



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

WARWICKSHIRE



Forestry Commission

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First Published 2002

Printed in the United Kingdom

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ACKNOWLEDGEMENTS

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

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

Preparation of the digital cartography for Warwickshire 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 Warwickshire 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Warwickshire is 9,390 hectares. This represents 4.7 % of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 66.7 % of all woodland. Conifer woodland represents 10.1 %, Mixed woodland 10.5 % and Open Space within woodlands 12.6 %. (Table 2)
- The main conifer species is pine covering 619 hectares or 43 % of all conifer species. The main broadleaved species is oak covering 2,014 hectares or 29.8 % of all broadleaved species. (Table 3)
- 550 hectares or 7 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 7,500 hectares or 93 % of woodland is in Other ownership. (Table 6)
- There are a total of 806 woods over 2 ha within Warwickshire with a mean wood area of 10 hectares. (Table 7a) There are a total of 3,490 woods from 0.1 - <2.0 hectares with a mean wood area of 0.38 hectares. (Table 14)
- There are 1.4 million live trees outside woodland in Warwickshire. (Table 15)
- Woodland land cover increased by over 2,200 hectares from 3.5 % to 4.6 % of the land area between 1980 and 1997. (Table 19)
- The area of broadleaves increased by 45 % between 1980 and 1997, with the relative proportion of broadleaves to conifers increasing from 77 % to 82 %. (Table 20)

INVENTORY REPORTS

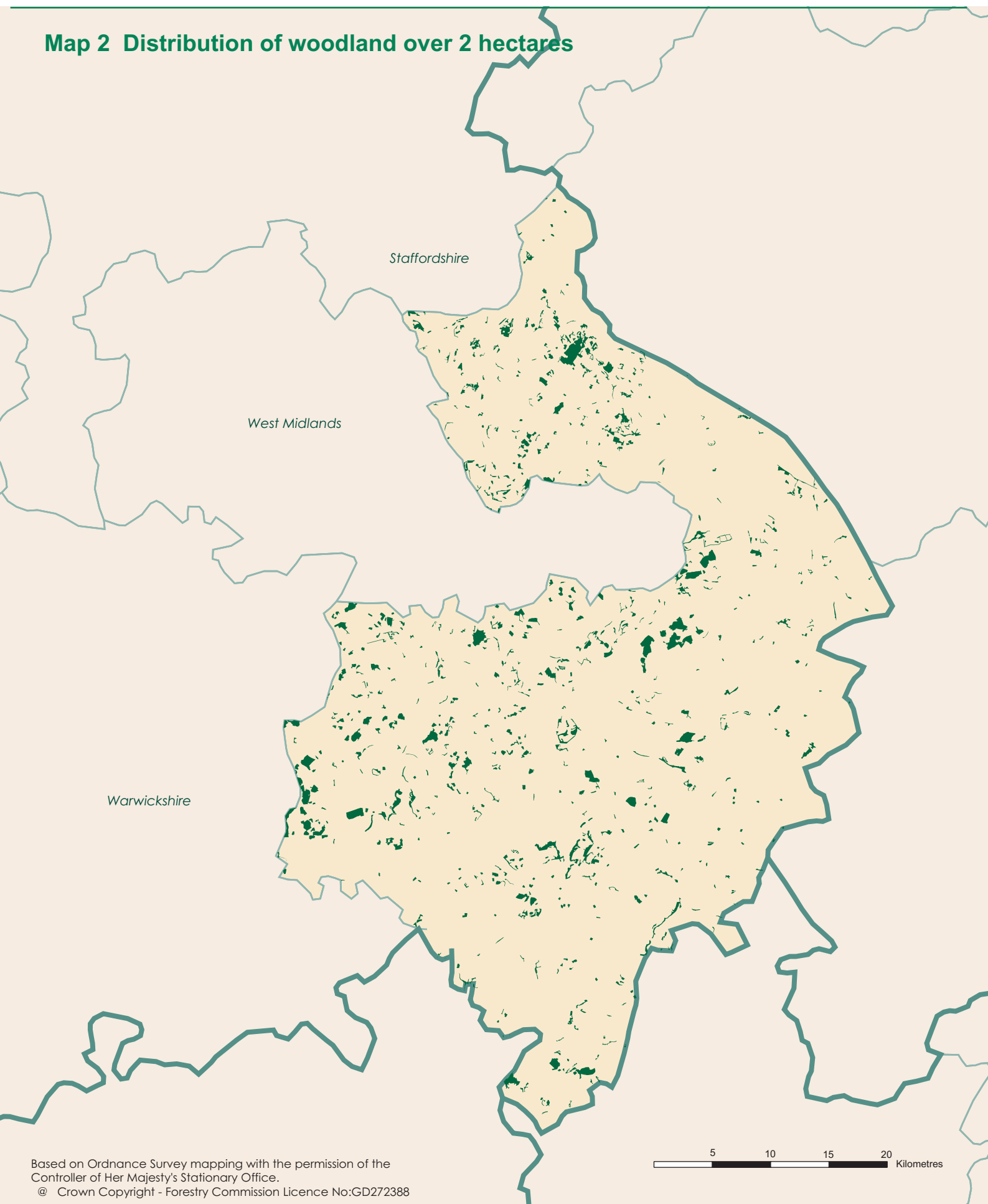
As well as this report for Warwickshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



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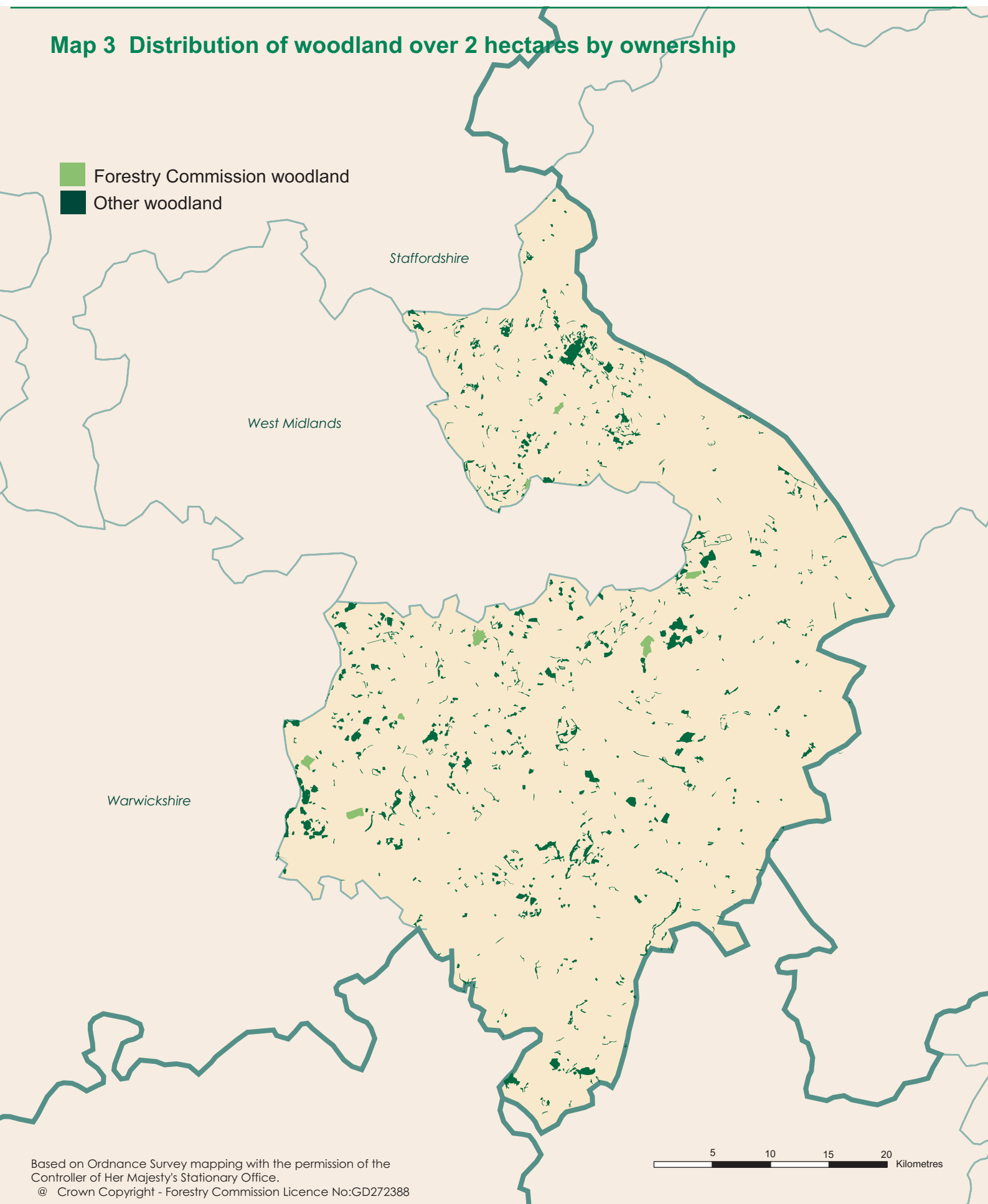
Map 2 Distribution of woodland over 2 hectares



