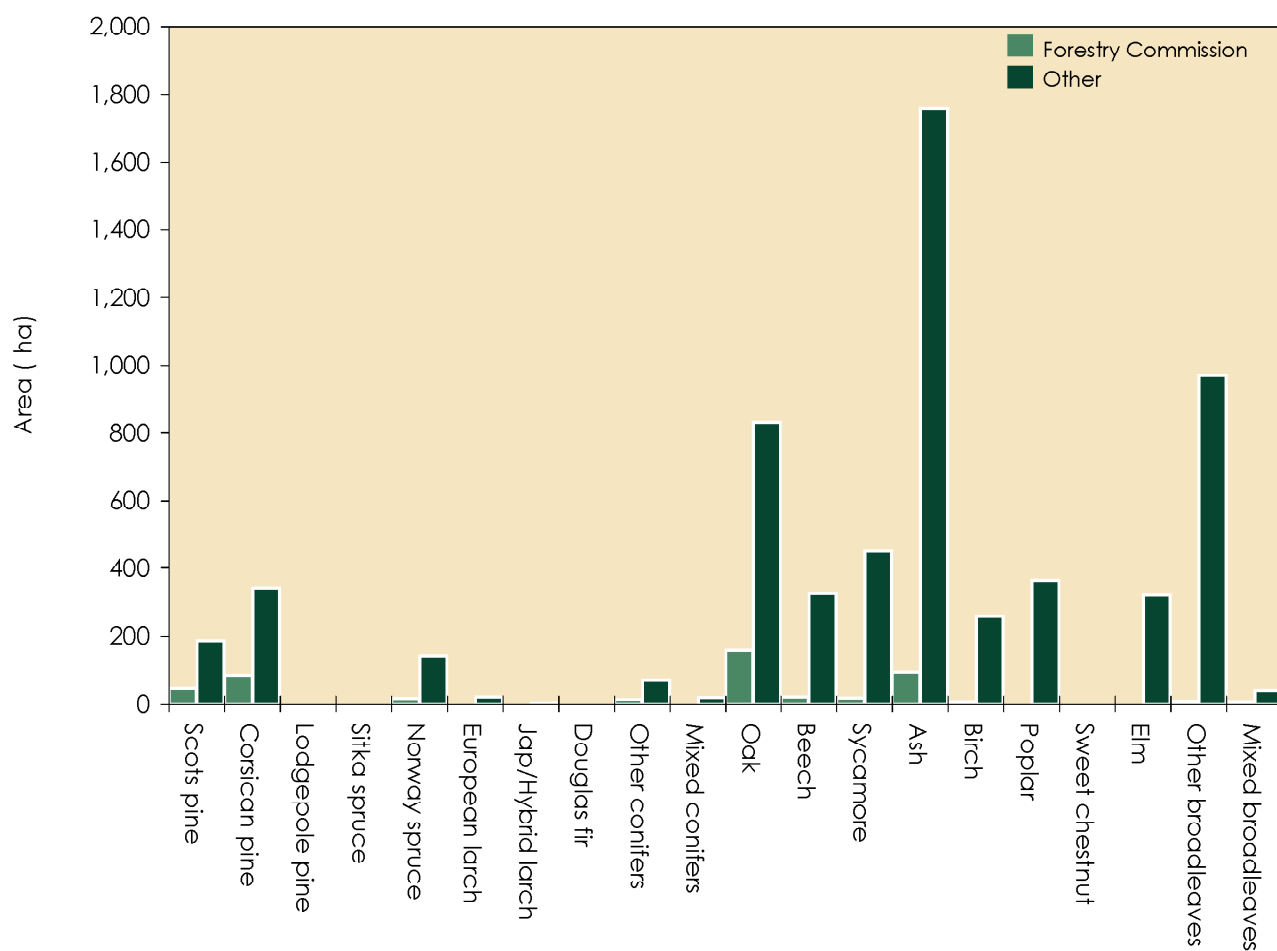


Table 9b Area of High Forest by principal species,ownership and category

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	46	0	46	183	4	187	229	4	233
Corsican pine	84	0	84	336	4	340	420	4	424
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	0	0	0	0	0	0
Norway spruce	16	0	16	122	19	142	139	19	158
European larch	0	0	0	20	0	20	20	0	20
Jap/Hybrid larch	0	0	0	0	4	4	0	4	4
Douglas fir	0	0	0	0	0	0	0	0	0
Other conifers	14	0	14	12	58	70	26	58	84
Mixed conifers	0	0	0	0	19	19	0	19	19
Total conifers	161	0	161	673	110	783	834	110	944
Oak	154	4	157	551	281	832	704	285	990
Beech	21	0	21	274	53	326	295	53	348
Sycamore	17	0	17	296	156	452	313	156	469
Ash	36	56	92	1,133	627	1,760	1,169	683	1,852
Birch	0	6	6	95	164	259	95	170	264
Poplar	0	0	0	252	113	365	252	113	365
Sweet chestnut	0	0	0	0	0	0	0	0	0
Elm	0	0	0	200	122	322	200	122	322
Other broadleaves	0	8	8	332	637	969	332	644	976
Mixed broadleaves	0	6	6	8	32	40	8	38	45
Total broadleaves	227	79	306	3,140	2,185	5,326	3,367	2,264	5,632
Total - all species	388	79	467	3,814	2,295	6,109	4,201	2,374	6,575

