



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

SOUTH YORKSHIRE



Forestry Commission

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

Preparation of the digital cartography for South Yorkshire was carried out by Graham Bull, Woodland Survey Officer, and Woodland GIS Officers Chris Brown, Robert Beck and Esther Whitton. Data processing and analysis was carried out by Woodland Data Officers Justin Gilbert and Shona Cameron.

The authors of this Report are Steve Smith (Head of Woodland Surveys) and Justin Gilbert (Woodland Data Officer) of Forest Research.

INTRODUCTION

This report presents the results for South Yorkshire from the Forestry Commission National Inventory of Woodland and Trees (NIWT).

The Inventory consists of two separate surveys -

- The Main Woodland Survey (MWS) covering woodlands of 2 hectares and over
- The Survey of Small Woodland and Trees (SSWT) covering Small Woods, Groups of Trees, Linear Features and Individual Trees.

BACKGROUND

Since 1924 the Forestry Commission has carried out a number of national woodland surveys at intervals of between 15 and 20 years. The previous survey was carried out between 1979 and 1982. With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.

The survey fieldwork for Great Britain was completed in July 2000. Work began in Scotland in 1994, followed by Southern England, Wales and Northern England.

SURVEY METHODS

Main Woodland Survey

In England, Woodland Surveys derived a digital map of all woodland showing Interpreted Forest Types from 1:25 000 scale aerial photography. This provided the basis for the sampling.

The digital map gives the extent of all woodland over 2 hectares and this was updated as survey work progressed. The maps on pages 4-6 show: overall woodland cover; woodland by ownership; and woodland by Interpreted Forest Type, respectively. The total area of woodland was obtained from the digital map with ground sampling undertaken to evaluate a wide range of woodland information such as species, age and stocking.

From the digital map the area of each woodland was recorded and this information was used to determine the intensity at which any selected woodland would be sampled. The overall sampling scheme was as follows:

- 2.0ha - <100ha : every fifth wood
- 100ha - <500ha : two woods in five
- 500ha and larger : all woods

1 hectare square plots were used to sample the selected woodlands on the ground. This was a change of practice from all previous Census surveys, where whole woods have been selected for survey. For each of the three bands of woodland area a different sampling grid was used with the density of the squares being reduced as the woodlands increase in size. The overall aim was to sample 1% of the woodland in each size class.

Survey of Small Woodland and Trees_

The land area of England was stratified into coastal and inland 1 km x 1 km squares and a random sample of 1 km² plots were then selected, representing around 1% of the land area. 1:25 000 scale aerial photos were then used to identify features in each sample square. Each 1 km² was then divided into 16 parts, and two of these were selected at random for field data collection. Data was collected on Small Woodlands (0.10 - <2.00 ha), Linear Features, Groups and Individual Trees. The survey did not collect information from areas of developed land of 2 hectares or more.

MAIN POINTS FROM THE SURVEY RESULTS

- The total area of woodland of 0.1 hectares and over in South Yorkshire is 11551 hectares. This represents 7.4% of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 57.4 % of all woodland. Conifer woodland represents 20.3 %, Mixed woodland 11.4 % and Open Space within woodlands 5.6 %. (Table 2)
- The main conifer species is pine covering 1,732 hectares or 59.1 % of all conifer species. The main broadleaved species is oak covering 2,341 hectares or 31.8 % of all broadleaved species. (Table 3)
- 622 hectares or 6 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 10,675 hectares or 94 % of woodland is in Other ownership. (Table 6)
- There are a total of 723 woods over 2 ha within South Yorkshire with a mean wood area of 15.8 hectares. (Table 7a) There are a total of 1,106 woods from 0.1 - <2.0 hectares with a mean wood area of 0.23 hectares. (Table 14)
- There are 600.8 thousand live trees outside woodland in South Yorkshire. (Table 15)
- Woodland land cover increased by over 1,000 hectares from 6.7 % to 7.3 % of the land area between 1980 and 1998. (Table 19)
- The area of broadleaves increased by 0.09% between 1980 and 1998, with the relative proportion of broadleaves to conifers decreasing from 76 % to 72 %. (Table 20)

INVENTORY REPORTS

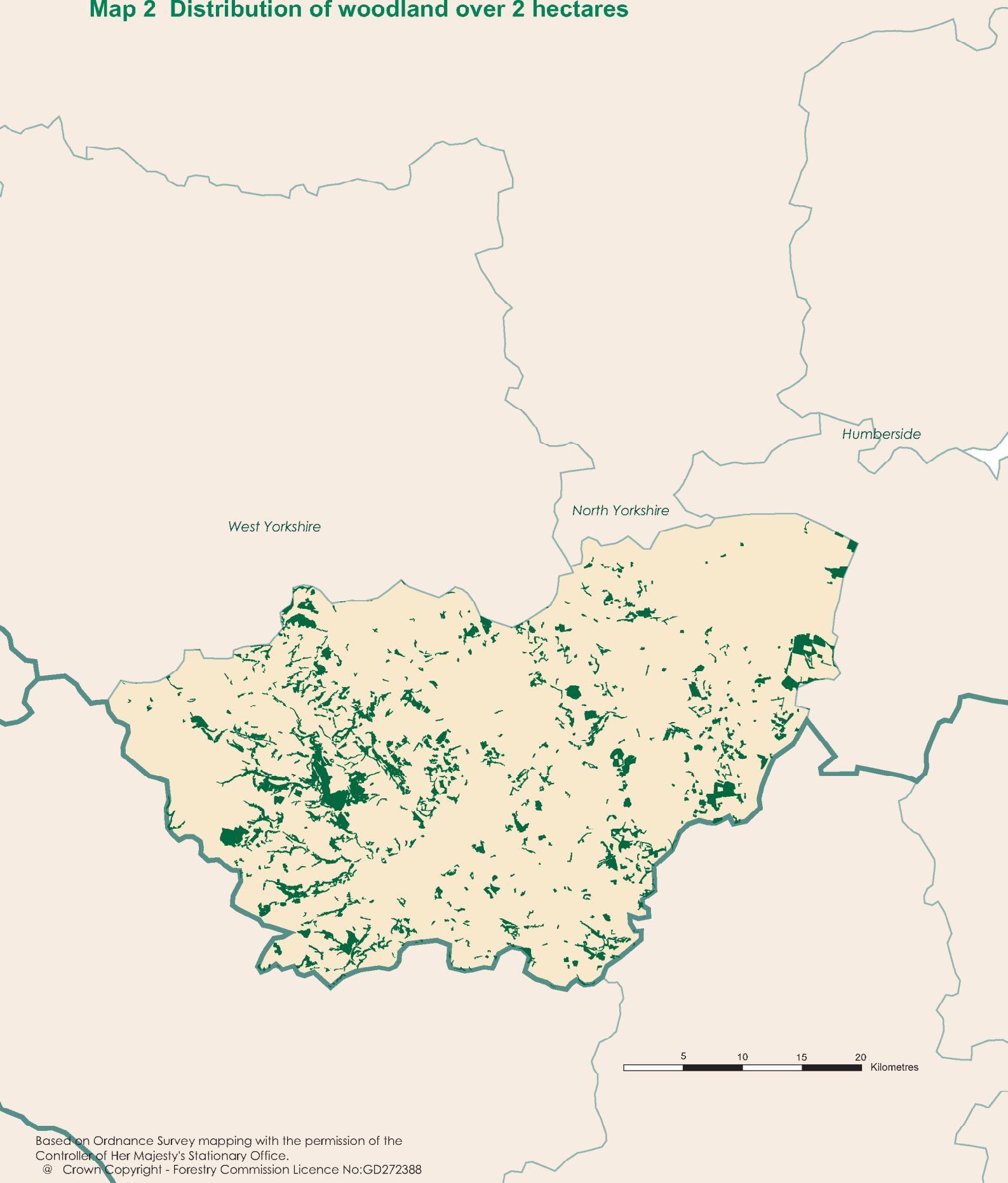
As well as this report for South Yorkshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