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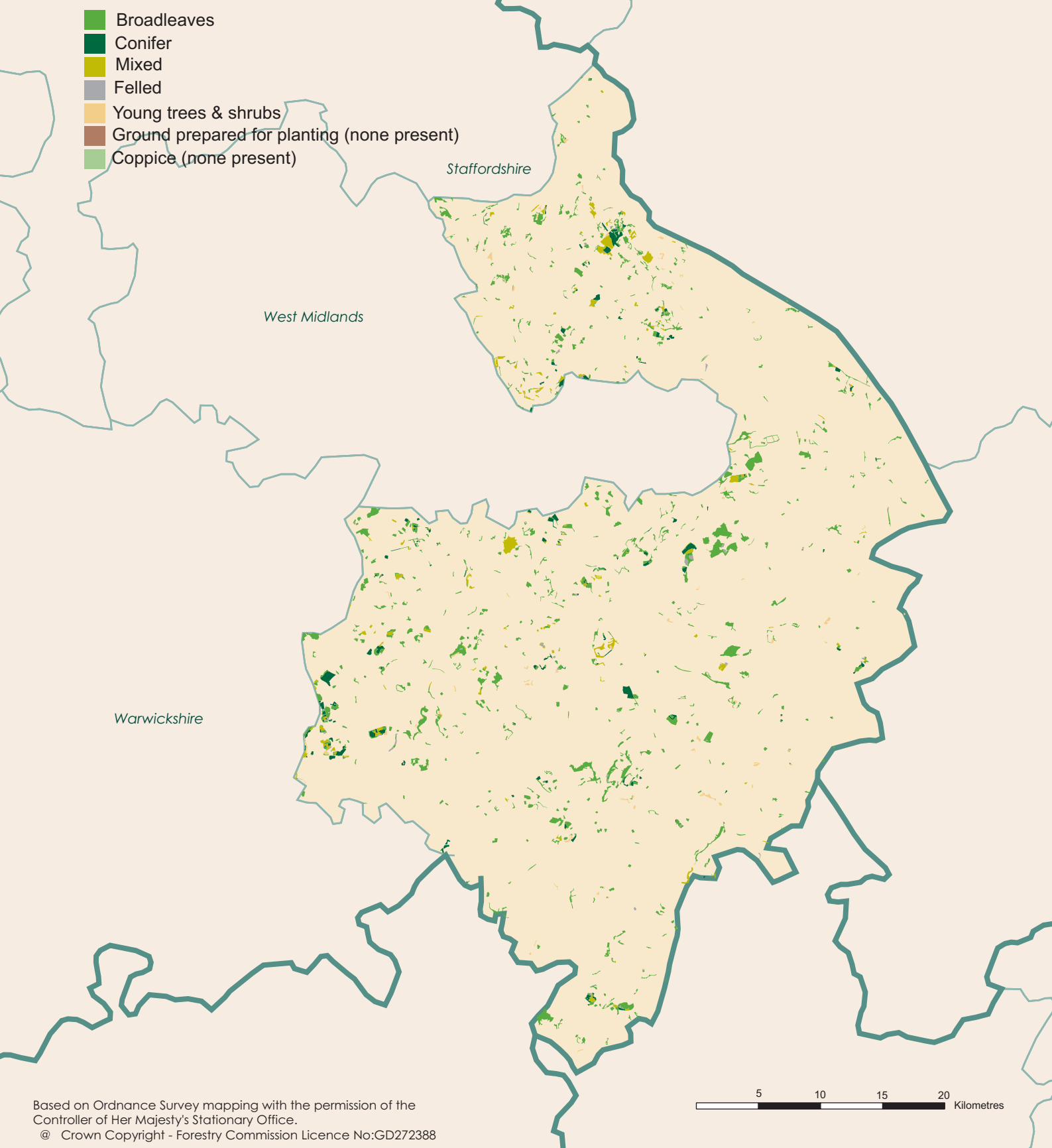
Map 3 Distribution of woodland over 2 hectares by ownership

- Forestry Commission woodland
- Other woodland



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



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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 Warwickshire.

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	8,050	85.7
0.25 - < 2.00	1,105	11.8
0.10 - < 0.25	234	2.5
Total area of woodland	9,390	100.0
% Woodland land cover	4.7	

1. Area of Warwickshire, including inland water, 197,854 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	909	43	952	10.1
Broadleaved	5,013	1,250	6,263	66.7
Mixed	961	21	982	10.5
Coppiced	0	0	0	0.0
Copp-w-standards	0	0	0	0.0
Windblow	0	0	0	0.0
Felled	6	0	6	0.1
Open Space	1,161	25	1,186	12.6
Total	8,050	1,340	9,390	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	603	16	619	43.0	7.6
Sitka spruce	40	0	40	2.8	0.5
Larch	253	0	253	17.6	3.1
Other conifers	431	34	465	32.3	5.7
Mixed conifers	64	0	64	4.4	0.8
Total conifers	1,391	50	1,441	100.0	17.6
Oak	1,826	188	2,014	29.8	24.6
Beech	75	0	75	1.1	0.9
Sycamore	292	98	390	5.8	4.8
Ash	1,598	125	1,723	25.5	21.0
Birch	409	0	409	6.1	5.0
Elm	80	12	92	1.4	1.1
Other broadleaves	869	569	1,438	21.3	17.5
Mixed broadleaves	343	273	616	9.1	7.5
Total broadleaves	5,492	1,265	6,757	100.0	82.4
Total all species***	6,883	1,315	8,197		100.0

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

**Species/group percentage of all species

***Excludes the 1,192 ha 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	12%
Broadleaves	5%
Pine	25%
Oak	11%
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	38,300	338,200	9	171
Narrow Linear Features	14,300	957,500	67	484
Individual Trees	130,800	130,800	1	66
Total		1,426,500		721

1. Land area used to calculate feature density 197,854ha 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	24%
Narrow Linear Features	34%
Individual Trees	21%
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	14,300	1,808	914
Total		1,808	914

1. Land area used to calculate feature density 197,854ha 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	0%
Narrow Linear Features	30%
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	550	7
Other	7,500	93
Total area of woodland	8,050	100

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

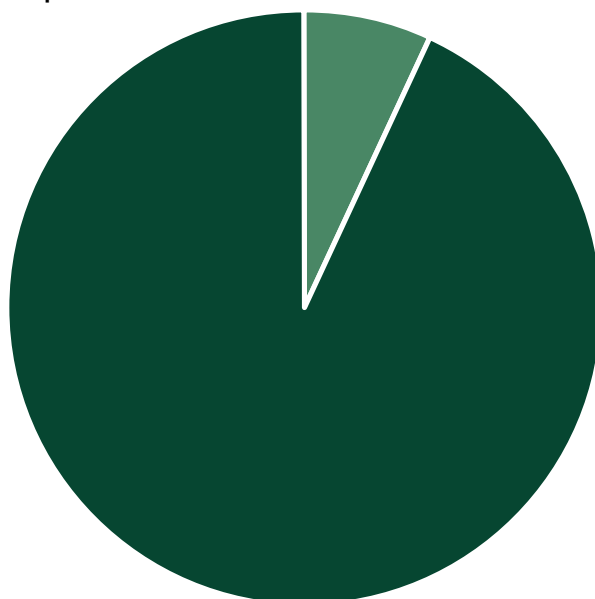
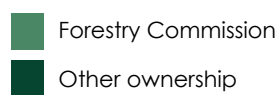
Woodland area by ownership

Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	636	2,641	33	4.2
10 - <20	79	1,111	14	14.1
20 - <50	61	1,816	23	29.8
50 - <100	25	1,773	22	70.9
<100	801	7,340	91	9.2
100 - <500	5	710	9	141.9
500 and >	0	0	0	0.0
All woods	806	8,050	100	10.0

Table 7b Size class distribution of woodland by ownership units

Size class (ha)	FC or Other	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	FC	0	0	0	0.0
	O	642	2,654	33	4.1
10 - <20	FC	0	0	0	0.0
	O	79	1,111	14	14.1
20 - <50	FC	3	98	1	32.7
	O	58	1,711	21	29.5
50 - <100	FC	3	232	3	77.3
	O	22	1,538	19	69.9
<100	FC	6	330	4	55.0
	O	801	7,014	87	8.8
100 - <500	FC	2	220	3	110.0
	O	3	486	6	161.8
500 and >	FC	0	0	0	0.0
	O	0	0	0	0.0
Total	FC	8	550	7	68.8
	O	804	7,500	93	9.3