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

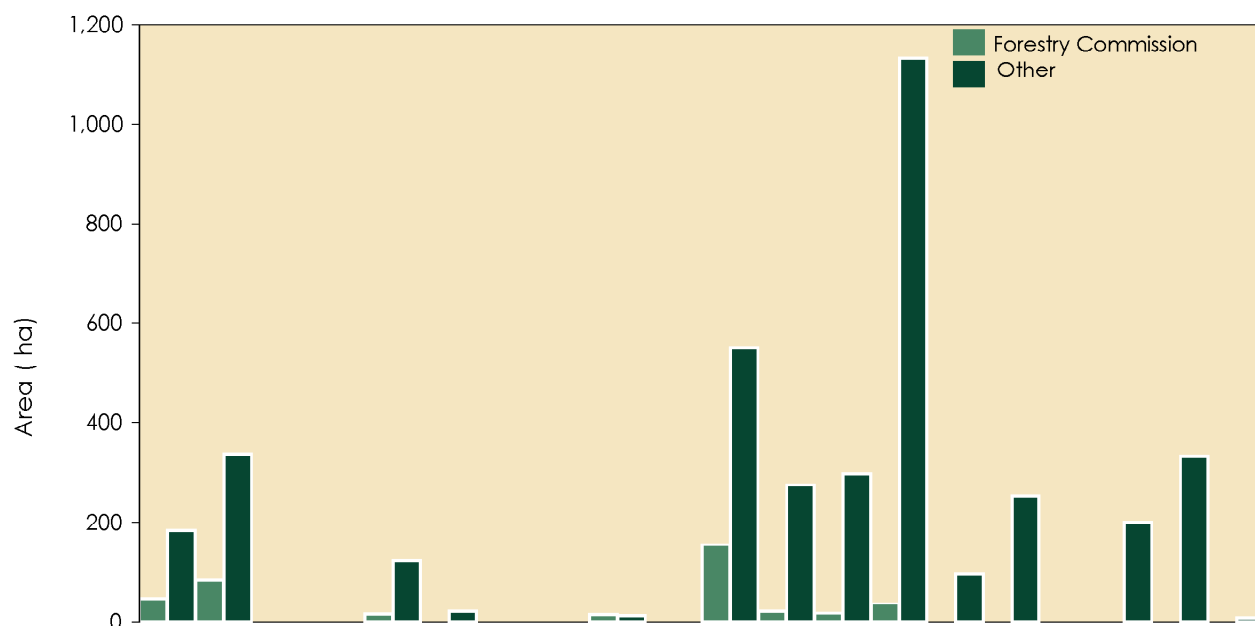
	Category 1*	Category 2*	Total High Forest
Conifers	19%	27%	17%
Broadleaves	8%	10%	5%
Corsican pine	36%	-	36%
Oak	15%	27%	13%
Ash	17%	25%	13%

*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

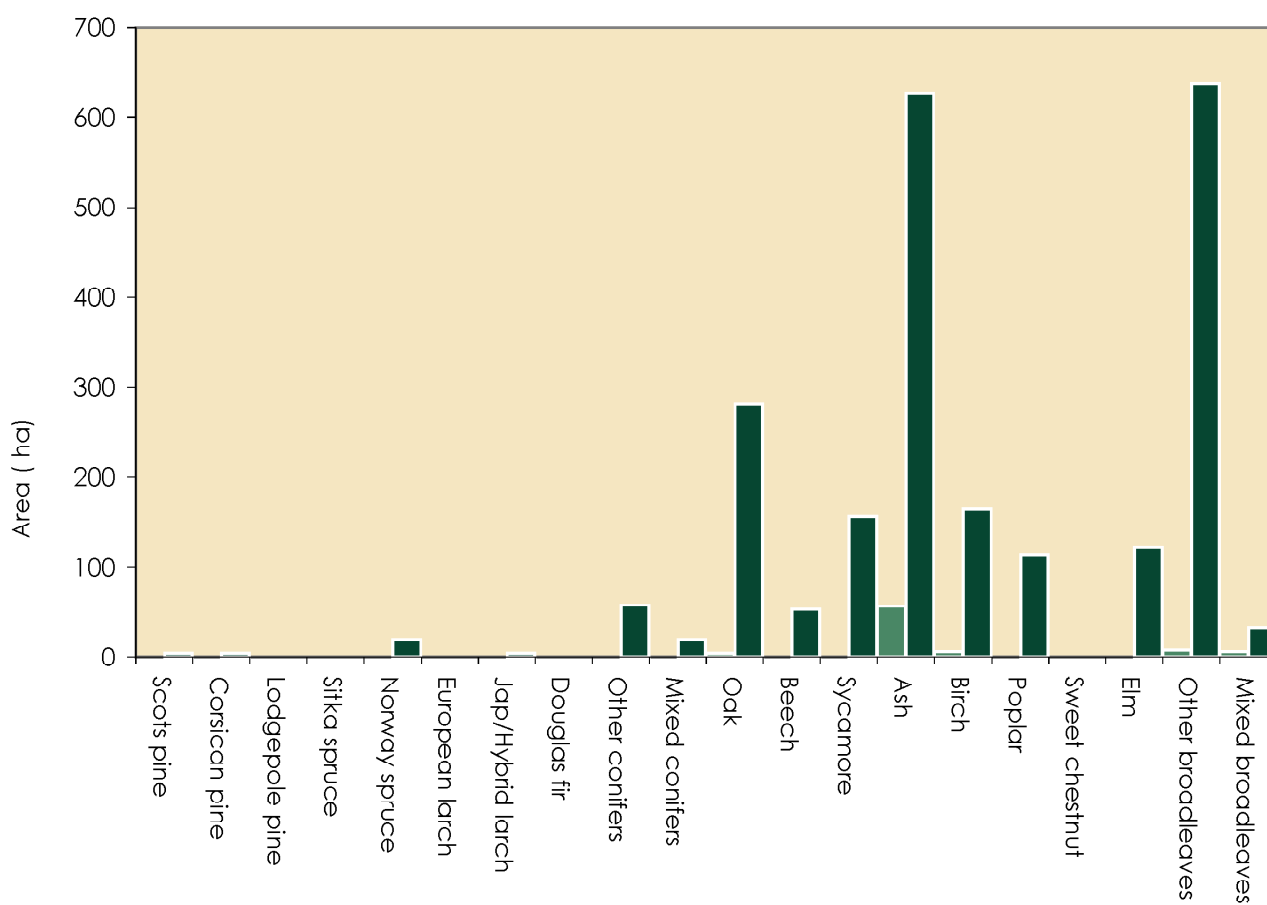
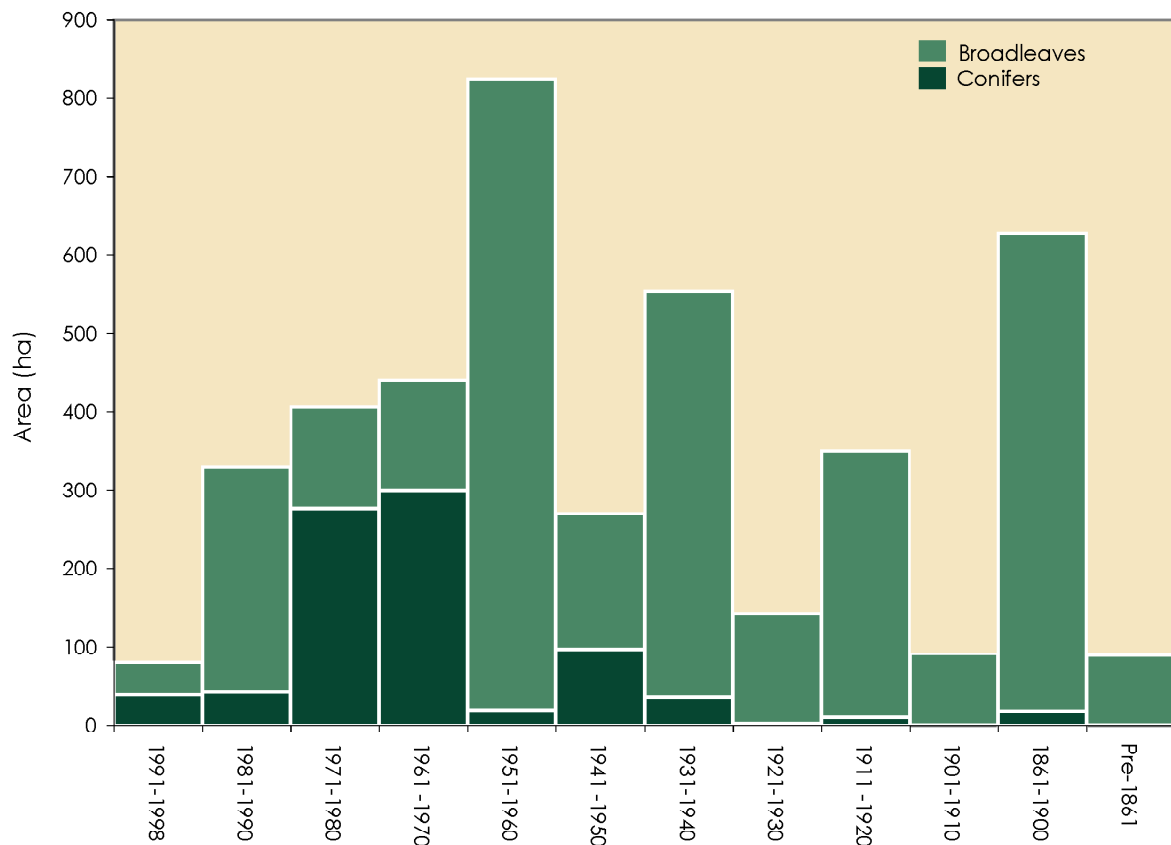