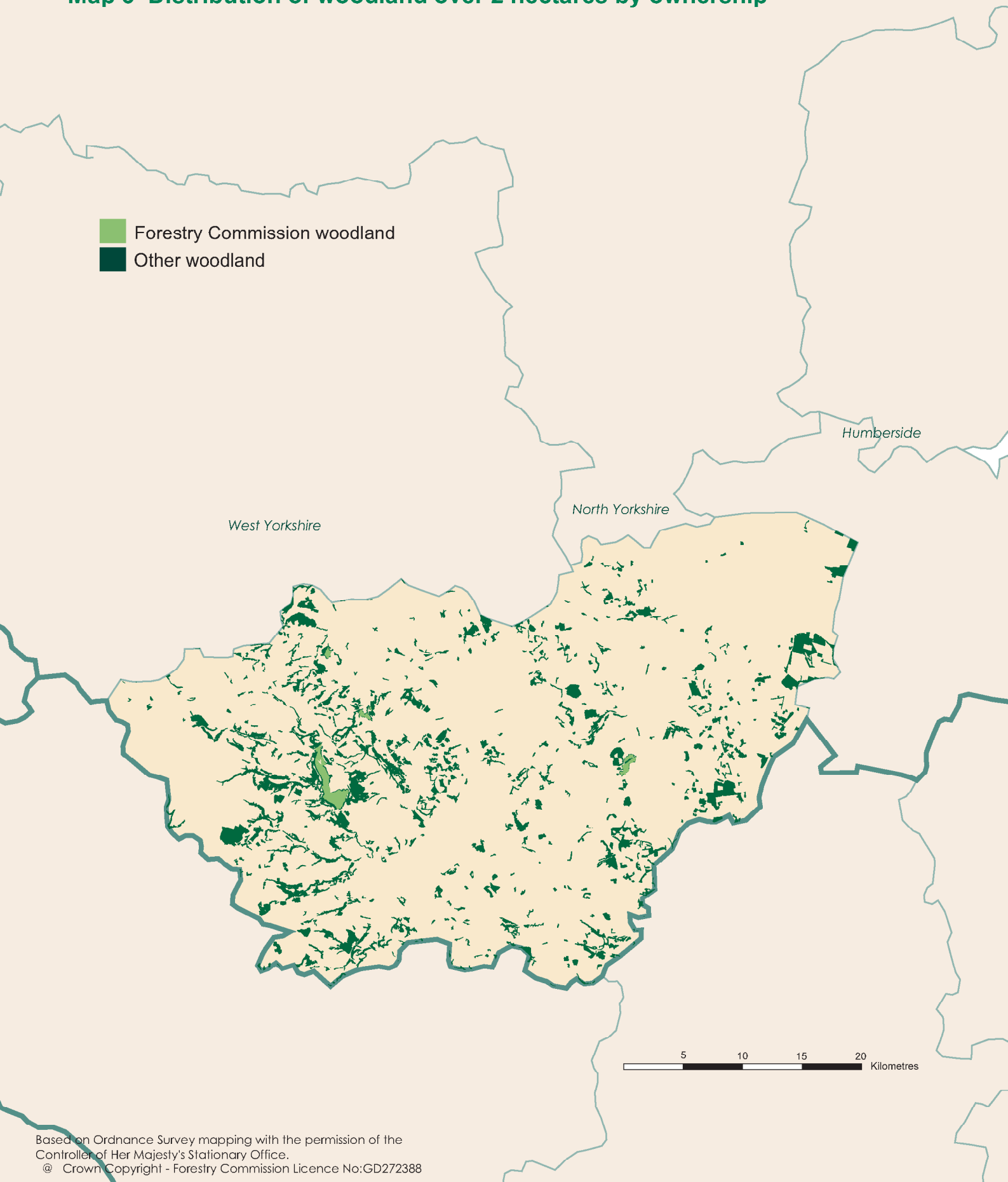
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Map 2 Distribution of woodland over 2 hectares

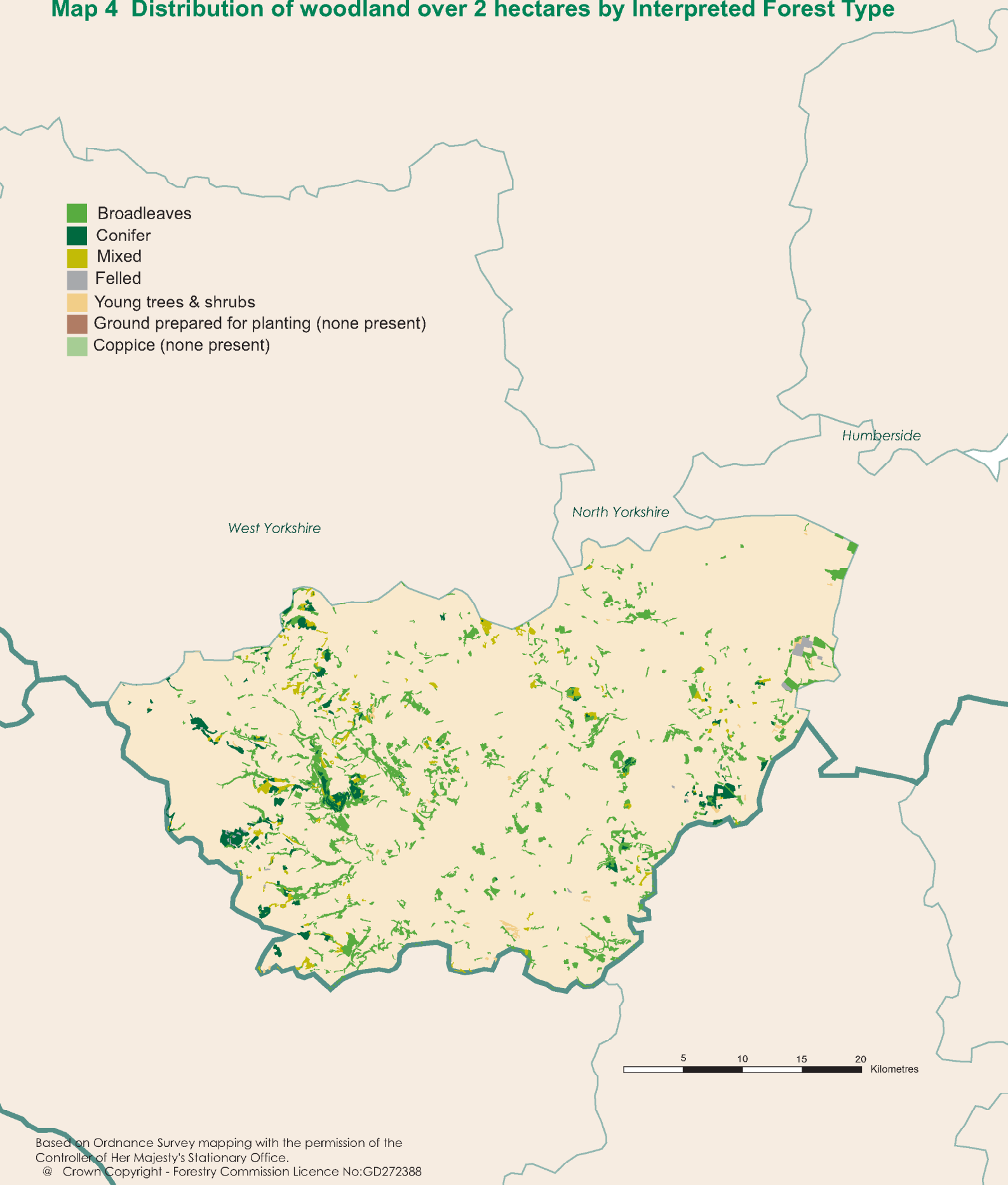


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Map 3 Distribution of woodland over 2 hectares by ownership



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



SUMMARY RESULTS FROM THE NATIONAL INVENTORY OF WOODLAND AND TREES (NIWT)

Both the Main Woodland Survey and the Survey of Small Woodland and Trees contributed to the estimate of woodland area for South Yorkshire.

Tables 1-3 show the combined woodland area from the Main Woodland Survey and the Survey of Small Woodland and Trees.

Tables 4 and 5 summarise the numbers of live trees outside woodland, and the lengths of Linear Features from the Survey of Small Woodland and Trees.

Table 1:	Woodland area by woodland size class
Table 2:	Woodland area by forest type and woodland size
Table 3:	Woodland area by principal species and woodland size
Table 4:	Numbers of live trees outside woodland by feature type
Table 5:	Lengths of Linear Features

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

Table 1 Woodland area by woodland size class

Woodland size (ha)	Woodland area (ha)	% of Woodland area
2.00 and over	11,297	97.8
0.25 - < 2.00	135	1.2
0.10 - < 0.25	119	1.0
Total area of woodland	11,551	100.0
% Woodland land cover	7.4	

1. Area of South Yorkshire, including inland water, 155,941 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	2,350	0	2,350	20.3
Broadleaved	6,543	87	6,630	57.4
Mixed	1,152	162	1,314	11.4
Coppiced	56	0	56	0.5
Copp-w-standards	50	0	50	0.4
Windblow	0	0	0	0.0
Felled	503	0	503	4.4
Open Space	642	4	646	5.6
Total	11297	254	11,551	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	1,652	80	1,732	59.2	16.8
Sitka spruce	372	42	414	14.1	4.0
Larch	636	7	643	22.0	6.2
Other conifers	102	0	102	3.5	1.0
Mixed conifers	30	9	39	1.3	0.4
Total conifers	2,790	138	2,928	100.0	28.4
Oak	2,337	4	2,341	31.8	22.7
Beech	1,029	9	1,038	14.1	10.1
Sycamore	1,326	7	1,333	18.1	12.9
Ash	724	11	735	10.0	7.1
Birch	782	27	809	11.0	7.9
Elm	54	0	54	0.7	0.5
Other broadleaves	767	54	821	11.1	8.0
Mixed broadleaves	236	0	236	3.2	2.3
Total broadleaves	7,255	112	7,367	100.0	71.6
Total all species***	10,046	250	10,296		100.0

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

**Species/group percentage of all species

***Excludes the 1255ha 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	8%
Broadleaves	4%
Pine	11%
Oak	8%
Sycamore	12%
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	70,700	311,100	4	199
Narrow Linear Features	5,900	167,400	28	107
Individual Trees	122,300	122,300	1	78
Total		600,800		385

1. Land area used to calculate tree density 155,941ha 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	52%
Narrow Linear Features	13%
Individual Trees	29%
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	837	82	52
Narrow Linear Features	5,900	435	279
Total		517	332

1. Land area used to calculate feature density 155,941ha 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	97%
Narrow Linear Features	50%
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	622	6
Other	10,675	94
Total area of woodland	11,297	100

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

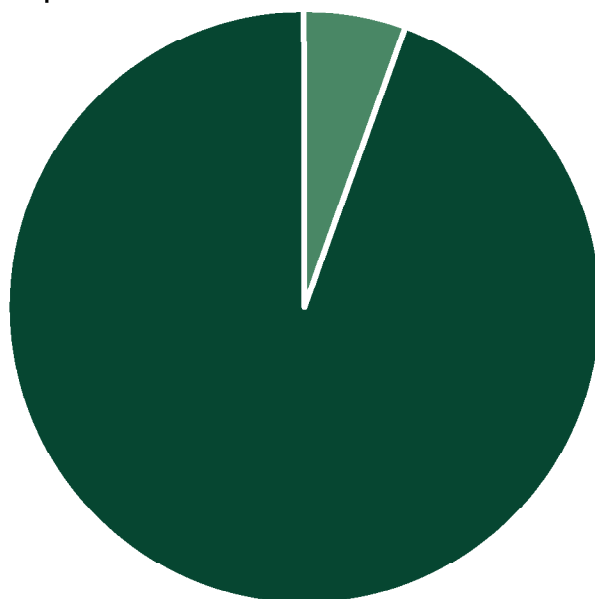
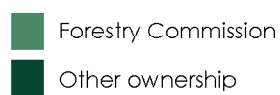
Woodland area by ownership

Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	507	2,235	19	4.4
10 - <20	98	1,416	12	14.5
20 - <50	72	2,206	19	30.6
50 - <100	31	2,101	18	67.8
<100	708	7,958	69	11.2
100 - <500	14	2,269	20	162.0
500 and >	1	1,237	11	1237.2
All woods	723	11,464	100	15.8

Table 7b Size class distribution of woodland by ownership units

Size class (ha)	FC or Other	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	FC	2	10	0	5.0
	O	501	2,267	20	4.5
10 - <20	FC	0	0	0	0.0
	O	99	1,430	12	14.4
20 - <50	FC	3	101	1	33.7
	O	73	2,228	19	30.5
50 - <100	FC	1	75	1	75.1
	O	30	2,050	18	68.3
<100	FC	7	186	2	26.6
	O	723	7,975	70	11.0
100 - <500	FC	1	435	4	435.2
	O	15	2,867	25	191.2
500 and >	FC	0	0	0	0.0
	O	0	0	0	0.0
Total	FC	8	622	5	77.8
	O	718	10,842	95	14.7

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 167 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	187	30.1	2,163	20.3	2,350	20.8
Broadleaved	311	50.0	6,233	58.4	6,543	57.9
Mixed	49	7.9	1,103	10.3	1,152	10.2
Coppice	2	0.3	54	0.5	56	0.5
Copp-w-Stds	12	1.9	38	0.4	50	0.4
Windblow	0	0.0	0	0.0	0	0.0
Felled	0	0.0	503	4.7	503	4.5
Open Space	60	9.6	582	5.5	642	5.7
Total	622	100.0	10,675	100.0	11,297	100.0

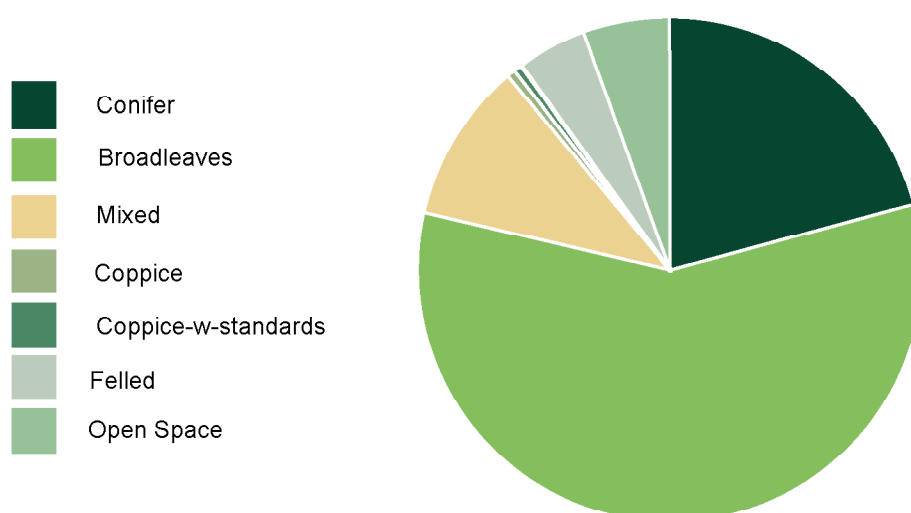
Area of woodland by forest type

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	2	1	0	826	32	9	828	30	8
Corsican pine	160	72	29	656	26	7	817	29	8
Lodgepole pine	7	3	1	0	0	0	7	0	0
Sitka spruce	0	0	0	372	14	4	372	13	4
Norway spruce	0	0	0	75	3	1	75	3	1
European larch	0	0	0	55	2	1	55	2	1
Jap/Hybrid larch	52	23	9	528	21	6	581	21	6
Douglas fir	0	0	0	8	0	0	8	0	0
Other conifers	0	0	0	19	1	0	19	1	0
Mixed conifers	0	0	0	30	1	0	30	1	0
Total conifers	222	100	41	2,568	100	27	2,790	100	28
Oak	80	25	15	2,256	33	24	2,337	32	23
Beech	34	10	6	996	14	10	1,029	14	10
Sycamore	37	11	7	1,289	19	14	1,326	18	13
Ash	57	18	10	667	10	7	724	10	7
Birch	89	27	16	693	10	7	782	11	8
Poplar	12	4	2	61	1	1	73	1	1
Sweet chestnut	0	0	0	139	2	1	139	2	1
Elm	0	0	0	54	1	1	54	1	1
Other broadleaves	0	0	0	555	8	6	555	8	6
Mixed broadleaves	16	5	3	220	3	2	236	3	2
Total broadleaves	325	100	59	6,930	100	73	7,255	100	72
Total - all species	548		100	9,498		100	10,046		100
Felled	0			503			503		
Total High Forest	548			10,001			10,549		

*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 642ha 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	8%
Broadleaves	4%
Scots pine	18%
Oak	8%
Sycamore	12%
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

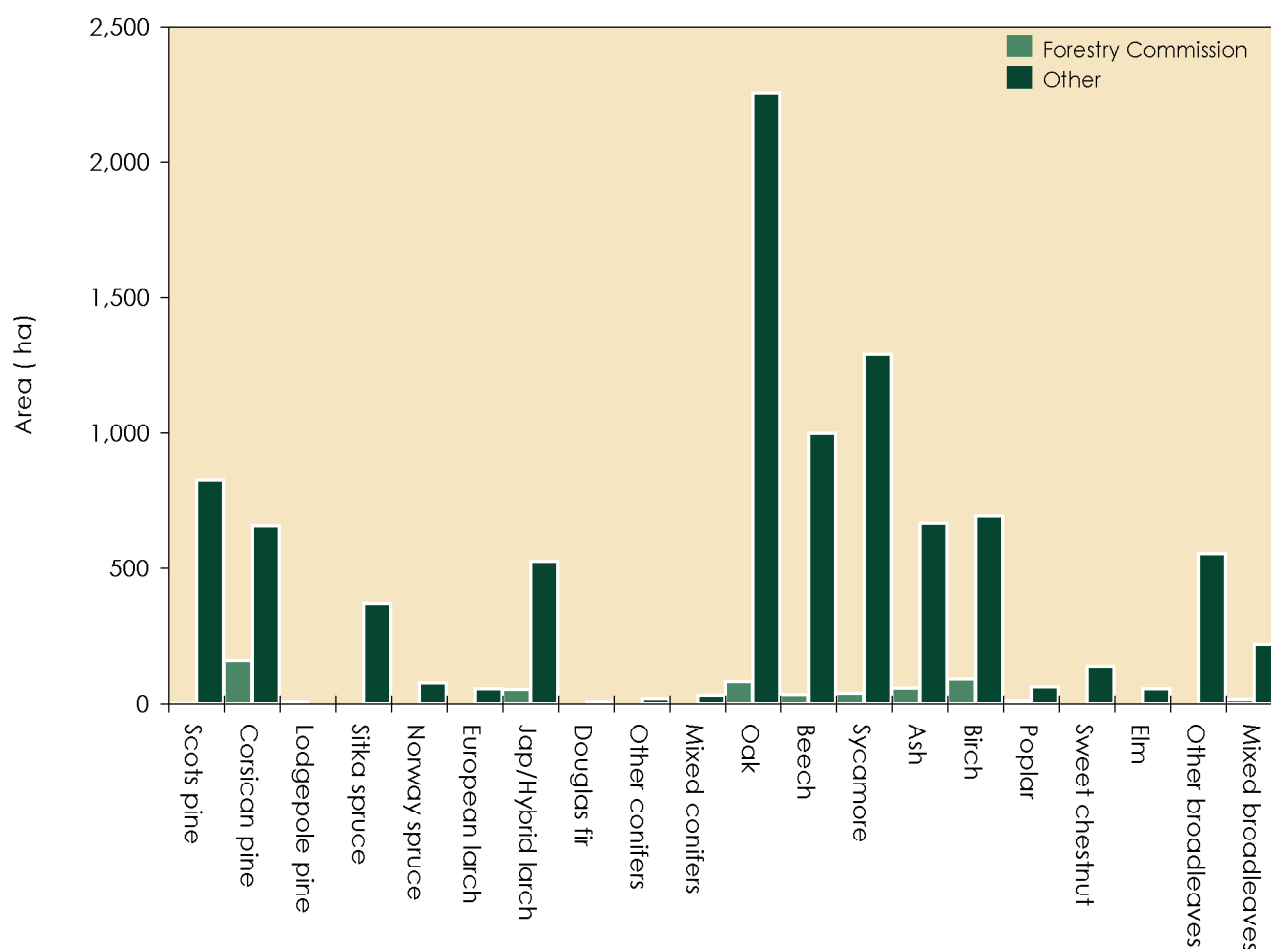


Table 9b Area of High Forest by principal species,ownership and category

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	2	0	2	801	24	826	804	24	828
Corsican pine	160	0	160	656	0	656	817	0	817
Lodgepole pine	7	0	7	0	0	0	7	0	7
Sitka spruce	0	0	0	367	4	372	367	4	372
Norway spruce	0	0	0	75		75	75	0	75
European larch	0	0	0	55	0	55	55	0	55
Jap/Hybrid larch	52	0	52	510	19	528	562	19	581
Douglas fir	0	0	0	8	0	8	8	0	8
Other conifers	0	0	0	16	3	19	16	3	19
Mixed conifers	0	0	0	24	7	30	24	7	30
Total conifers	222	0	222	2,511	56	2,569	2,734	56	2,790
Oak	60	20	80	1,277	979	2,256	1,337	999	2,337
Beech	34	0	34	816	179	996	850	179	1,029
Sycamore	37	0	37	858	431	1,289	895	431	1,326
Ash	57	0	57	557	110	667	614	110	724
Birch	2	86	89	245	448	693	248	535	782
Poplar	12	0	12	56	4	61	69	4	73
Sweet chestnut	0	0	0	114	25	139	114	25	139
Elm	0	0	0	20	34	54	20	34	54
Other broadleaves	0	0	0	153	402	555	153	402	555
Mixed broadleaves	10	6	16	135	85	220	145	92	236
Total broadleaves	212	113	325	4,232	2,698	6,930	4,444	2,811	7,255
Total - all species	435	113	547	6,743	2,755	9,499	7,178	2,868	10,045