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 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 7c 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	339	61.6	570	7.6	909	11.3
Broadleaved	101	18.4	4,912	65.5	5,013	62.3
Mixed	92	16.7	869	11.6	961	11.9
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	0	0.0	6	0.1	6	0.1
Open Space	18	3.3	1,143	15.2	1,161	14.4
Total	550	100.0	7,500	100.0	8,050	100.0

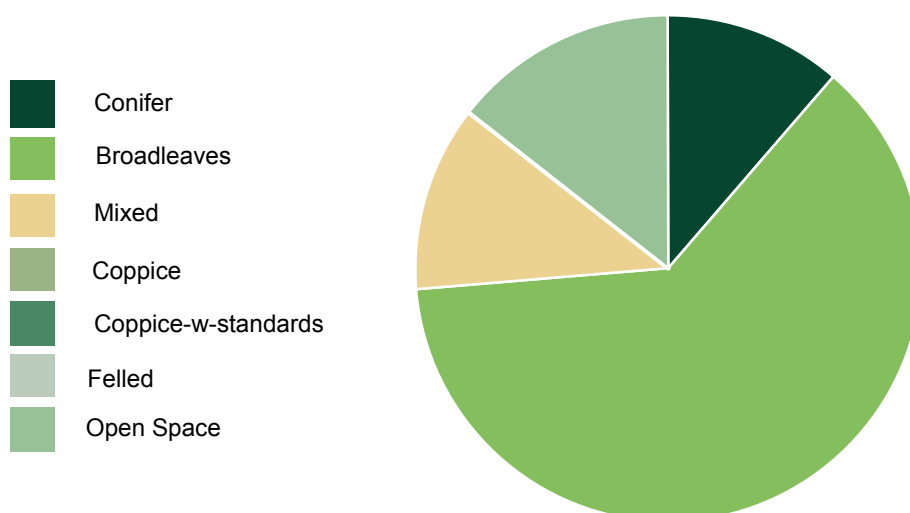
Area of woodland by forest type

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	257	67	48	175	17	3	431	31	6
Corsican pine	83	22	16	89	9	1	172	12	2
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	40	4	1	40	3	1
Norway spruce	9	2	2	134	13	2	143	10	2
European larch	0	0	0	121	12	2	121	9	2
Jap/Hybrid larch	0	0	0	132	13	2	132	9	2
Douglas fir	0	0	0	111	11	2	111	8	2
Other conifers	37	10	7	140	14	2	177	13	3
Mixed conifers	0	0	0	64	6	1	64	5	1
Total conifers	385	100	72	1,006	100	16	1,391	100	20
Oak	64	44	12	1,762	33	28	1,826	33	27
Beech	0	0	0	75	1	1	75	1	1
Sycamore	0	0	0	292	5	5	292	5	4
Ash	0	0	0	1,598	30	25	1,598	29	23
Birch	73	50	14	336	6	5	409	7	6
Poplar	0	0	0	364	7	6	364	7	5
Sweet chestnut	0	0	0	69	1	1	69	1	1
Elm	0	0	0	80	1	1	80	1	1
Other broadleaves	0	0	0	436	8	7	436	8	6
Mixed broadleaves	9	6	2	333	6	5	343	6	5
Total broadleaves	147	100	28	5,345	100	84	5,492	100	80
Total - all species	532		100	6,351		100	6,883		100
Felled	0			6			6		
Total High Forest	532			6,357			6,889		

*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 1,161ha 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	12%
Broadleaves	5%
Scots pine	28%
Oak	11%
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

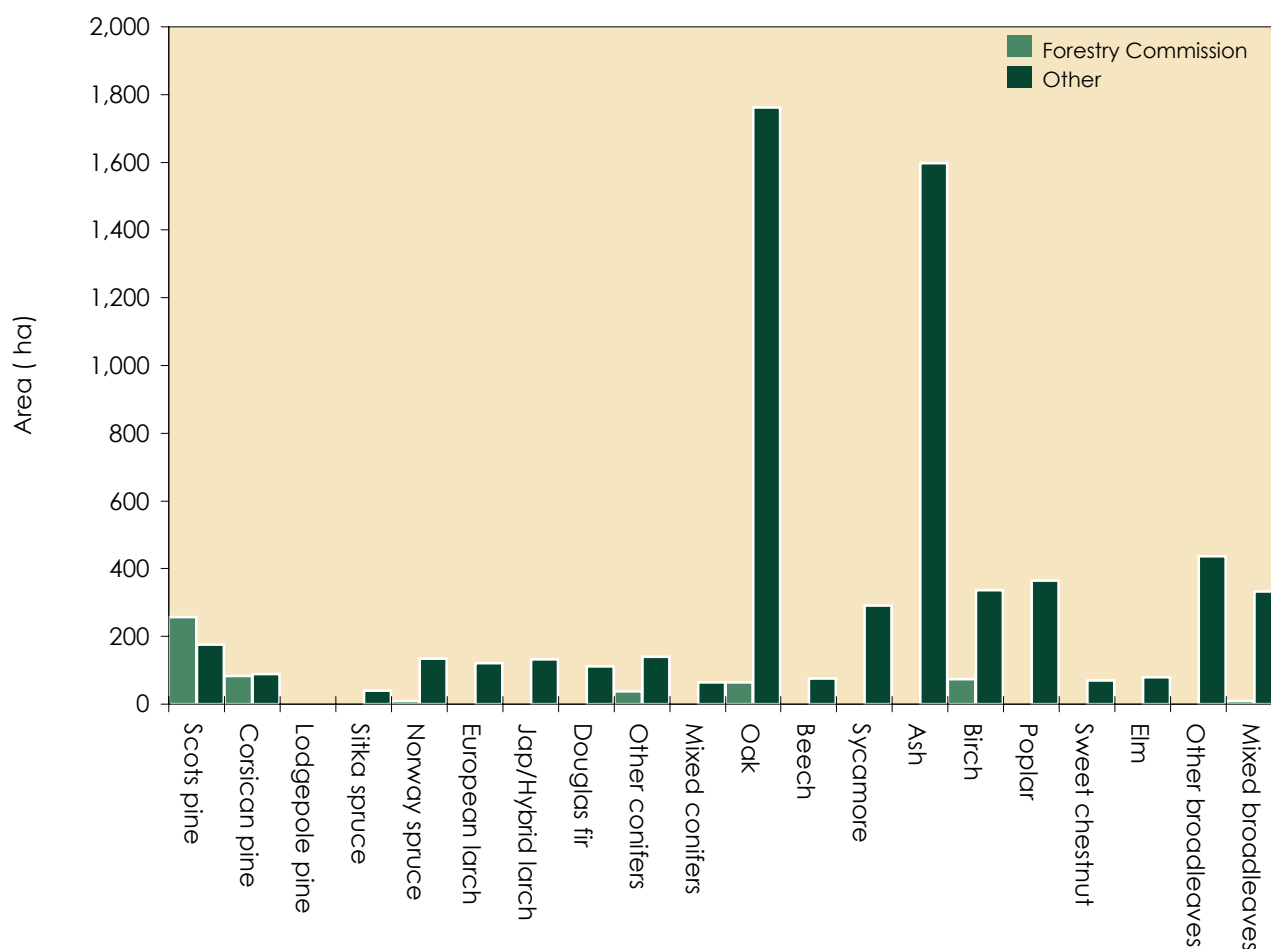


Table 9b Area of High Forest by principal species,ownership and category

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	257	0	257	155	19	175	412	19	431
Corsican pine	83	0	83	89	0	89	172	0	172
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	29	11	40	29	11	40
Norway spruce	9	0	9	134	0	134	143	0	143
European larch	0	0	0	100	21	121	100	21	121
Jap/Hybrid larch	0	0	0	119	14	132	119	14	132
Douglas fir	0	0	0	111	0	111	111	0	111
Other conifers	37	0	37	90	50	140	127	50	177
Mixed conifers	0	0	0	64	0	64	64	0	64
Total conifers	385	0	385	891	115	1,006	1,276	115	1,391
Oak	55	9	64	1,035	727	1,762	1,090	737	1,826
Beech	0	0	0	42	33	75	42	33	75
Sycamore	0	0	0	138	154	292	138	154	292
Ash	0	0	0	1,005	593	1,598	1,005	593	1,598
Birch	0	73	73	85	251	336	85	325	409
Poplar	0	0	0	263	102	364	263	102	364
Sweet chestnut	0	0	0	38	31	69	38	31	69
Elm	0	0	0	0	80	80	0	80	80
Other broadleaves	0	0	0	201	235	436	201	235	436
Mixed broadleaves	9	0	9	135	199	333	144	199	343
Total broadleaves	64	83	147	2,940	2,405	5,345	3,005	2,487	5,492
Total - all species	449	83	532	3,831	2,520	6,351	4,280	2,603	6,883