Table 10a High Forest Category 1 - Area by principal species and planting year class

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	38	16	79	71	0	15	0	0	10	0	0	0	229
Corsican pine	0	13	144	187	0	61	5	0	0	0	10	0	420
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	48	41	19	0	30	0	0	0	0	0	139
European larch	0	13	0	0	0	8	0	0	0	0	0	0	20
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	4	0	0	12	0	2	0	0	8	0	26
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	38	42	276	299	19	96	35	2	10	0	17	0	834
Oak	38	42	10	11	231	2	51	11	56	10	193	52	704
Beech	0	70	12	5	11	20	0	7	0	0	132	38	295
Sycamore	0	48	27	18	82	20	27	16	40	0	35	0	313
Ash	0	95	31	11	187	114	315	106	203	0	107	0	1,169
Birch	0	0	0	0	5	0	89	0	0	0	0	0	95
Poplar	0	0	0	43	171	2	0	0	8	0	29	0	252
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	11	20	48	91	0	23	0	6	0	0	0	200
Other broadleaves	0	21	30	0	28	15	15	0	28	81	113	0	332
Mixed broadleaves	4	0	0	3	0	0	0	0	0	0	0	0	8
Total broadleaves	42	287	130	140	805	174	519	140	340	91	610	89	3,367
Total - all species	80	329	406	439	825	270	554	142	350	91	627	89	4,201

*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



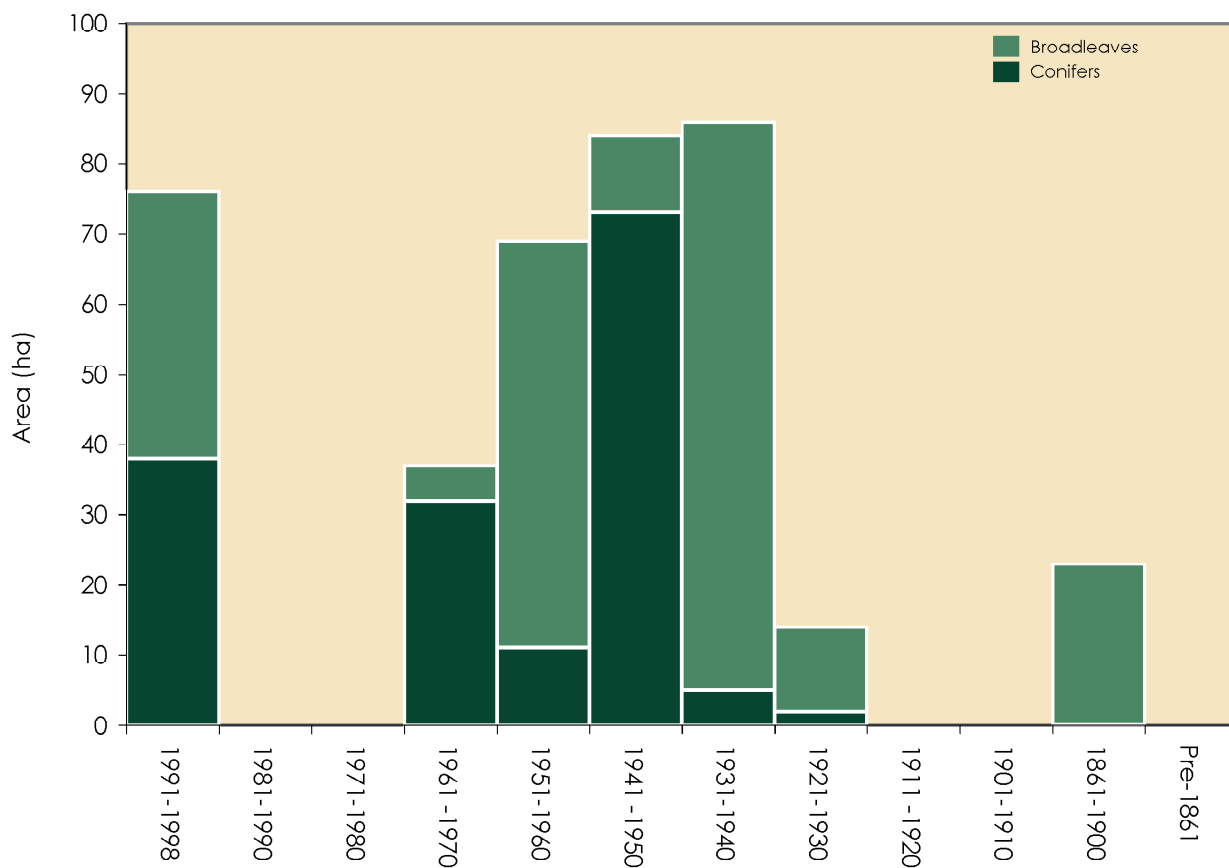
1. Most of the planting year classes cover 10 years, 1991-1998 is 8 years, and the classes prior to 1901 are 40 years or more.