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

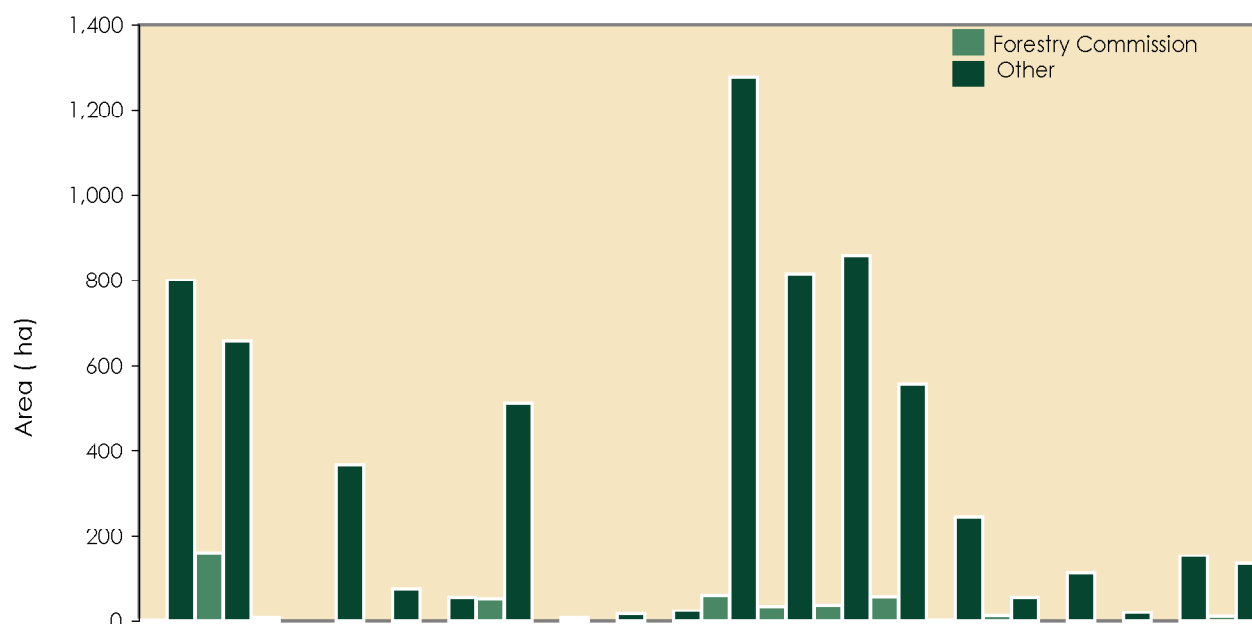
	Category 1*	Category 2*	Total High Forest
Conifers	7%	59%	8%
Broadleaves	6%	7%	4%
Scots pine	18%	85%	18%
Oak	11%	13%	8%
Sycamore	14%	23%	12%

*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

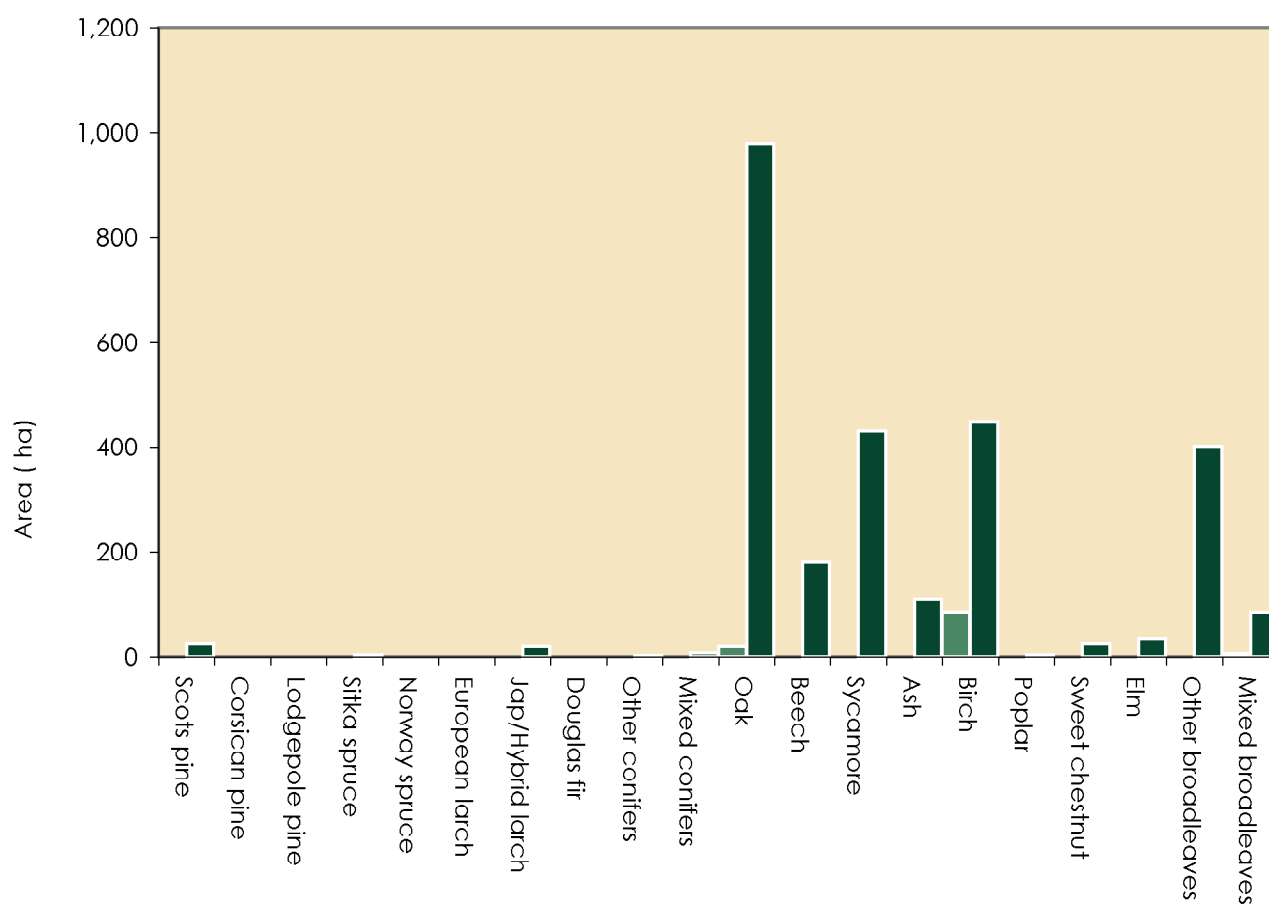
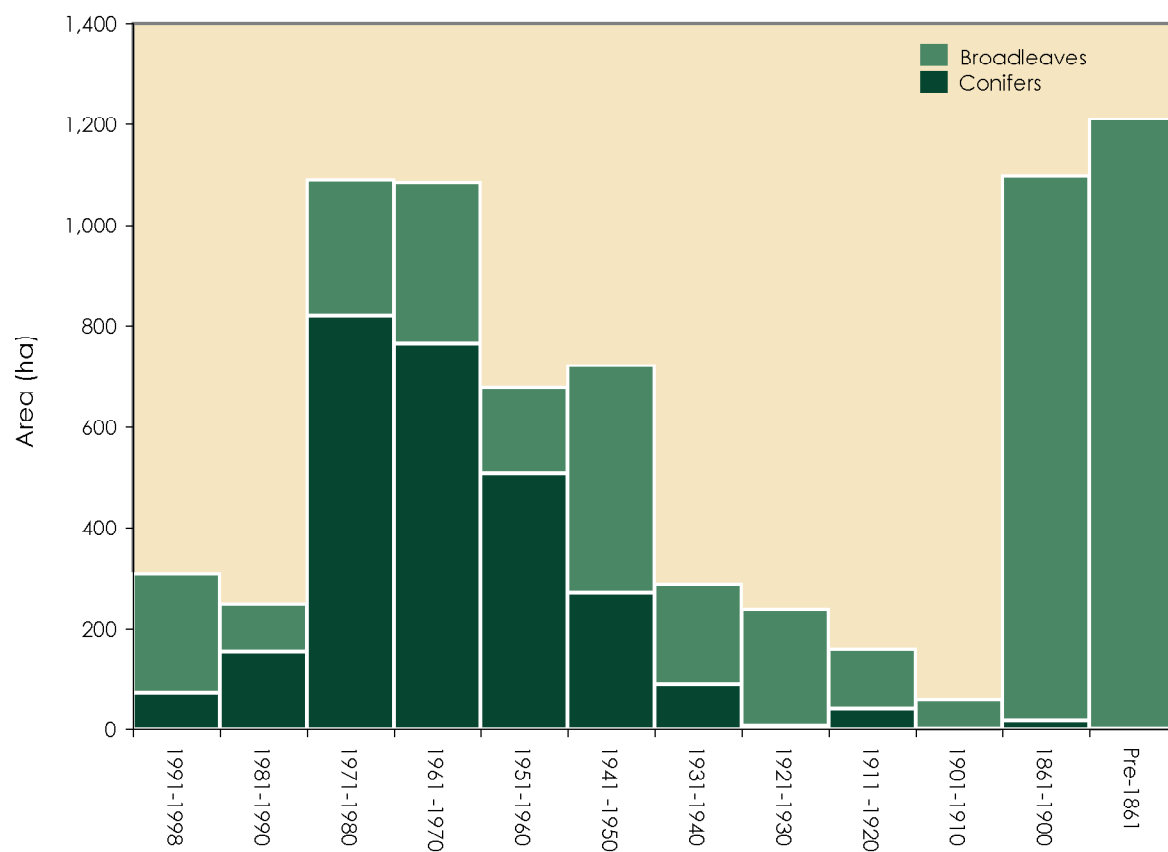