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

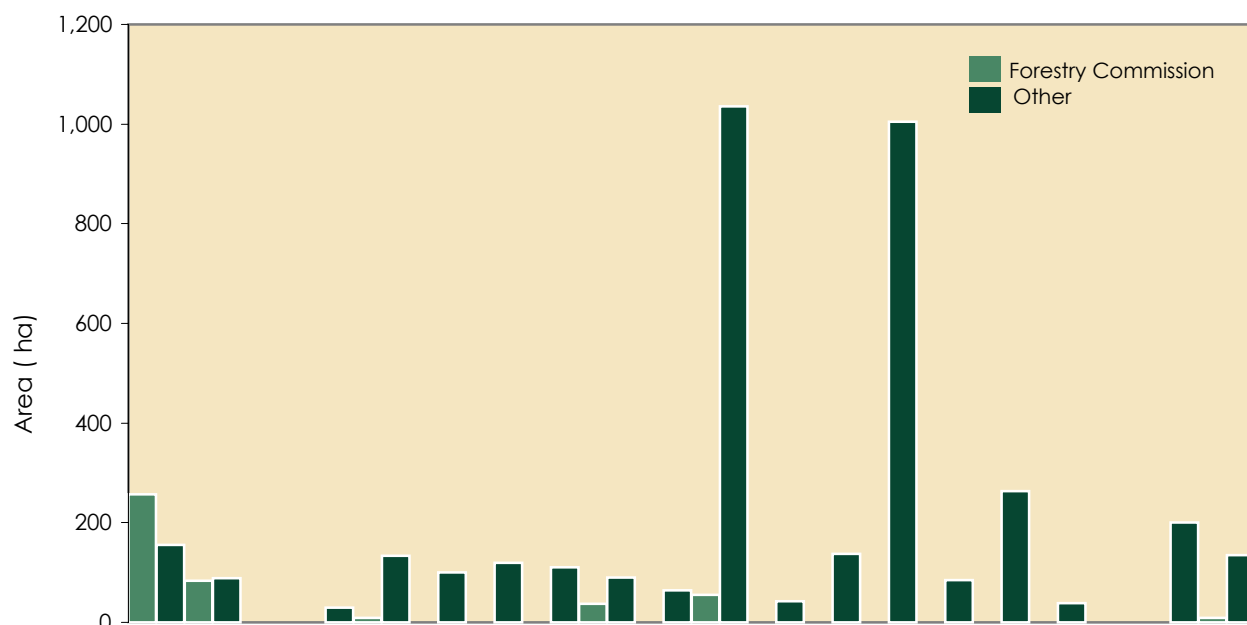
	Category 1*	Category 2*	Total High Forest
Conifers	12%	31%	12%
Broadleaves	9%	9%	5%
Scots pine	29%	80%	28%
Oak	16%	17%	11%
Ash	19%	19%	13%

*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

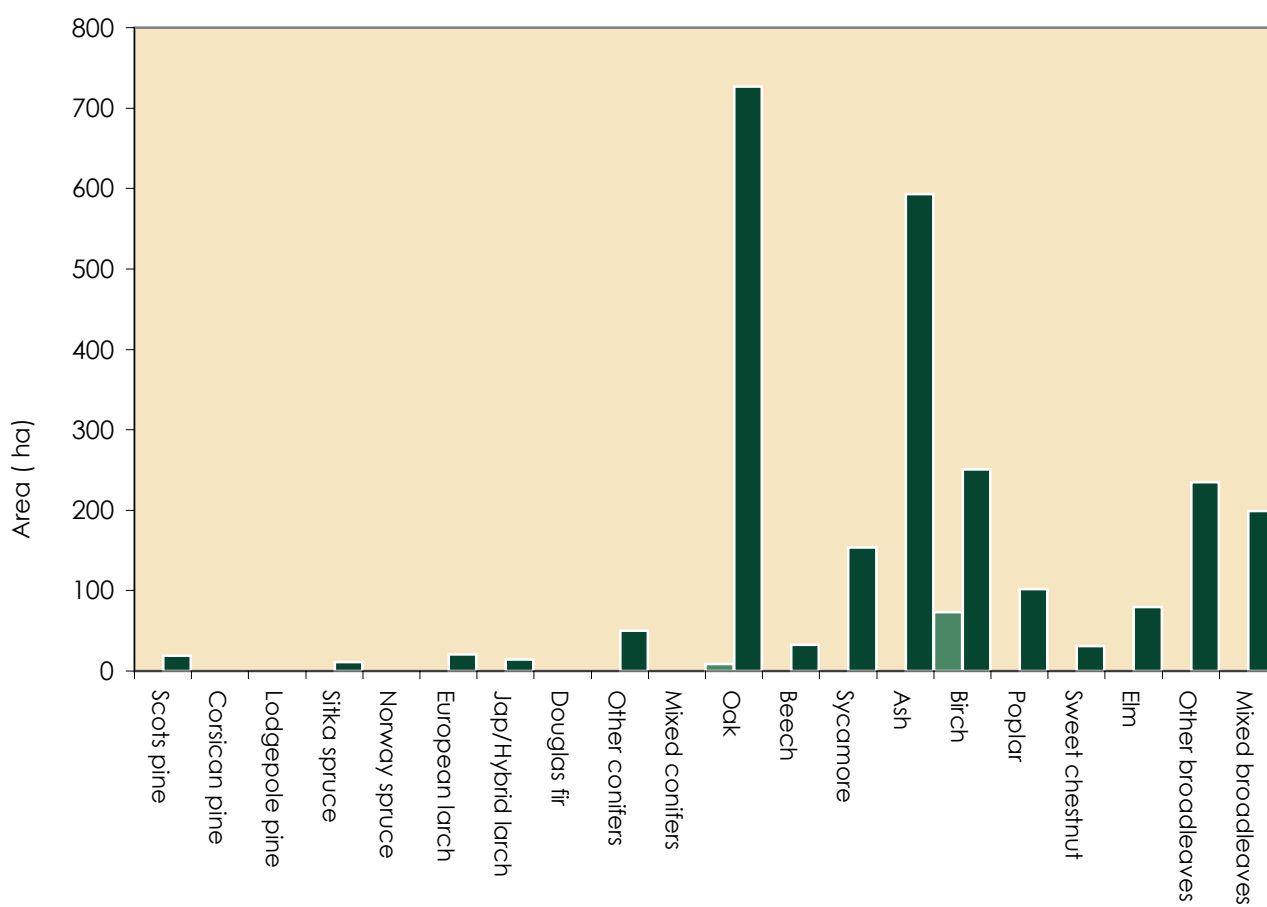
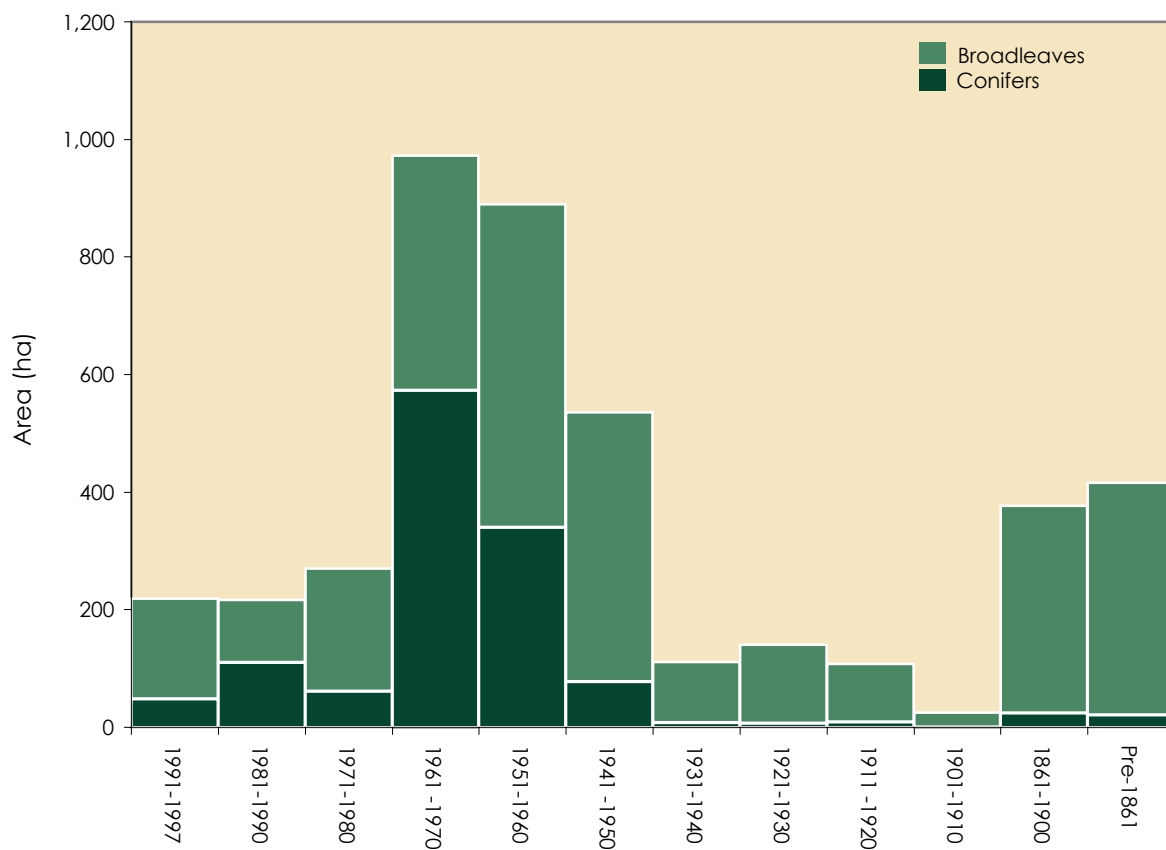


