



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

WILTSHIRE



Forestry Commission

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Enquiries regarding this report should be directed to:

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

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

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

Preparation of the digital cartography for Wiltshire 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 Wiltshire 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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.

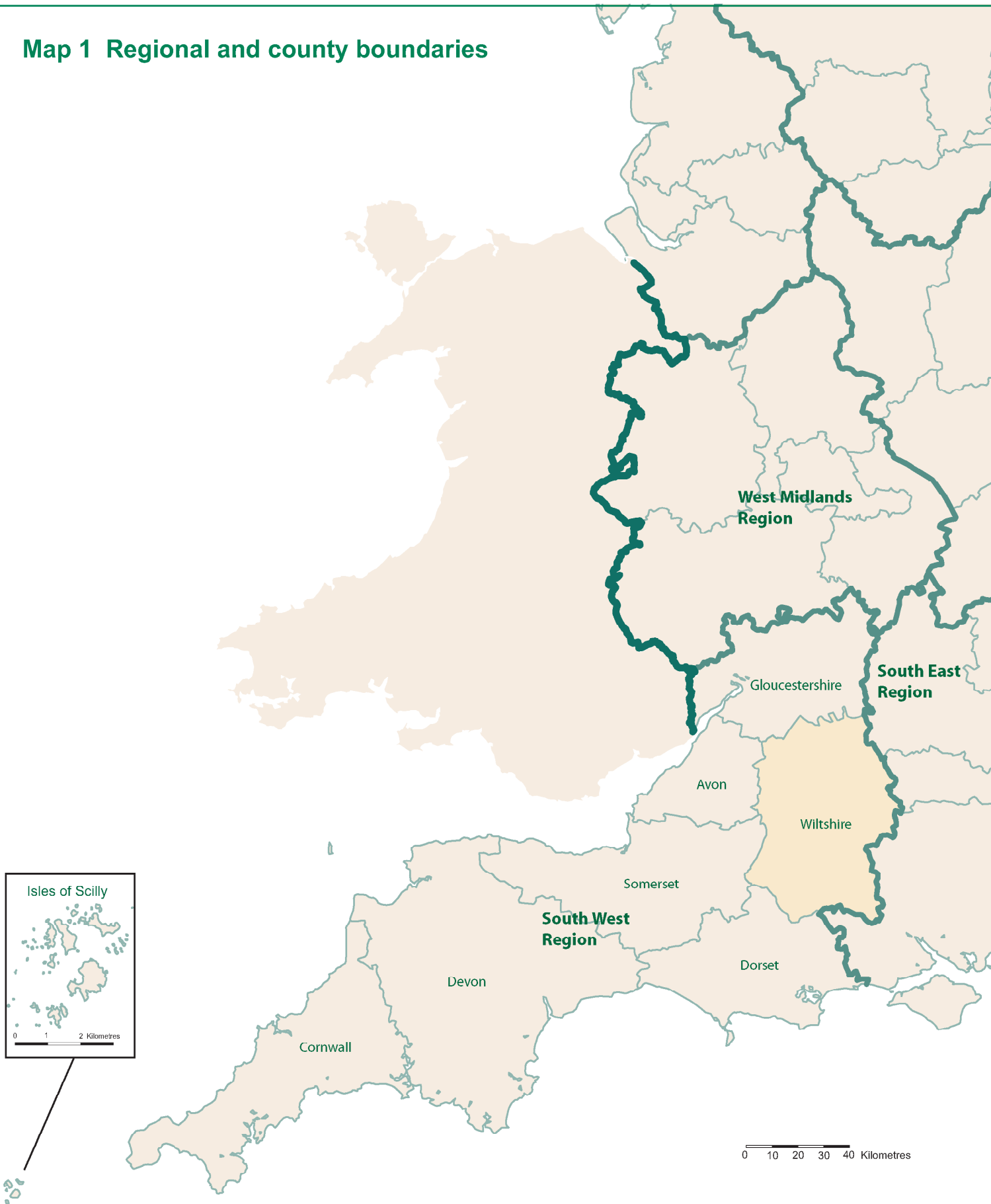
MAIN POINTS FROM THE SURVEY RESULTS

- The total area of woodland of 0.1 hectares and over in Wiltshire is 27,325 hectares. This represents 7.9% of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 55.5 % of all woodland. Conifer woodland represents 13.6 %, Mixed woodland 17.1 % and Open Space within woodlands 11.8 %. (Table 2)