Table 10a High Forest Category 1 - Area by principal species and planting year class

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	0	8	333	211	156	70	26	0	0	0	0	0	804
Corsican pine	32	110	142	284	44	142	24	0	39	0	0	0	817
Lodgepole pine	0	0	0	7	0	0	0	0	0	0	0	0	7
Sitka spruce	0	8	132	68	129	24	7	0	0	0	0	0	367
Norway spruce	8	0	20	8	33	0	6	0	0	0	0	0	75
European larch	0	0	0	0	10	12	27	6	0	0	0	0	55
Jap/Hybrid larch	6	27	191	185	132	21	0	0	0	0	0	0	562
Douglas fir	8	0	0	0	0	0	0	0	0	0	0	0	8
Other conifers	0	0	0	0	0	0	0	0	0	0	16	0	16
Mixed conifers	19	0	0	0	4	0	0	0	0	0	0	0	24
Total conifers	72	152	819	763	508	269	89	6	39	0	16	0	2,734
Oak	28	8	27	8	58	158	24	40	4	0	229	753	1,337
Beech	9	0	89	4	10	38	22	0	26	24	361	266	850
Sycamore	16	0	35	115	31	75	98	185	46	33	260	0	895
Ash	70	26	34	140	7	30	34	7	32	0	192	42	614
Birch	6	15	42	11	18	112	8	0	0	0	35	0	248
Poplar	9	0	9	13	29	7	0	0	0	0	0	0	69
Sweet chestnut	6	16	0	0	0	0	0	0	4	0	4	83	114
Elm	0	0	4	9	3	3	0	0	0	0	0	0	20
Other broadleaves	52	13	0	16	6	3	0	0	0	0	0	63	153
Mixed broadleaves	40	18	29	3	8	25	13	0	5	0	0	3	145
Total broadleaves	237	96	270	321	171	452	199	231	118	57	1,081	1,211	4,444
Total - all species	309	248	1,089	1,084	679	721	288	237	157	57	1,097	1,211	7,178

*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.

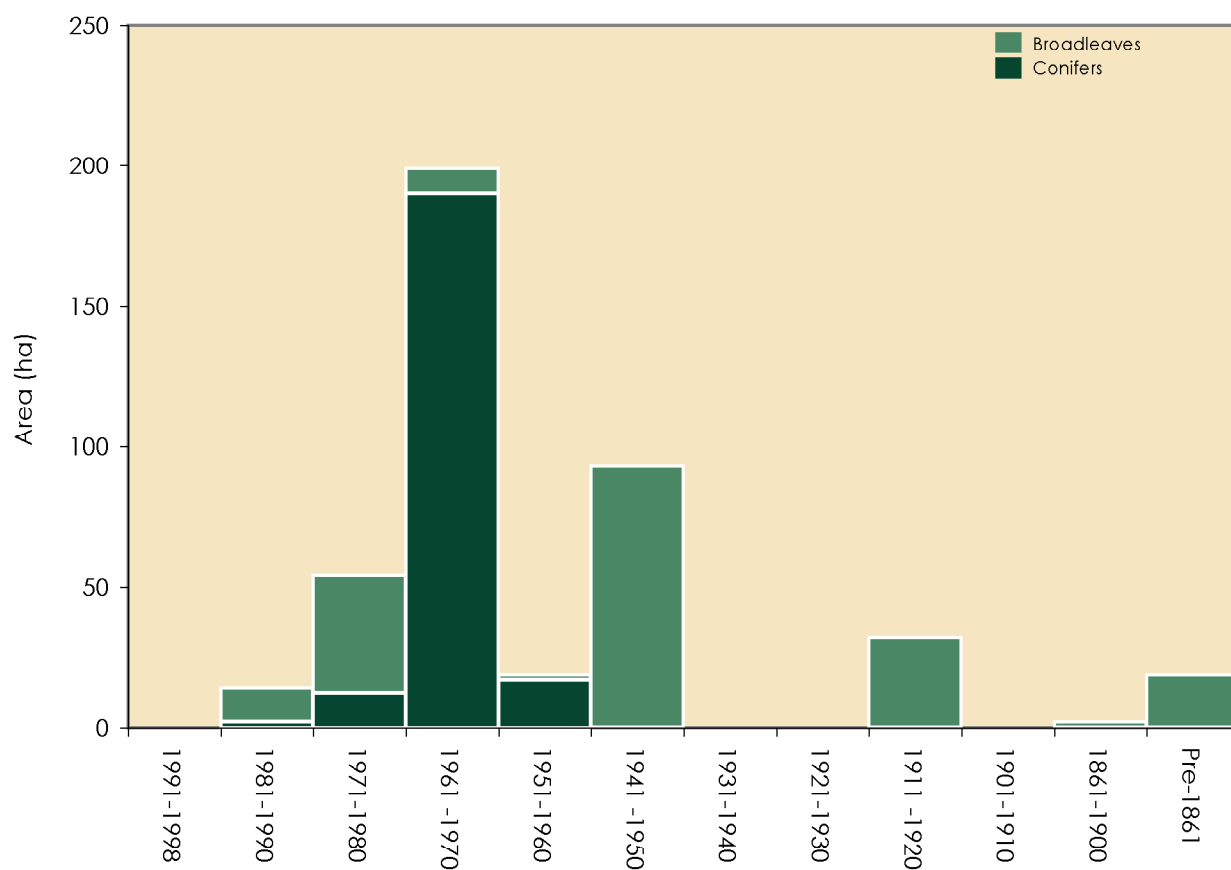
High Forest Category 1 - Area by planting year class

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	0	2	0	0	0	0	0	0	0	0	0	0	2
Corsican pine	0	0	12	141	7	0	0	0	0	0	0	0	160
Lodgepole pine	0	0	0	7	0	0	0	0	0	0	0	0	7
Sitka spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	0	0	0	42	10	0	0	0	0	0	0	0	52
Douglas fir	0	0	0	0	0	0	0	0	0	0	0	0	0
Other conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	0	2	12	190	17	0	0	0	0	0	0	0	222
Oak	0	5	0	2	0	36	0	0	0	0	2	14	60
Beech	0	0	10	4	0	15	0	0	0	0	0	4	34
Sycamore	0	0	10	2	0	25	0	0	0	0	0	0	37
Ash	0	5	10	0	0	10	0	0	32	0	0	0	57
Birch	0	0	0	0	2	0	0	0	0	0	0	0	2
Poplar	0	0	5	0	0	7	0	0	0	0	0	0	12
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	2	7	0	0	0	0	0	0	0	0	0	10
Total broadleaves	0	12	42	9	2	93	0	0	32	0	2	19	212
Total - all species	0	15	54	200	20	93	0	0	32	0	2	19	435

*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

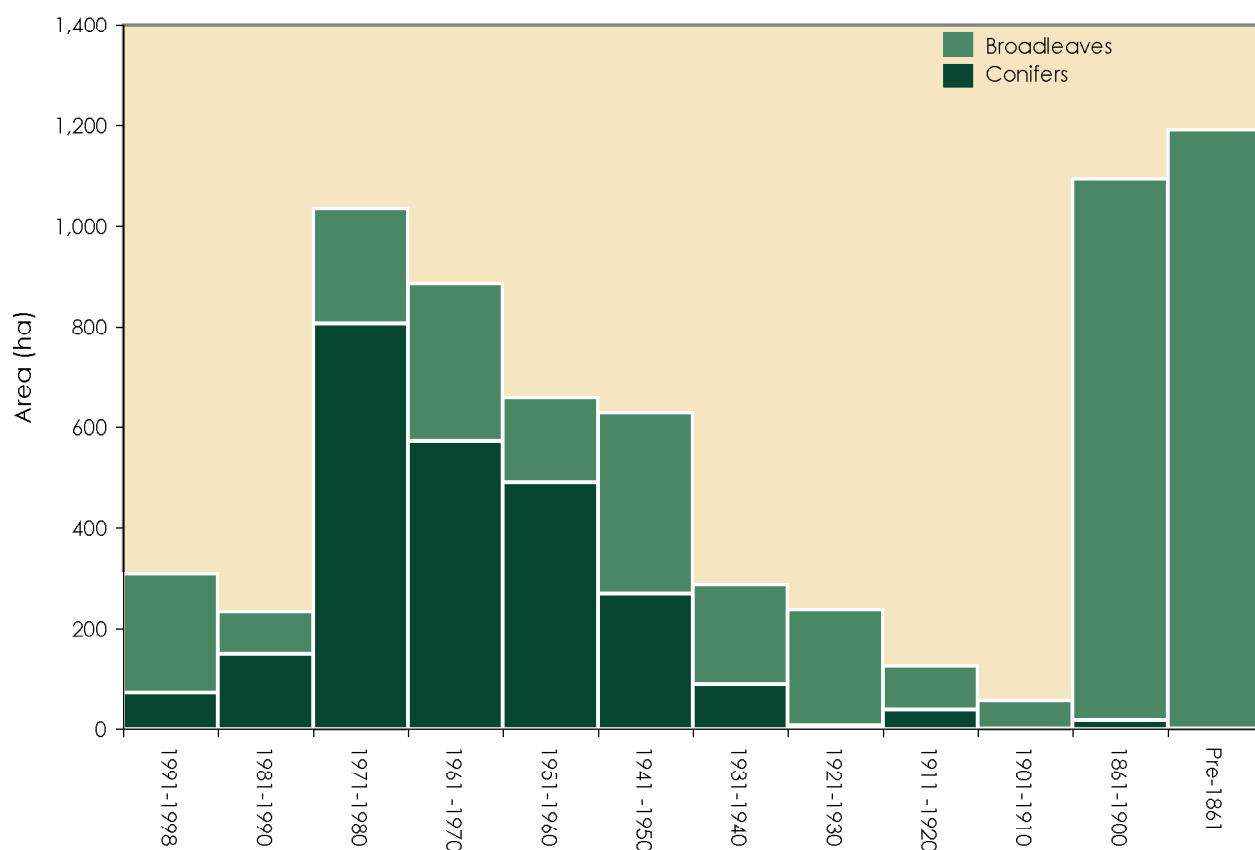
1. Most of the planting year classes cover 10 years, 1991-1998 is 8 years, and the classes prior to 1901 are 40 years or more.