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	0	34	16	293	64	0	0	0	5	0	0	0	412
Corsican pine	0	35	6	83	27	0	0	0	5	0	0	16	172
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	6	11	6	0	0	6	0	0	0	0	29
Norway spruce	21	0	5	80	16	22	0	0	0	0	0	0	143
European larch	0	0	8	8	85	0	0	0	0	0	0	0	100
Jap/Hybrid larch	0	8	0	6	50	55	0	0	0	0	0	0	119
Douglas fir	13	17	0	0	81	0	0	0	0	0	0	0	111
Other conifers	0	9	9	93	11	0	0	0	0	0	0	5	127
Mixed conifers	15	6	11	0	0	0	8	0	0	0	24	0	64
Total conifers	48	110	61	573	340	77	8	6	9	0	24	21	1,276
Oak	30	17	30	51	69	78	0	33	95	0	314	373	1,090
Beech	0	0	0	0	6	0	0	0	0	0	31	6	42
Sycamore	0	6	74	13	38	0	0	0	0	0	8	0	138
Ash	53	16	43	143	266	313	74	56	0	25	0	16	1,005
Birch	0	0	6	34	45	0	0	0	0	0	0	0	85
Poplar	29	0	9	91	89	0	0	45	0	0	0	0	263
Sweet chestnut	0	0	0	0	16	22	0	0	0	0	0	0	38
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	5	47	17	39	23	37	29	0	5	0	0	0	201
Mixed broadleaves	56	22	30	26	0	10	0	0	0	0	0	0	144
Total broadleaves	171	107	209	399	550	459	103	134	99	25	353	395	3,005
Total - all species	219	217	269	972	891	536	111	139	108	25	377	416	4,280

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

High Forest Category 1 - Area by planting year class



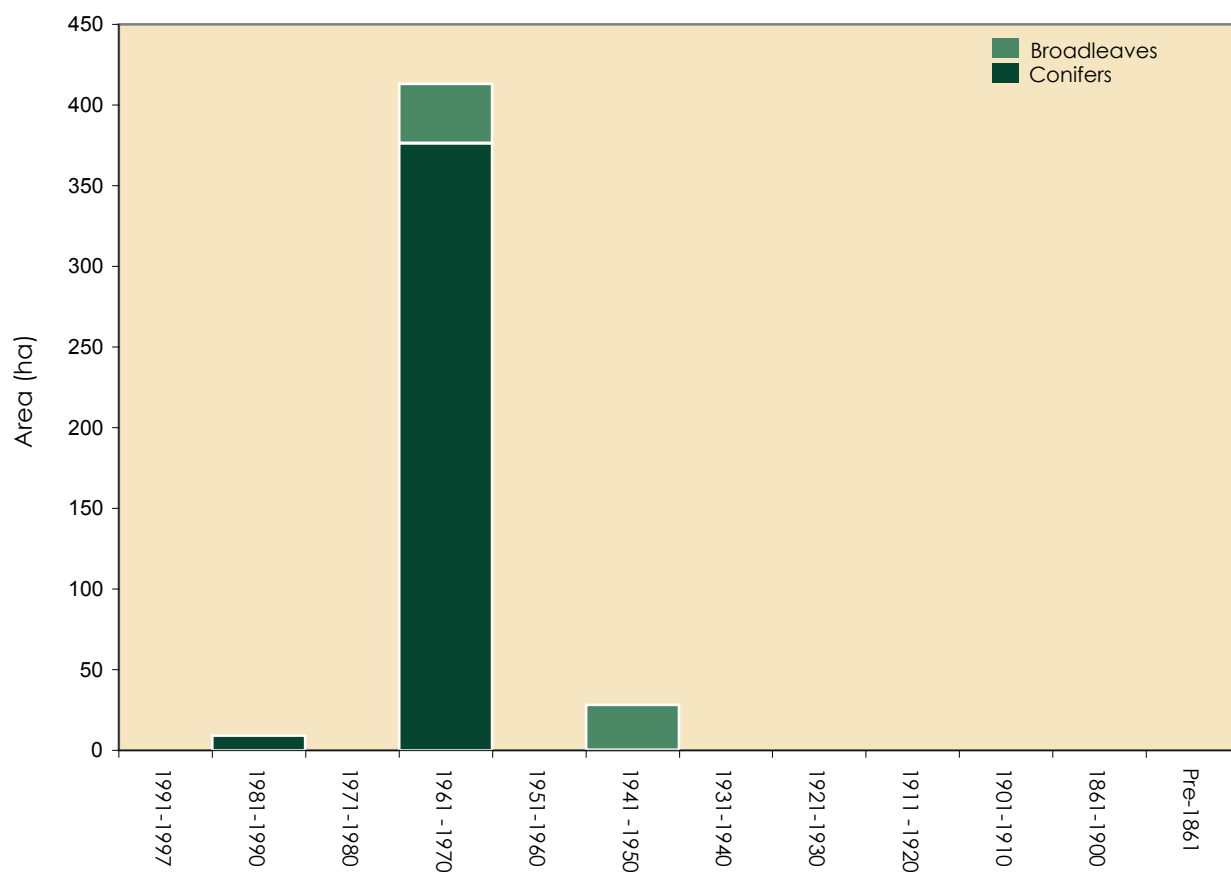
1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	0	0	0	257	0	0	0	0	0	0	0	0	257
Corsican pine	0	0	0	83	0	0	0	0	0	0	0	0	83
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	9	0	0	0	0	0	0	0	0	9
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	9	0	28	0	0	0	0	0	0	0	0	37
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	0	9	0	376	0	0	0	0	0	0	0	0	385
Oak	0	0	0	28	0	28	0	0	0	0	0	0	55
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Sycamore	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed broadleaves	0	0	0	9	0	0	0	0	0	0	0	0	9
Total broadleaves	0	0	0	37	0	28	0	0	0	0	0	0	64
Total - all species	0	9	0	413	0	28	0	0	0	0	0	0	449