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	38	0	0	9	0	0	0	0	0	0	0	0	46
Corsican pine	0	0	0	18	0	61	5	0	0	0	0	0	84
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	6	11	0	0	0	0	0	0	0	16
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas fir	0	0	0	0	0	0	0	0	0	0	0	0	0
Other conifers	0	0	0	0	0	12	0	2	0	0	0	0	14
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	38	0	0	32	11	73	5	2	0	0	0	0	161
Oak	38	0	0	0	58	2	28	5	0	0	23	0	154
Beech	0	0	0	5	0	9	0	7	0	0	0	0	21
Sycamore	0	0	0	0	0	0	17	0	0	0	0	0	17
Ash	0	0	0	0	0	0	36	0	0	0	0	0	36
Birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Total broadleaves	38	0	0	5	58	11	81	12	0	0	23	0	227
Total - all species	75	0	0	37	68	84	86	14	0	0	23	0	388

*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



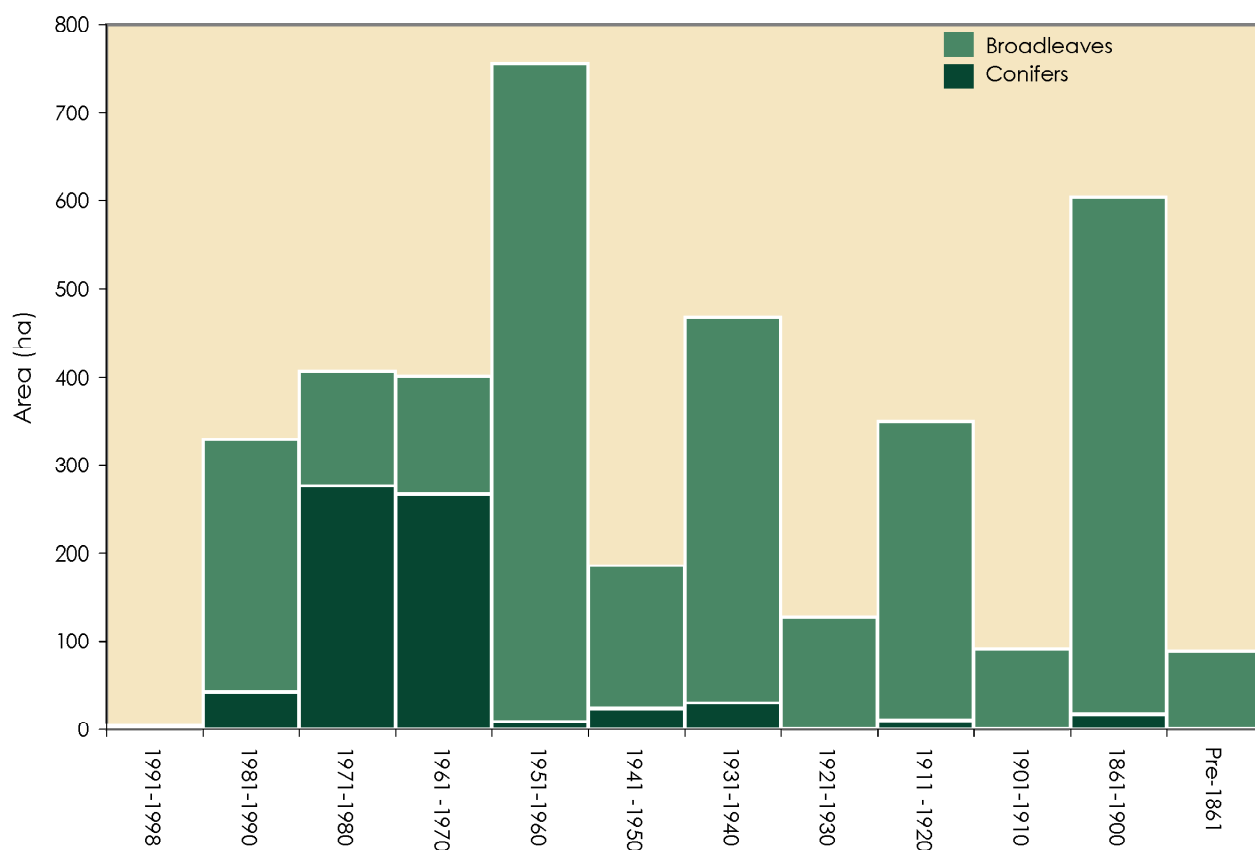
1. Most of the planting year classes cover 10 years, 1991-1998 is 8 years, and the classes prior to 1901 are 40 years or more.