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	6	333	211	156	70	26	0	0	0	0	0	801
Corsican pine	32	110	130	143	37	142	24	0	39	0	0	0	656
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	8	132	68	129	24	7	0	0	0	0	0	367
Norway spruce	8	0	20	8	33	0	6	0	0	0	0	0	75
European larch	0	0	0	0	10	12	27	6	0	0	0	0	55
Jap/Hybrid larch	6	27	191	143	122	21	0	0	0	0	0	0	510
Douglas fir	8	0	0	0	0	0	0	0	0	0	0	0	8
Other conifers	0	0	0	0	0	0	0	0	0	0	16	0	16
Mixed conifers	19	0	0	0	4	0	0	0	0	0	0	0	24
Total conifers	72	150	806	573	491	269	89	6	39	0	16	0	2,511
Oak	28	3	27	6	58	122	24	40	4	0	227	739	1,277
Beech	9	0	79	0	10	23	22	0	26	24	361	262	816
Sycamore	16	0	25	113	31	51	98	185	46	33	260	0	858
Ash	70	21	24	140	7	20	34	7	0	0	192	42	557
Birch	6	15	42	11	16	112	8	0	0	0	35	0	245
Poplar	9	0	4	13	29	0	0	0	0	0	0	0	56
Sweet chestnut	6	16	0	0	0	0	0	0	4	0	4	83	114
Elm	0	0	4	9	3	3	0	0	0	0	0	0	20
Other broadleaves	52	13	0	16	6	3	0	0	0	0	0	63	153
Mixed broadleaves	40	15	22	3	8	25	13	0	5	0	0	3	135
Total broadleaves	237	83	228	312	168	360	199	231	86	57	1,078	1,192	4,232
Total - all species	309	233	1,035	885	660	628	288	237	125	57	1,094	1,192	6,743

*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	Ash	21	Mixed broadleaves	18	Other broadleaves	15
1981-90	Corsican pine	40	Jap/Hybrid larch	10	Ash	9
1971-80	Scots pine	25	Jap/Hybrid larch	14	Corsican pine	11
1961-70	Corsican pine	21	Scots pine	16	Jap/Hybrid larch	15
1951-60	Oak	23	Scots pine	17	Jap/Hybrid larch	13
1941-50	Oak	25	Birch	21	Sycamore	19
1931-40	Other broadleaves	26	Sycamore	23	Ash	10
1921-30	Sycamore	48	Oak	40	Birch	5
1911-20	Sycamore	29	Corsican pine	21	Ash	17
1901-10	Sycamore	58	Beech	42	-	
1861-1900	Oak	31	Beech	29	Sycamore	19
Pre 1861	Oak	60	Beech	24	Sweet chestnut	6
All years	Oak	23	Sycamore	13	Beech	10

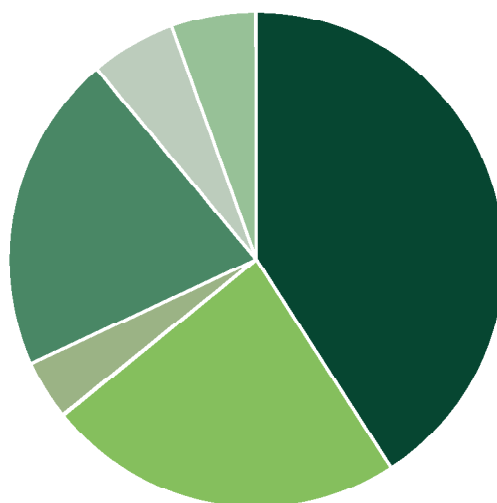
1. Principal species as a percentage of area in the planting year class.

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	4,609	40.8
Business	2,634	23.3
Forestry or timber business	0	0.0
Charity	457	4.0
Local Authority	2,327	20.6
Other public (not FC)	648	5.7
Forestry Commission	622	5.5
Community ownership or common land	0	0.0
Unidentified	0	0.0
Total	11,297	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	269	137	Area (ha)
Wide Linear Features	837	117	Area (ha)
Wide Linear Features	837	82	Length (Km)
Narrow Linear Features	5,900	435	Length (Km)
Narrow Linear Features	5,900	167,400	Number of live trees
Groups	70,700	311,100	Number of live trees
Individual Trees	122,300	122,300	Number of live trees

1. See Glossary for definitions of feature types.

Table 14 Woodland area by feature type and woodland size

Feature type	Woodland size (ha)		Total area (ha)	Number of features	Mean size (ha)
	0.1 - <0.25	0.25 - <2.0			
Small Woods	2	135	137	269	0.51
Wide Linear Features	117	0	117	837	0.14
Total	119	135	254	1,106	0.23

1. See Glossary for definitions of feature types.

Species	Feature type				Total live trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.8	0.0	5.8	20.1	26.7	37.7	4.4
Spruce	0.0	0.0	1.7	5.9	7.6	10.7	1.3
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.8	0.0	9.1	0.0	9.9	14.0	1.6
Other conifers	2.1	2.1	22.5	0.0	26.7	37.7	4.4
Total conifers	3.7	2.1	39.1	25.9	70.9	100.0	11.8
Oak	17.5	1.7	12.5	9.2	40.9	7.7	6.8
Beech	1.6	0.0	6.7	15.1	23.4	4.4	3.9
Sycamore	8.3	0.0	11.6	20.1	40.0	7.5	6.7
Ash	19.0	4.3	34.9	0.8	59.0	11.1	9.8
Birch	8.2	11.8	29.1	15.1	64.2	12.1	10.7
Poplar	0.0	0.0	23.3	0.0	23.3	4.4	3.9
Sweet chestnut	0.0	0.0	0.0	0.8	0.8	0.2	0.1
Horse chestnut	0.0	0.0	1.7	0.8	2.5	0.5	0.4
Alder	0.0	0.8	0.0	5.9	6.7	1.3	1.1
Lime	0.0	0.0	0.0	8.4	8.4	1.6	1.4
Elm	0.0	0.0	0.0	0.8	0.8	0.2	0.1
Willow	0.8	0.0	1.7	1.7	4.2	0.8	0.7
Other broadleaves	35.8	6.6	150.5	62.8	255.7	48.3	42.6
Total broadleaves	91.2	25.2	272.0	141.5	529.9	100.0	88.2
Total - all species	94.9	27.3	311.1	167.4	600.8		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	29%
Groups	52%
Narrow Linear Features	44%
- See Glossary for definitions of feature types.

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

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

1. See Glossary for definitions of feature types.

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

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	1.7	25.1	0.0	0.0	26.8
Spruce	1.7	5.9	0.0	0.0	7.6
Larch	0.0	0.0	0.0	0.0	0.0
Cypress	7.5	2.5	0.0	0.0	10.0
Other conifers	14.1	12.5	0.0	0.0	26.6
Total conifers	25.0	46.0	0.0	0.0	71.0
Oak	23.3	15.8	1.7	0.0	40.8
Beech	13.4	8.4	1.7	0.0	23.5
Sycamore	8.3	26.7	5.0	0.0	40.0
Ash	26.6	27.4	3.3	1.7	59.0
Birch	40.8	23.4	0.0	0.0	64.2
Poplar	7.5	15.8	0.0	0.0	23.3
Sweet chestnut	0.0	0.8	0.0	0.0	0.8
Horse chestnut	0.8	1.7	0.0	0.0	2.5
Alder	3.3	3.3	0.0	0.0	6.6
Lime	6.7	1.7	0.0	0.0	8.4
Elm	0.0	0.8	0.0	0.0	0.8
Willow	2.5	1.7	0.0	0.0	4.2
Other broadleaves	186.7	69.1	0.0	0.0	255.8
Total broadleaves	319.9	196.6	11.7	1.7	529.9
Total - all species	344.8	242.5	11.7	1.7	600.8

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	14
3-5	34
6-10	12
11-20	5
21-50	5
51-100	1
>100	0
Total	71

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

COMPARISON OF RESULTS WITH THE 1980 CENSUS AND PREVIOUS SURVEYS

Survey Method

The 1980 Census and 1998 Inventory were undertaken using very different sampling methods.