- The main conifer species is larch covering 1,309 hectares or 22.4 % of all conifer species. The main broadleaved species is oak covering 4,561 hectares or 25.7 % of all broadleaved species. (Table 3)
- 3,725 hectares or 14 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 22,899 hectares or 86 % of woodland is in Other ownership. (Table 6)
- There are a total of 1,651 woods over 2 ha within Wiltshire with a mean wood area of 16.1 hectares. (Table 7a) There are a total of 1,882 woods from 0.1 - <2.0 hectares with a mean wood area of 0.37 hectares. (Table 14)
- There are 1.6 million live trees outside woodland in Wiltshire. (Table 15)
- Woodland land cover increased by over 2,300 hectares from 7.1 % to 7.8 % of the land area between 1980 and 1996. (Table 19)
- The area of broadleaves increased by 31 % between 1980 and 1996, with the relative proportion of broadleaves to conifers increasing from 65 % to 75 %. (Table 20)

INVENTORY REPORTS

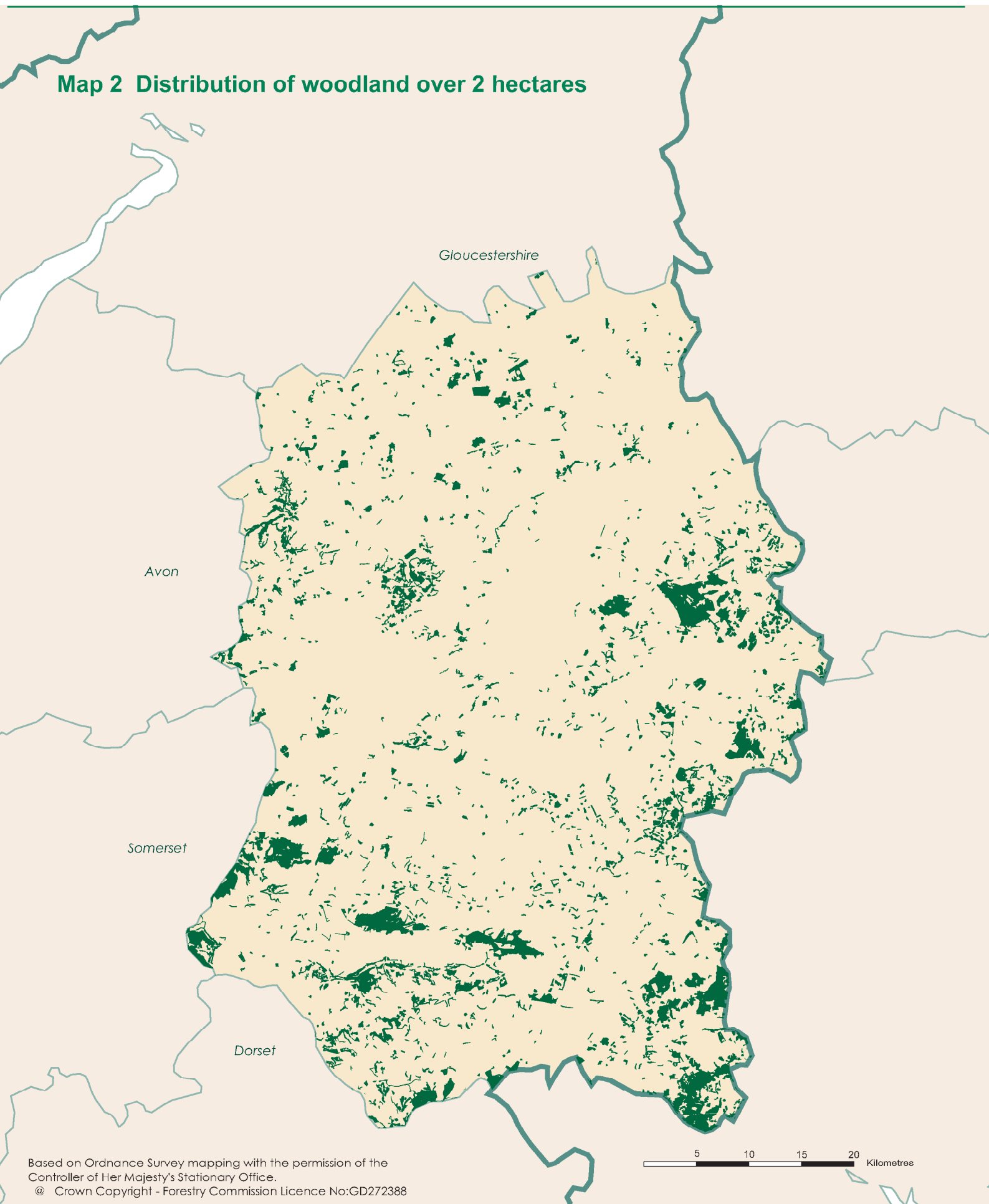
As well as this report for Wiltshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