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	0	16	79	62	0	15	0	0	10	0	0	0	183
Corsican pine	0	13	144	170	0	0	0	0	0	0	10	0	336
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Silka spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway spruce	0	0	48	35	9	0	30	0	0	0	0	0	122
European larch	0	13	0	0	0	8	0	0	0	0	0	0	20
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	4	0	0	0	0	0	0	0	8	0	12
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	0	42	276	267	9	23	30	0	10	0	17	0	673
Oak	0	42	10	11	173	0	23	5	56	10	171	52	551
Beech	0	70	12	0	11	12	0	0	0	0	132	38	274
Sycamore	0	48	27	18	82	20	10	16	40	0	35	0	296
Ash	0	95	31	11	187	114	279	106	203	0	107	0	1,133
Birch	0	0	0	0	5	0	89	0	0	0	0	0	95
Poplar	0	0	0	43	171	2	0	0	8	0	29	0	252
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	11	20	48	91	0	23	0	6	0	0	0	200
Other broadleaves	0	21	30	0	28	15	15	0	28	81	113	0	332
Mixed broadleaves	4	0	0	3	0	0	0	0	0	0	0	0	8
Total broadleaves	4	287	130	134	747	163	438	128	340	91	587	89	3,140
Total - all species	4	329	406	402	756	186	468	128	350	91	605	89	3,814

*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	Scots pine/Oak	45	Norway spruce / MB	5	-	
1981-90	Ash	30	Beech	19	Sycamore	15
1971-80	Corsican pine	28	Other broadleaves	19	Scots pine	16
1961-70	Corsican pine	31	Other broadleaves	22	Scots pine	12
1951-60	Poplars	21	Ash	19	Oak	19
1941-50	Ash	51	Other broadleaves	12	Birch	11
1931-40	Ash	51	Sycamore	11	Oak	10
1921-30	Other broadleaves	30	Ash	25	Birch	17
1911-20	Ash	52	Oak	18	Sycamore	14
1901-10	Other broadleaves	50	Ash	39	Oak	11
1861-1900	Ash	28	Oak	26	Beech	13
Pre 1861	Oak	55	Beech	41	Other conifers	4
All years	Ash	28	Oak	15	Other broadleaves	15

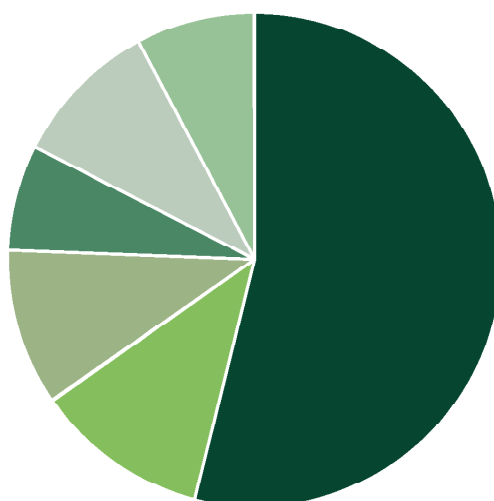
1. Principal species as a percentage of area in the planting year class.
2. MB - Mixed broadleaves

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	3,614	53.8
Business	776	11.5
Forestry or timber business	0	0.0
Charity	693	10.3
Local Authority	467	6.9
Other public (not FC)	647	9.6
Forestry Commission	523	7.8
Community ownership or common land	0	0.0
Unidentified	0	0.0
Total	6,720	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	5,939	6,925	Area (ha)
Wide Linear Features	1,549	2,323	Area (ha)
Wide Linear Features	1,549	581	Length (Km)
Narrow Linear Features	29,400	2,423	Length (Km)
Narrow Linear Features	29,400	1,888,100	Number of live trees
Groups	28,800	471,100	Number of live trees
Individual Trees	88,800	88,800	Number of live trees

1. See Glossary for definitions of feature types.

Table 14 Woodland area by feature type and woodland size

Feature type	Woodland size (ha)		Total area (ha)	Number of features	Mean size (ha)
	0.1 - <0.25	0.25 - <2.0			
Small Woods	281	3,001	3,282	5,939	0.55
Wide Linear Features	0	2,323	2,323	1,549	1.50
Total	281	5,324	5,605	7,488	0.75

1. See Glossary for definitions of feature types.

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

Species	Feature type				Total live trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.8	1.5	2.3	3.1	0.1
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	1.6	69.7	71.3	96.9	2.9
Other conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total conifers	0.0	0.0	2.4	71.3	73.6	100.0	3.0
Oak	16.0	0.8	7.2	153.5	177.5	7.5	7.3
Beech	0.0	0.0	8.8	0.0	8.8	0.4	0.4
Sycamore	1.6	0.0	11.2	71.3	84.1	3.5	3.4
Ash	23.2	0.8	59.2	159.5	242.7	10.2	9.9
Birch	4.0	0.8	5.6	10.8	21.2	0.9	0.9
Poplar	0.8	2.4	10.4	20.1	33.7	1.4	1.4
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	2.4	0.0	1.6	15.5	19.5	0.8	0.8
Alder	1.6	0.8	2.4	74.3	79.1	3.3	3.2
Lime	7.2	0.0	0.0	0.0	7.2	0.3	0.3
Elm	0.8	0.0	0.0	1.5	2.3	0.1	0.1
Willow	4.0	5.6	36.0	44.9	90.5	3.8	3.7
Other broadleaves	13.6	2.4	326.4	1265.5	1607.9	67.7	65.7
Total broadleaves	75.2	13.6	468.7	1816.9	2374.5	100.0	97.0
Total - all species	75.2	13.6	471.1	1888.2	2448.1		100.0

- Percentages

Category : species percentage of conifer or broadleaved.
Species : percentage of all species.
- The standard errors of the total tree number estimates for these feature types are:

Individual Trees	26%
Groups	59%
Narrow Linear Features	50%
- See Glossary for definitions of feature types.