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

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



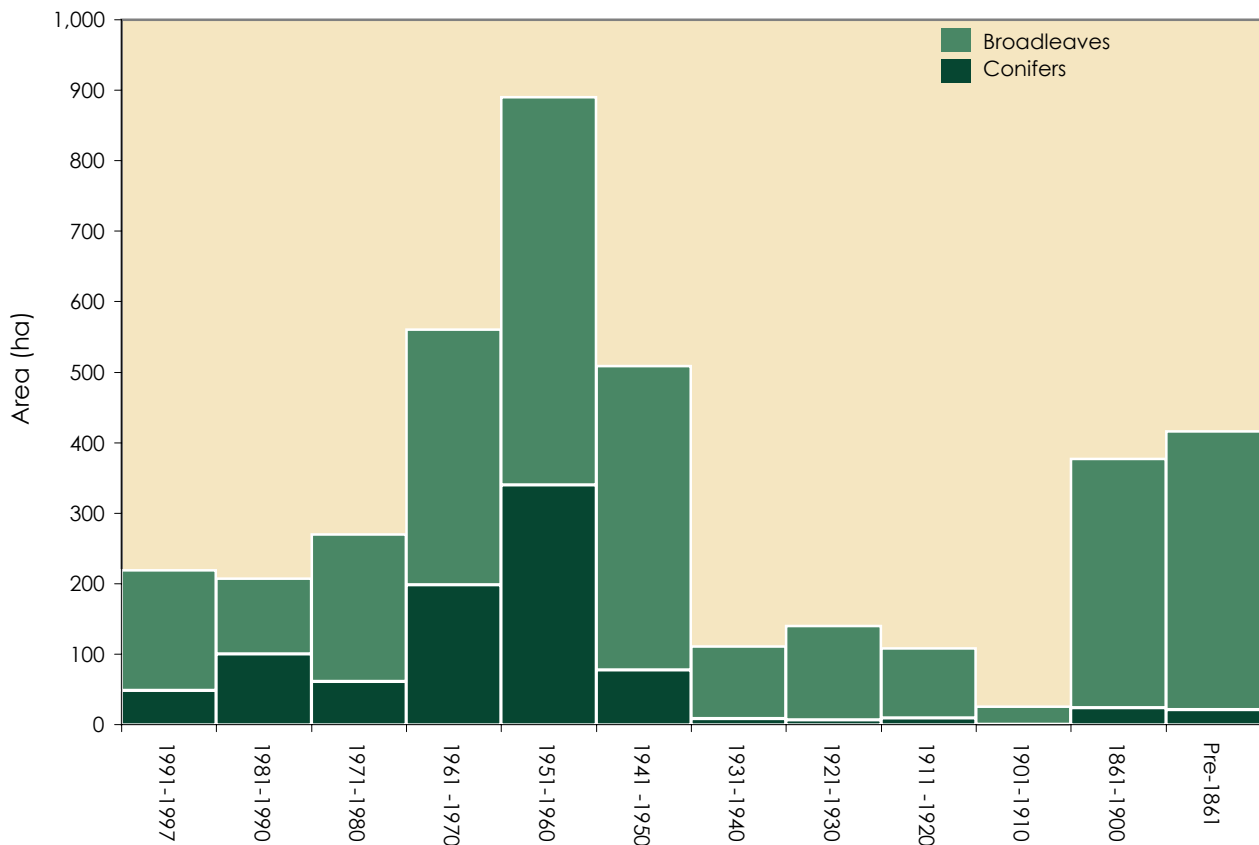
1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	0	34	16	37	64	0	0	0	5	0	0	0	155
Corsican pine	0	35	6	0	27	0	0	0	5	0	0	16	89
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	6	11	6	0	0	6	0	0	0	0	29
Norway spruce	21	0	5	71	16	22	0	0	0	0	0	0	134
European larch	0	0	8	8	85	0	0	0	0	0	0	0	100
Jap/Hybrid larch	0	8	0	6	50	55	0	0	0	0	0	0	119
Douglas fir	13	17	0	0	81	0	0	0	0	0	0	0	111
Other conifers	0	0	9	66	11	0	0	0	0	0	0	5	90
Mixed conifers	15	6	11	0	0	0	8	0	0	0	24	0	64
Total conifers	48	100	61	198	340	77	8	6	9	0	24	21	891
Oak	30	17	30	24	69	50	0	33	95	0	314	373	1,035
Beech	0	0	0	0	6	0	0	0	0	0	31	6	42
Sycamore	0	6	74	13	38	0	0	0	0	0	8	0	138
Ash	53	16	43	143	266	313	74	56	0	25	0	16	1,005
Birch	0	0	6	34	45	0	0	0	0	0	0	0	85
Poplar	29	0	9	91	89	0	0	45	0	0	0	0	263
Sweet chestnut	0	0	0	0	16	22	0	0	0	0	0	0	38
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	5	47	17	39	23	37	29	0	5	0	0	0	201
Mixed broadleaves	56	22	30	17	0	10	0	0	0	0	0	0	135
Total broadleaves	171	107	209	362	550	432	103	134	99	25	353	395	2,940
Total - all species	219	208	269	560	891	508	111	139	108	25	377	416	3,831

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

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



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

Table 11 High Forest : principal species by planting year class

Planting year class	First	%	Second	%	Third	%
1991-97	Mixed broadleaves	26	Ash	24	Oak	14
1981-90	Other broadleaves	21	Corsican pine	16	Scots pine	15
1971-80	Sycamore	20	Elm	18	Mixed broadleaves	12
1961-70	Scots pine	25	Ash	16	Birch	9
1951-60	Ash	26	Poplar	14	Birch	13
1941-50	Ash	47	Other broadleaves	19	Oak	11
1931-40	Ash	65	Birch	12	Sycamore / OB	8
1921-30	Ash	51	Poplar / Oak	19	Birch	5
1911-20	Oak	66	Mixed broadleaves	19	Ash	9
1901-10	Mixed broadleaves	70	Ash	30	-	
1861-1900	Oak	73	Ash	10	Beech	6
Pre 1861	Oak	78	Sycamore	8	OC/ SC/ MB	3
All years	Oak	26	Ash	23	Other broadleaves	6

1. Principal species as a percentage of area in the planting year class.
2. OB - Other broadleaves, OC - Other conifers, SC - Sweet chestnut, MB - Mixed broadleaves

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	6,000	74.5
Business	1,013	12.6
Forestry or timber business	0	0.0
Charity	48	0.6
Local Authority	82	1.0
Other public (not FC)	357	4.4
Forestry Commission	550	6.8
Community ownership or common land	0	0.0
Unidentified	0	0.0
Total	8,050	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	3,490	1,340	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	14,300	1,808	Length (Km)
Narrow Linear Features	14,300	957,500	Number of live trees
Groups	38,300	338,200	Number of live trees
Individual Trees	130,800	130,800	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	234	1,106	1,340	3,490	0.38
Wide Linear Features	0	0	0	0	0.00
Total	234	1,106	1,340	3,490	0.38

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	5.4	5.4	21.3	0.4
Spruce	0.0	0.8	0.0	0.0	0.8	3.1	0.1
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	19.2	0.0	19.2	75.6	1.3
Total conifers	0.0	0.8	19.2	5.4	25.4	100.0	1.8
Oak	35.8	3.3	28.3	148.6	216.0	15.4	15.1
Beech	2.5	0.0	10.0	26.0	38.5	2.7	2.7
Sycamore	5.0	0.0	5.0	22.4	32.4	2.3	2.3
Ash	41.7	4.2	64.1	192.4	302.4	21.6	21.2
Birch	0.8	0.0	0.0	3.6	4.4	0.3	0.3
Poplar	4.2	0.0	3.3	0.0	7.5	0.5	0.5
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	2.5	0.0	1.7	6.3	10.5	0.7	0.7
Alder	0.0	0.0	0.0	74.3	74.3	5.3	5.2
Lime	0.0	0.0	7.5	0.0	7.5	0.5	0.5
Elm	3.3	0.0	51.7	153.0	208.0	14.8	14.6
Willow	6.7	0.0	33.3	48.3	88.3	6.3	6.2
Other broadleaves	20.0	0.0	114.1	277.4	411.5	29.4	28.8
Total broadleaves	122.5	7.5	319.1	952.2	1,401.3	100.0	98.2
Total - all species	122.5	8.3	338.2	957.5	1,426.6		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	21%
Groups	24%
Narrow Linear Features	34%
- 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
Mixed 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	1.7	0.8	0.0	0.0	2.5	6.5	6.5
Beech	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sycamore	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Birch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poplar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alder	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	1.7	0.0	0.0	34.0	35.7	93.5	93.5
Willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other broadleaves	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total broadleaves	3.3	0.8	0.0	34.0	38.2	100.0	100.0
Total - all species	3.3	0.8	0.0	34.0	38.2		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	5.4	0.0	0.0	5.4
Spruce	0.0	0.8	0.0	0.0	0.8
Larch	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	0.0	0.0
Other conifers	6.7	11.7	0.8	0.0	19.2
Total conifers	6.7	17.9	0.8	0.0	25.4
Oak	76.2	94.5	45.3	0.0	216.0
Beech	28.5	5.0	5.0	0.0	38.5
Sycamore	13.0	16.9	2.5	0.0	32.4
Ash	98.1	161.8	42.5	0.0	302.4
Birch	0.0	4.4	0.0	0.0	4.4
Poplar	0.8	3.3	3.3	0.0	7.4
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.8	7.0	2.6	0.0	10.4
Alder	74.3	0.0	0.0	0.0	74.3
Lime	0.0	0.0	7.5	0.0	7.5
Elm	143.0	65.0	0.0	0.0	208.0
Willow	53.6	27.8	7.0	0.0	88.4
Other broadleaves	395.1	14.8	1.7	0.0	411.6
Total broadleaves	883.4	400.5	117.4	0.0	1,401.3
Total - all species	890.1	418.4	118.1	0.0	1,426.5

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	5
3-5	9
6-10	11
11-20	8
21-50	5
51-100	1
>100	0
Total	38

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

COMPARISON OF RESULTS WITH THE 1980 CENSUS AND PREVIOUS SURVEYS

Survey Method

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

Inventory practice and technology have moved on since the 1980 Census; this has led to changes in sampling methodology, scope and woodland definitions 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 1997 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1997 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1997 Inventory

Woodland cover

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

Woodland size (ha)	1980 Census woodland area		1997 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	6,032	87.6	8,050	87.9	33
0.25 - <2.0	851	12.4	1,105	12.1	30
Total	6,883		9,155		33
% Woodland land cover	3.5		4.6		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1997), 197,854 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 198,053ha, (Ordnance Survey data)