Inventory practice and technology have moved on since the 1980 Census; this has led to changes in sampling methodology, scope and woodland definitions. For example, the Main Woodland Survey used the digital woodland map, created from aerial photos as a basis for sampling whereas the 1980 Census relied only on the woodland shown on the 1:50,000 Ordnance Survey map. Also in contrast to the 1980 Census, the Survey of Small Woodland and Trees did not record information within developed land e.g. residential or industrial areas of 2 or more hectares.

Where possible adjustments have been made to both the 1980 Census and the Inventory to achieve the nearest available comparison. The apparent changes indicated in the following tables and charts should therefore be treated with caution, particularly where areas are small.

Table 19:	Comparison of woodland area between 1980 Census and 1998 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1998 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1998 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1998 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1998 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1998 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1998 Inventory

Woodland cover

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

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

Table 19 Comparison of woodland area between 1980 Census and 1998 Inventory

Woodland size (ha)	1980 Census woodland area		1998 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	9,557	91.9	11,297	98.8	18
0.25 - <2.0	840	8.1	135	1.2	-84
Total	10,397		11,432		10
% Woodland land cover	6.7		7.3		

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), 155,941 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 156,049ha, (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	479	832	74
Corsican pine	693	817	18
Lodgepole pine	112	7	-94
Sitka spruce	232	372	60
Norway spruce	24	75	218
European larch	97	55	-43
Jap/Hybrid larch	473	588	24
Douglas fir	5	8	69
Other conifers	16	19	18
Mixed conifers	123	39	-68
Total conifers	2,253	2,812	25
Oak	1,013	2,341	131
Beech	655	1,038	58
Sycamore	1,517	1,330	-12
Ash	365	735	101
Birch	1,644	809	-51
Poplar	76	73	-3
Sweet chestnut	113	139	23
Elm	203	54	-73
Other broadleaves	1,366	609	-55
Mixed broadleaves	407	236	-42
Total broadleaves	7,358	7,364	0
Total all species	9,612	10,176	6
Felled	204	503	147
Total High Forest	9,816	10,679	9

1. Differences in sampling methodology may account for some of the apparent differences.
2. In the 1980 Census the areas assigned to species included any associated open space such as roads and rides. In the Inventory open spaces are separately identified and the overall proportion is 5.6% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 5.6%.
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

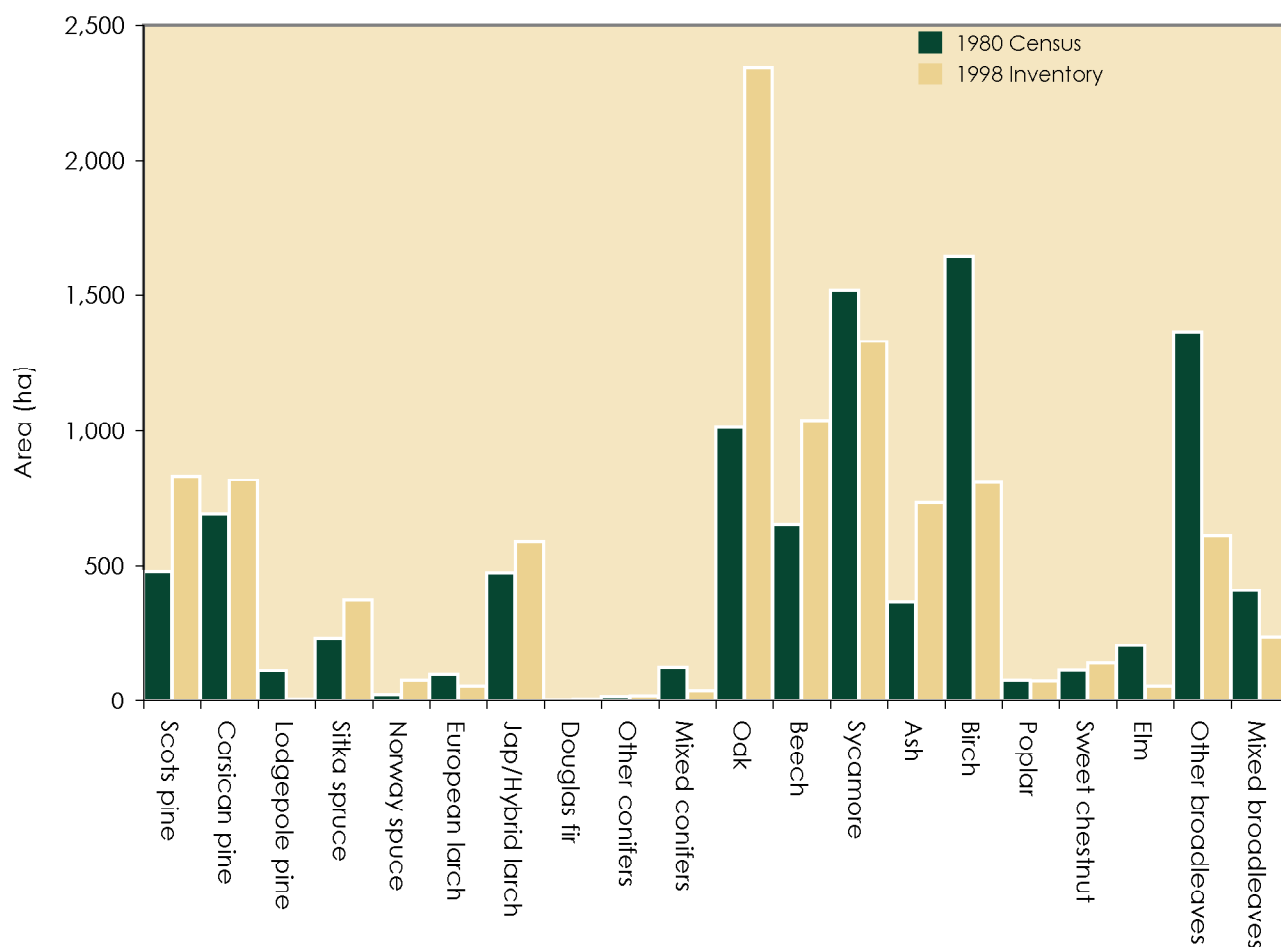


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1998 Inventory

Planting year class	1980 Census woodland area (ha)	1998 Inventory woodland area (ha)	Change (%)
1991-1998	0	334	see note
1981-1990	0	266	see note
1971-1980	401	1,089	171
1961-1970	1,415	1,084	-23
1951-1960	1,446	679	-53
1941-1950	488	748	53
1931-1940	715	288	-60
1921-1930	669	237	-65
1911-1920	683	157	-77
1901-1910	410	57	-86
1861-1900	935	1,097	17
Pre 1861	148	1,211	717
Total all years	7,310	7,247	-1

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.

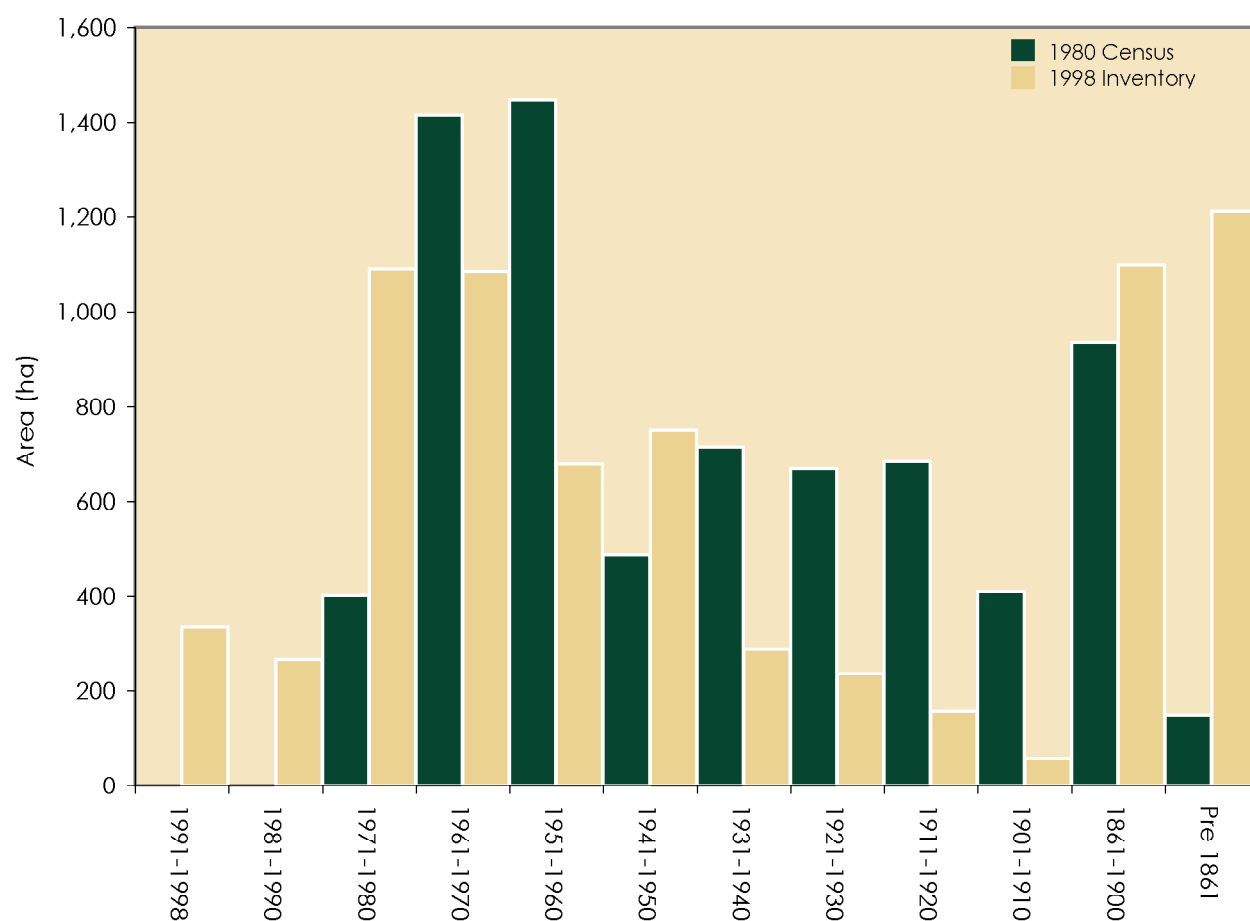
Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1998 Inventory