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

Species	Feature type				Total dead trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oak	0.0	0.8	0.0	1.5	2.3	9.0	9.0
Beech	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sycamore	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Birch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poplar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alder	0.8	0.0	0.0	0.0	0.8	3.1	3.1
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other broadleaves	0.8	0.0	0.0	21.7	22.5	87.9	87.9
Total broadleaves	1.6	0.8	0.0	23.2	25.6	100.0	100.0
Total - all species	1.6	0.8	0.0	23.2	25.6		100.0

1. See Glossary for definitions of feature types.

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

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	0.0	0.0	0.0	0.0	0.0
Spruce	0.8	1.5	0.0	0.0	2.3
Larch	0.0	0.0	0.0	0.0	0.0
Cypress	0.8	70.5	0.0	0.0	71.3
Other conifers	0.0	0.0	0.0	0.0	0.0
Total conifers	1.6	72.0	0.0	0.0	73.6
Oak	86.7	70.9	19.7	0.0	177.3
Beech	0.0	8.8	0.0	0.0	8.8
Sycamore	0.8	52.1	31.1	0.0	84.0
Ash	70.6	126.5	44.8	0.8	242.7
Birch	14.0	7.2	0.0	0.0	21.2
Poplar	4.0	12.6	17.1	0.0	33.7
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	3.9	9.3	6.2	0.0	19.4
Alder	6.3	72.9	0.0	0.0	79.2
Lime	0.0	7.2	0.0	0.0	7.2
Elm	2.3	0.0	0.0	0.0	2.3
Willow	36.3	49.4	3.9	0.8	90.4
Other broadleaves	1,357.4	249.6	0.8	0.0	1,607.8
Total broadleaves	1,582.3	666.5	123.7	1.6	2,374.0
Total - all species	1,584.1	738.7	123.7	1.6	2,448.1

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	5
3-5	4
6-10	8
11-20	8
21-50	3
51-100	0
>100	1
Total	29

*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 were required. 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	6,053	91.5	6,720	55.8	11
0.25 - <2.0	559	8.5	5,324	44.2	852
Total	6,612		12,044		82
% Woodland land cover	1.9		3.5		

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), 339,963ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 340,901ha, (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	216	288	33
Corsican pine	179	596	233
Lodgepole pine	0	0	0
Sitka spruce	2	0	-100
Norway spruce	356	267	-25
European larch	71	20	-72
Jap/Hybrid larch	2	51	2475
Douglas fir	46	0	-100
Other conifers	135	123	-9
Mixed conifers	105	19	-82
Total conifers	1,112	1,364	23
Oak	1,215	1,553	28
Beech	360	387	7
Sycamore	248	710	187
Ash	1,349	2,884	114
Birch	270	272	1
Poplar	245	614	151
Sweet chestnut	2	188	9393
Elm	394	353	-10
Other broadleaves	627	2,654	323
Mixed broadleaves	385	825	114
Total broadleaves	5,094	10,440	105
Total all species	6,206	11,804	90
Felled	315	39	-88
Total High Forest	6,521	11,843	82

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 1.0% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 1.0%.
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