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

Species	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
Scots pine	459	431	-6
Corsican pine	194	172	-11
Lodgepole pine	36	0	-100
Sitka spruce	7	40	472
Norway spruce	122	170	39
European larch	171	121	-29
Jap/Hybrid larch	120	132	10
Douglas fir	23	111	388
Other conifers	67	177	163
Mixed conifers	130	64	-51
Total conifers	1,329	1,418	7
Oak	1,836	1,976	8
Beech	152	75	-51
Sycamore	159	376	136
Ash	856	1,723	101
Birch	397	409	3
Poplar	205	489	139
Sweet chestnut	45	69	52
Elm	5	80	1426
Other broadleaves	459	776	69
Mixed broadleaves	408	580	42
Total broadleaves	4,522	6,553	45
Total all species	5,851	7,971	36
Felled	155	6	-96
Total High Forest	6,006	7,977	33

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 12.6% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 12.6%.
3. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
4. The 1980 figures include scrub to enable comparison

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

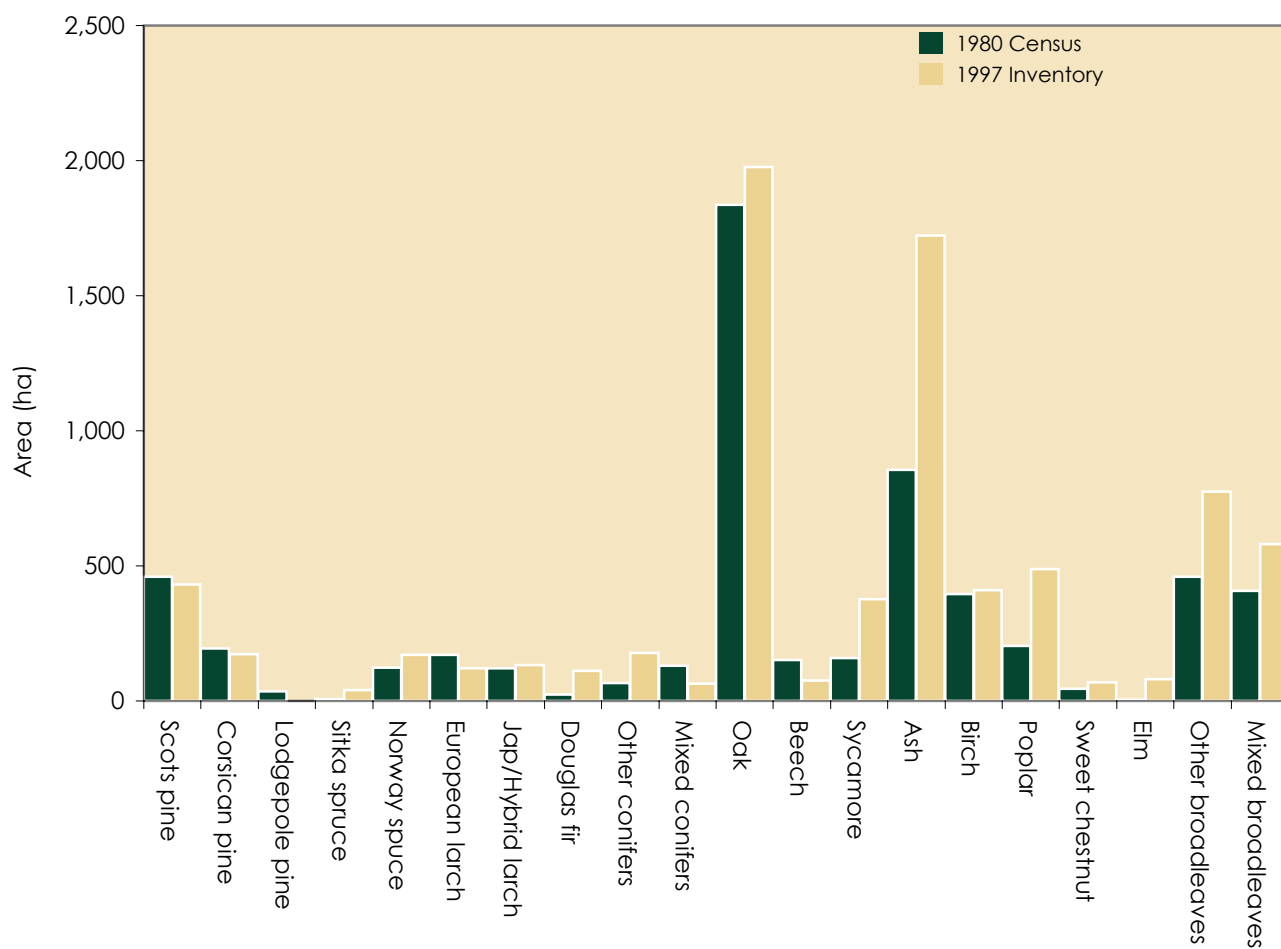


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1997 Inventory

Planting year class	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
1991-1997	0	481	see note
1981-1990	0	261	see note
1971-1980	249	297	19
1961-1970	863	972	13
1951-1960	1,134	1,064	-6
1941-1950	518	536	3
1931-1940	396	150	-62
1921-1930	449	140	-69
1911-1920	155	115	-26
1901-1910	281	25	-91
1861-1900	1,192	483	-59
Pre 1861	367	416	13
Total all years	5,603	4,940	-12

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

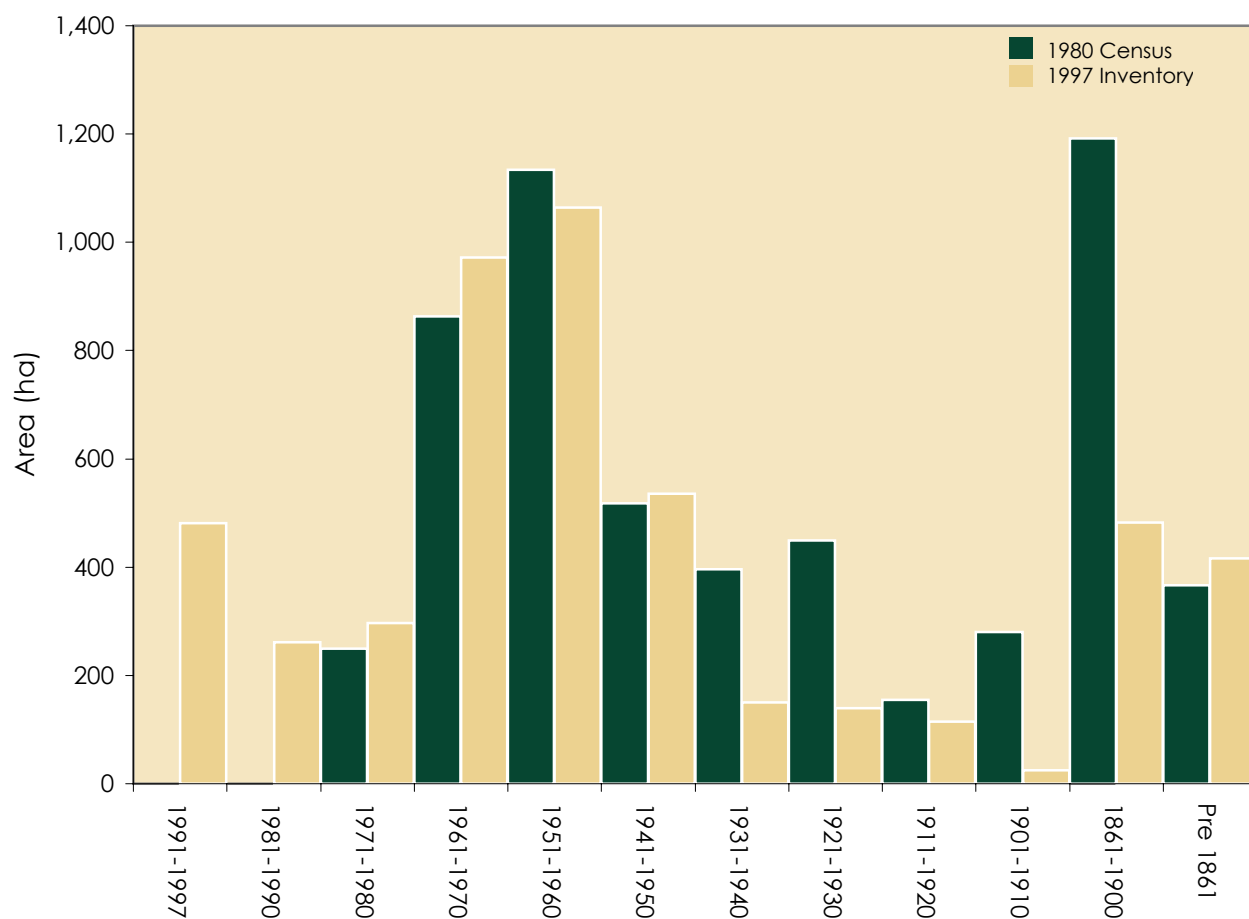
Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory