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

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

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

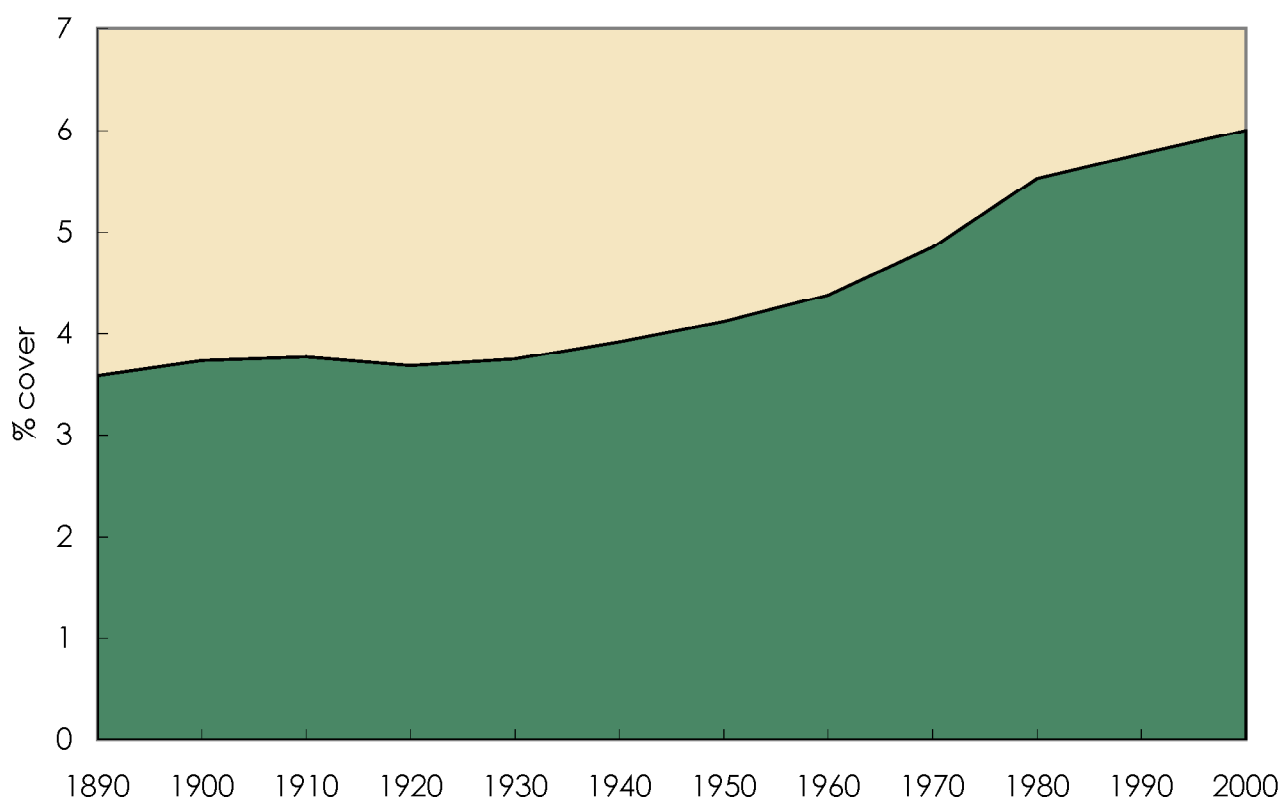
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WOODLAND COVER

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

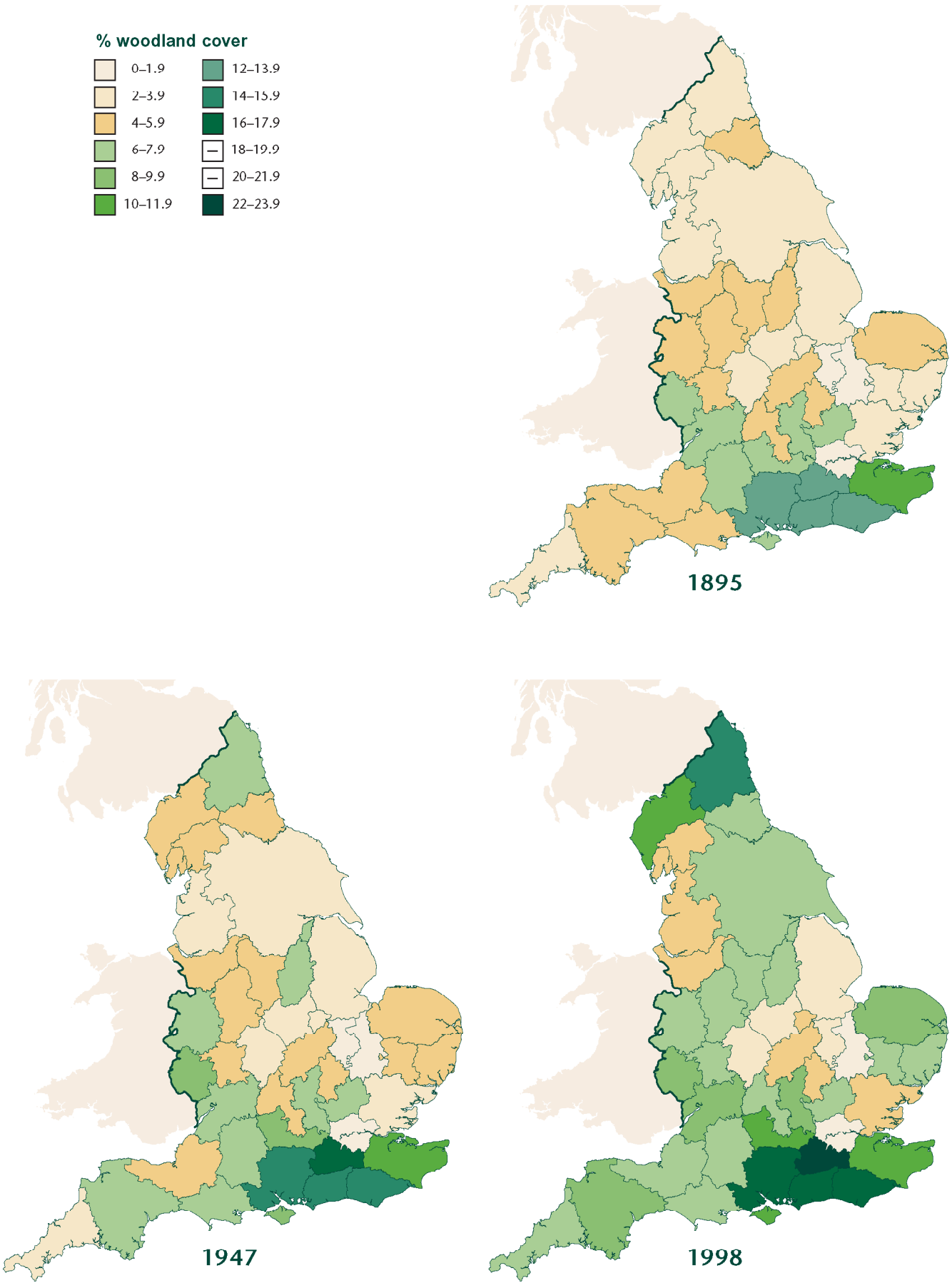
The maps use the old County structure data of England, as reported on in 1895 and 1947. The data from these counties could not be re-worked for different geographic areas. In contrast, the digital woodland map, which forms the basis of the current inventory, can be analysed for any geographic area.

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



1. Following local government reorganisation the boundaries of the county of the report have changed significantly since 1980 and therefore data from a wider geographic area have been used.

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



GLOSSARY

Woodland

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

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

Interpreted Forest Types

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

High Forest

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

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

Mixtures

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

Forest Types

- **Conifer**

Woodland containing more than 80% by area of coniferous species.
- **Broadleaved**

Woodland containing more than 80% by area of broadleaved species.
- **Mixed**

A combination of broadleaved and coniferous species where each category occupies at least 20% of the canopy (see note on mixtures above.)

- **Coppice**

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

- **Coppice with Standards**

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

- **Felled**

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

- **Windblow**

Areas of blown woodland which remain uncleared and not regenerated.

- **Open Space**

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

Ownership types

- **Other Ownership**

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

- **Personal**

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

- **Private forestry or timber business**

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

- **Other private business**

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

- **Local Authority**

Region, County, District or other Council

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

Government department/agency, nationalised industry, etc.

- **Charitable organisations**

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

- Community ownership or common land

the common property of all members of the community.

- **Forestry Commission**

Land owned by or land leased to the Forestry Commission

Feature types

- **Small Wood**

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

- **Group**

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

- **Individual Tree**

A tree the crown of which has no contact with any other tree crown and which is at least 2m tall. Two types of individual tree are recognised:

- Boundary Tree (an Individual Tree on any boundary)
- Middle Tree (an Individual Tree not on a boundary)

- **Linear Feature**

A feature with a length of 25 m or more, and one which is at least four times as long as it is broad. It can be up to 50m wide or as narrow as a single line of trees. Two types of Linear Features are recognised:

- Narrow Linear Features (with a width of 1.6 m or less)
- Wide Linear Features (with a width greater than 1.6 m)

NOTES



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