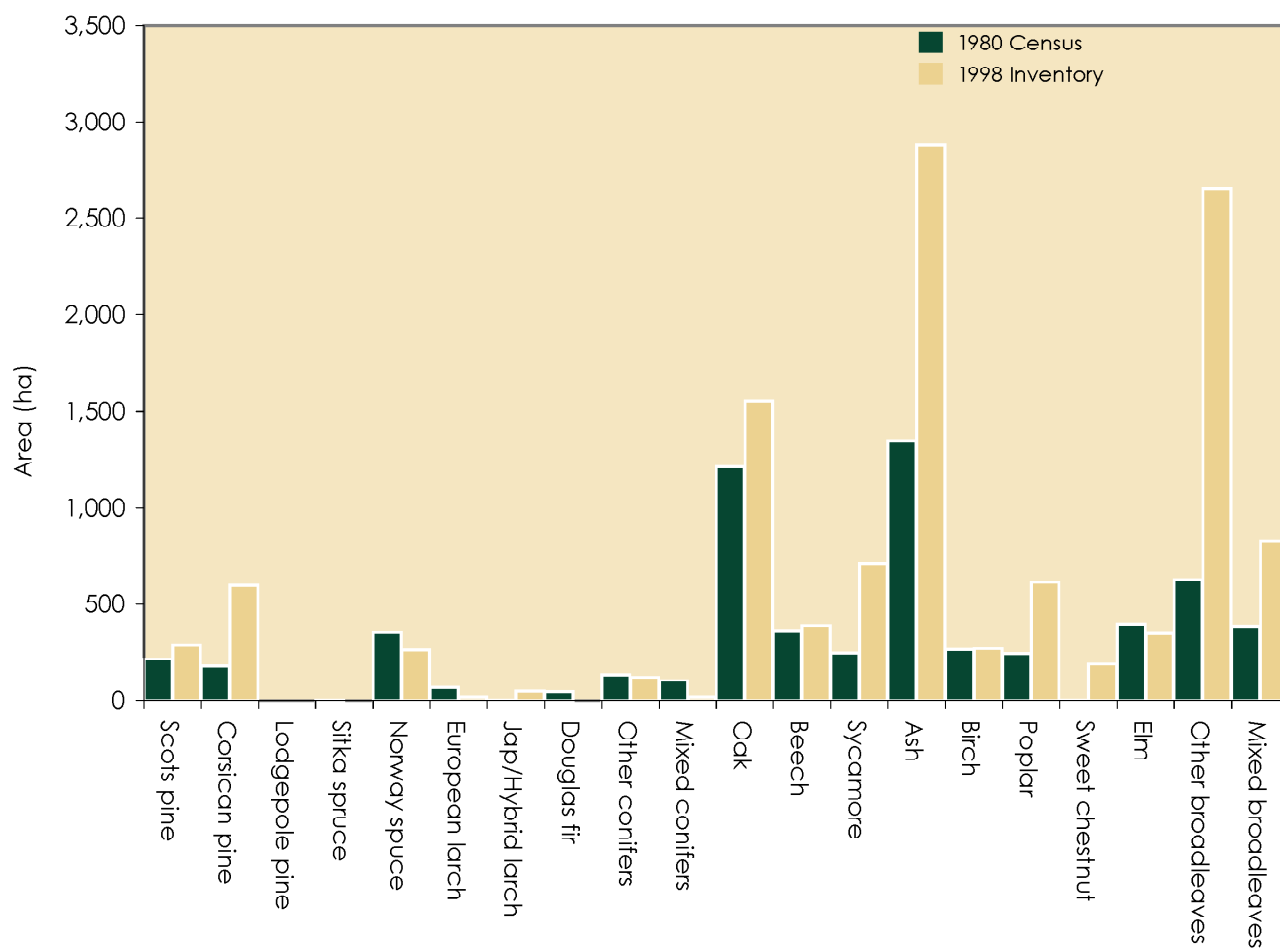


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1998 Inventory

Planting year class	1980 Census woodland area (ha)	1998 Inventory woodland area (ha)	Change (%)
1991-1998	0	635	see note
1981-1990	0	1,103	see note
1971-1980	215	2,120	887
1961-1970	481	494	3
1951-1960	720	824	14
1941-1950	634	442	-30
1931-1940	794	632	-20
1921-1930	572	142	-75
1911-1920	443	350	-21
1901-1910	493	122	-75
1861-1900	683	705	3
Pre 1861	793	183	-77
Total all years	5,828	7,752	33

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

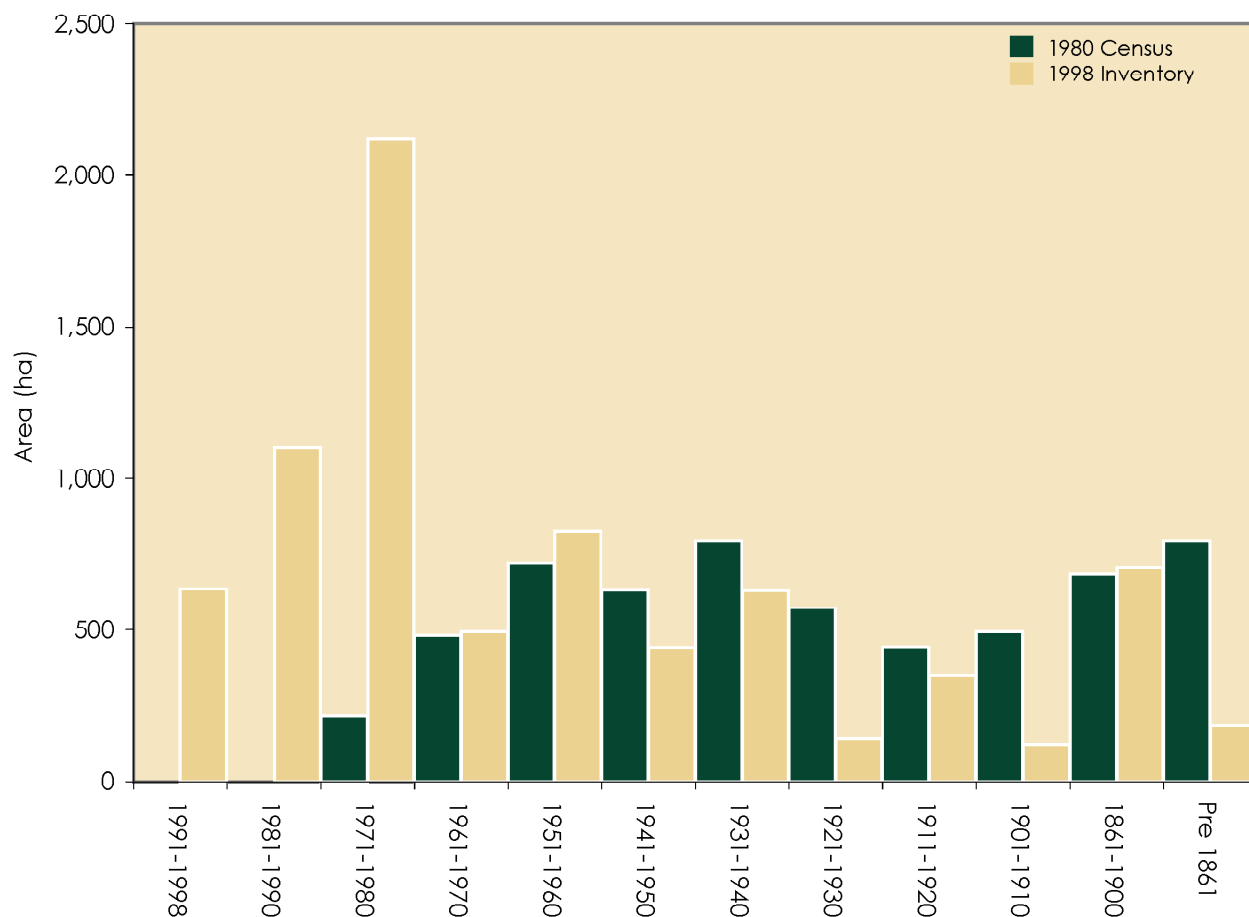


Table 22 Comparison of numbers of live trees outside woodland between 1980 Census and 1998 Inventory (000's)

Feature type	1980 Census	1998 Inventory	Change (%)
Boundary Tree	42	70	67
Middle Tree	41	13	-69
Total Individual Trees	83	83	0
Groups	217	420	94
Linear Features	177	657	272
Total	476	1,160	144

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)	24.4	24.5	0
Groups (per sq km)	8.0	7.3	-9
Linear Features (m per sq km)	202.4	648.3	220