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

Feature type	1980 Census	1997 Inventory	Change (%)
Boundary Tree	168	109	-35
Middle Tree	88	8	-91
Total Individual Trees	257	117	-54
Groups	354	251	-29
Linear Features	516	758	47
Total	1,127	1,126	0

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

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

Feature type	1980 Census	1997 Inventory	Change (%)
Individual Trees (per sq km)	129.6	59.3	-54
Groups (per sq km)	37.5	17.7	-53
Linear Features (m per sq km)	580.6	913.6	57

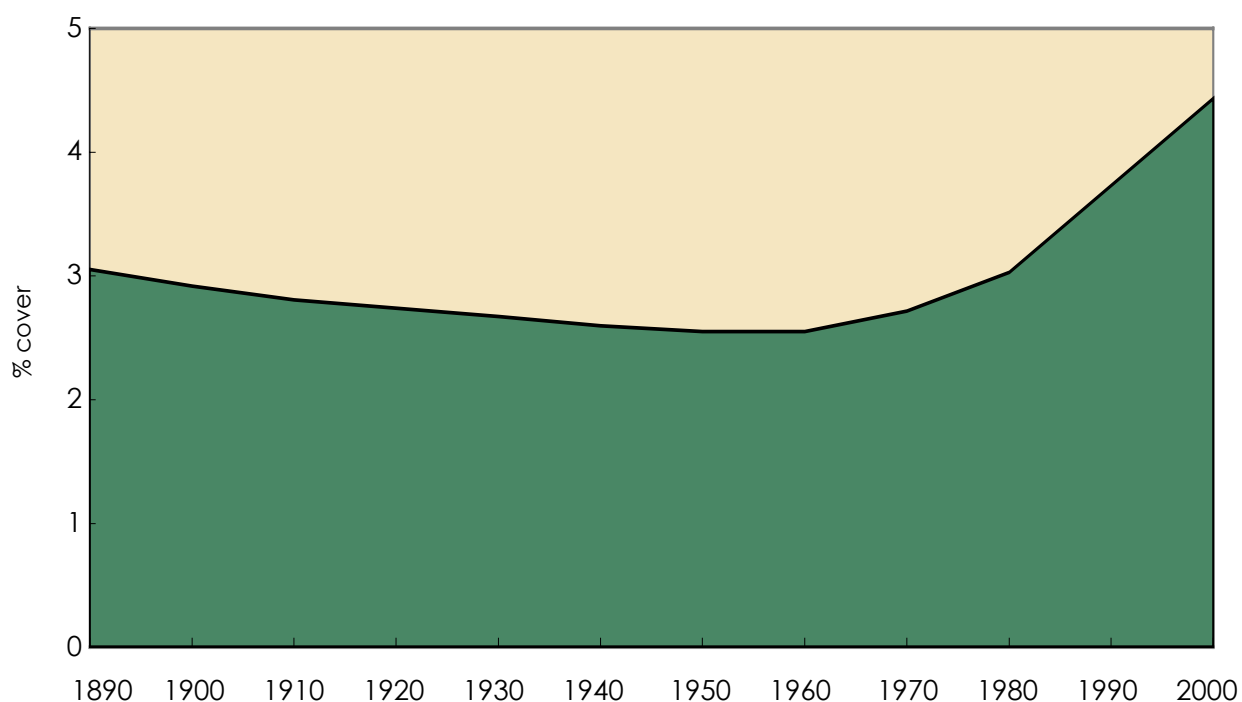
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WOODLAND COVER

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

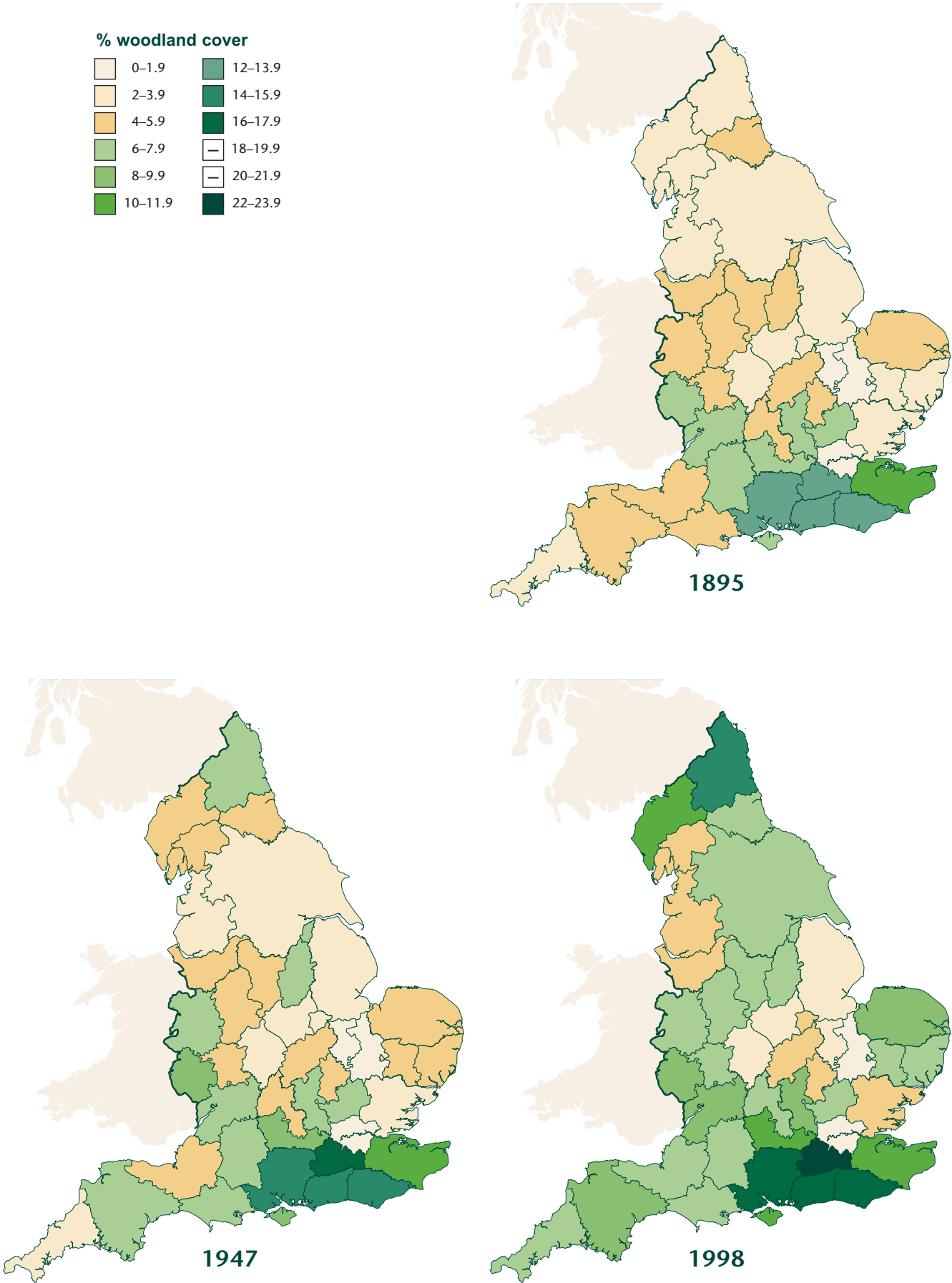
The maps use the old County structure data of England, as reported on in 1895 and 1947. The data from these counties could not be re-worked for different geographic areas. In contrast, the digital woodland map, which forms the basis of the current inventory, can be analysed for any geographic area.

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



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

Map 5 Woodland Cover in England by County through time (1895–1998)



GLOSSARY

Woodland

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

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

Interpreted Forest Types

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

High Forest

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

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

Mixtures

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

Forest Types

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

- **Coppice**

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

- **Coppice with Standards**

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

- **Felled**

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

- **Windblow**

Areas of blown woodland which remain uncleared and not regenerated.

- **Open Space**

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

Ownership types

- **Other Ownership**

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

- **Personal**

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

- **Private forestry or timber business**

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

- **Other private business**

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

- **Local Authority**

Region, County, District or other Council

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

Government department/agency, nationalised industry, etc.

- **Charitable organisations**

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

- Community ownership or common land

the common property of all members of the community.

- **Forestry Commission**

Land owned by or land leased to the Forestry Commission

Feature types

- **Small Wood**

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

- **Group**

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

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

NOTES



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