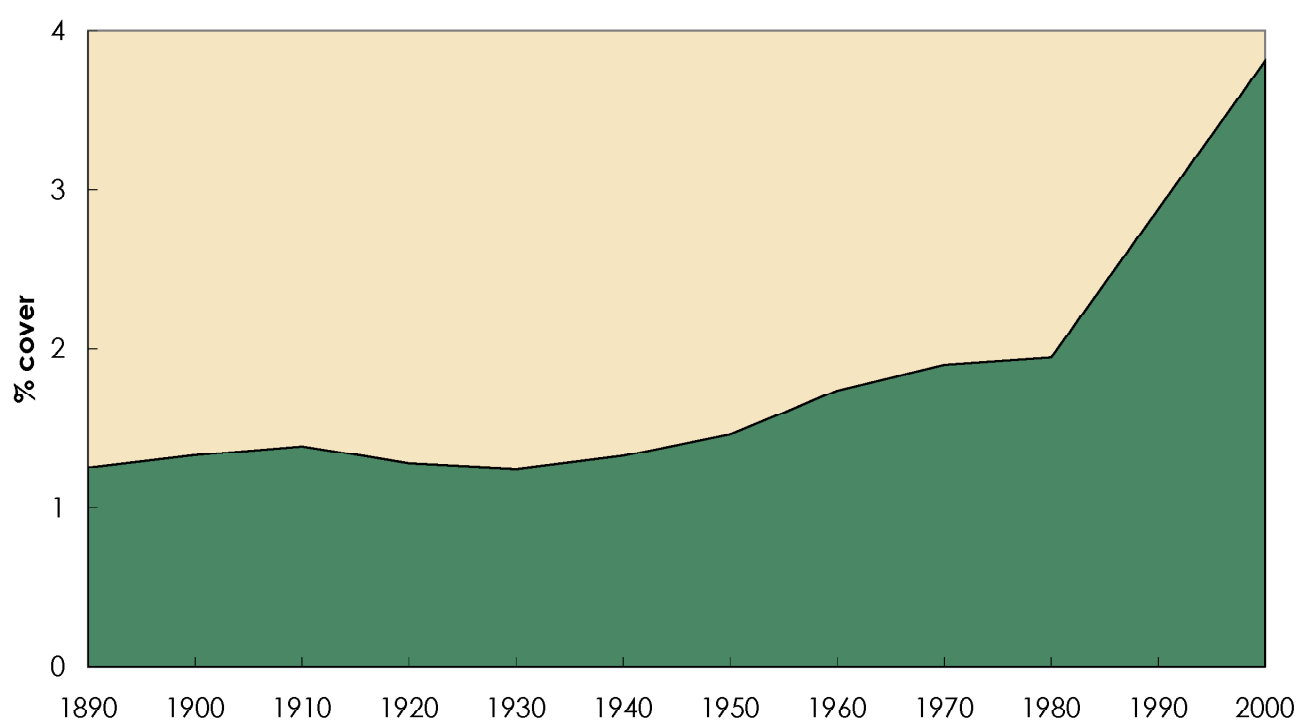
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4. See Glossary for definitions of feature type.

WOODLAND COVER

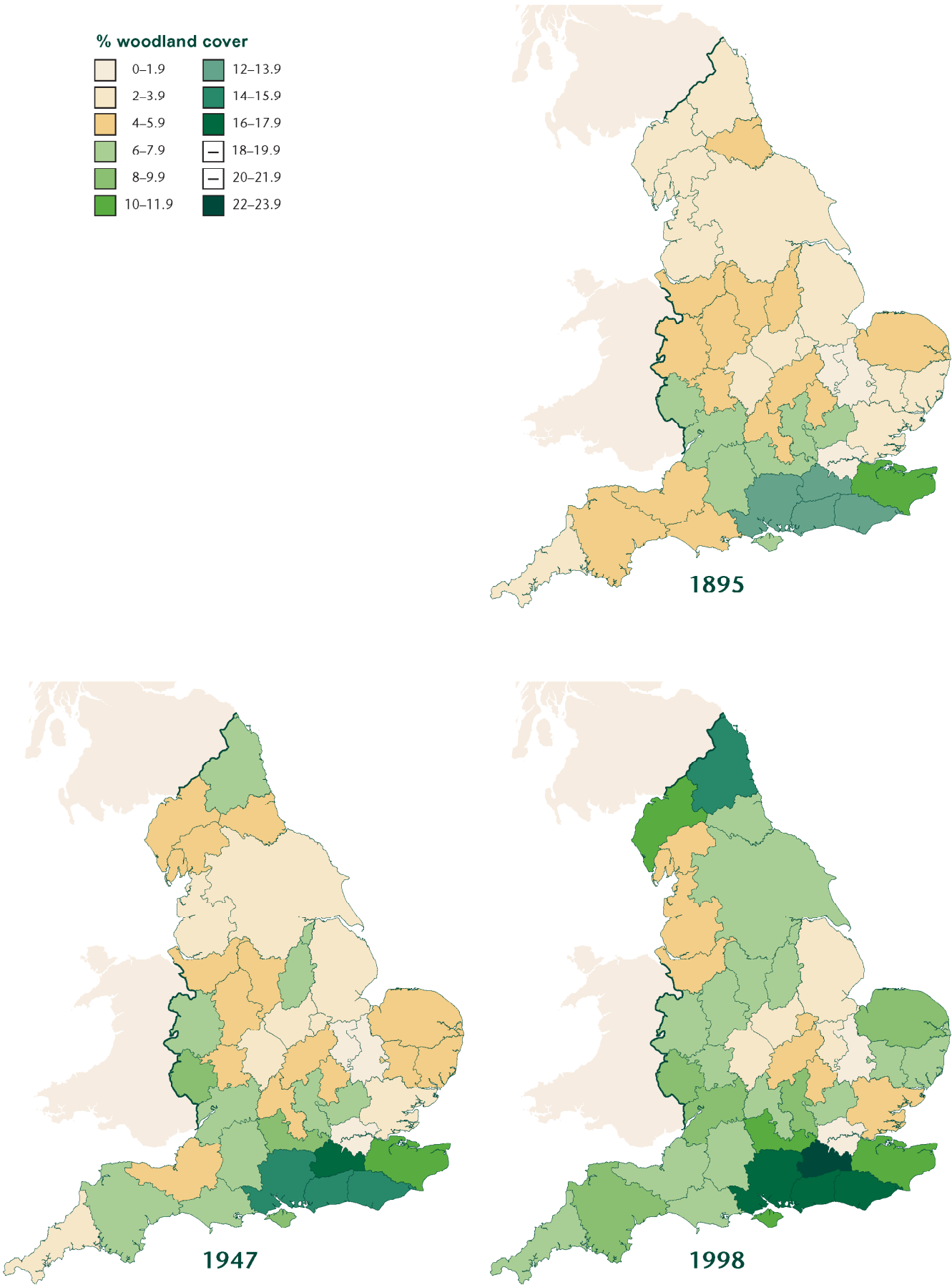
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

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



Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT

www.forestry.gov.uk