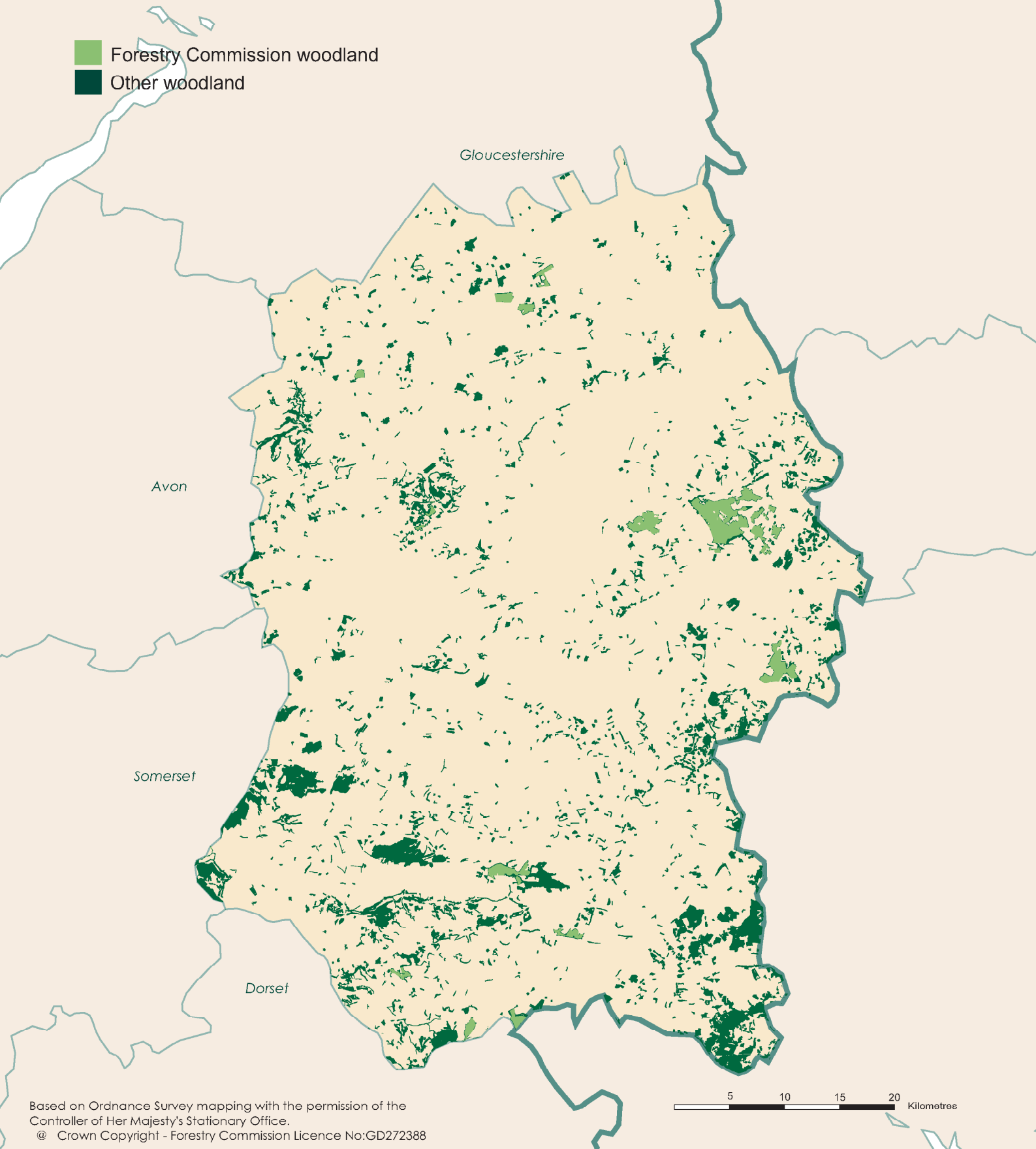
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Map 2 Distribution of woodland over 2 hectares



Map 3 Distribution of woodland over 2 hectares by ownership

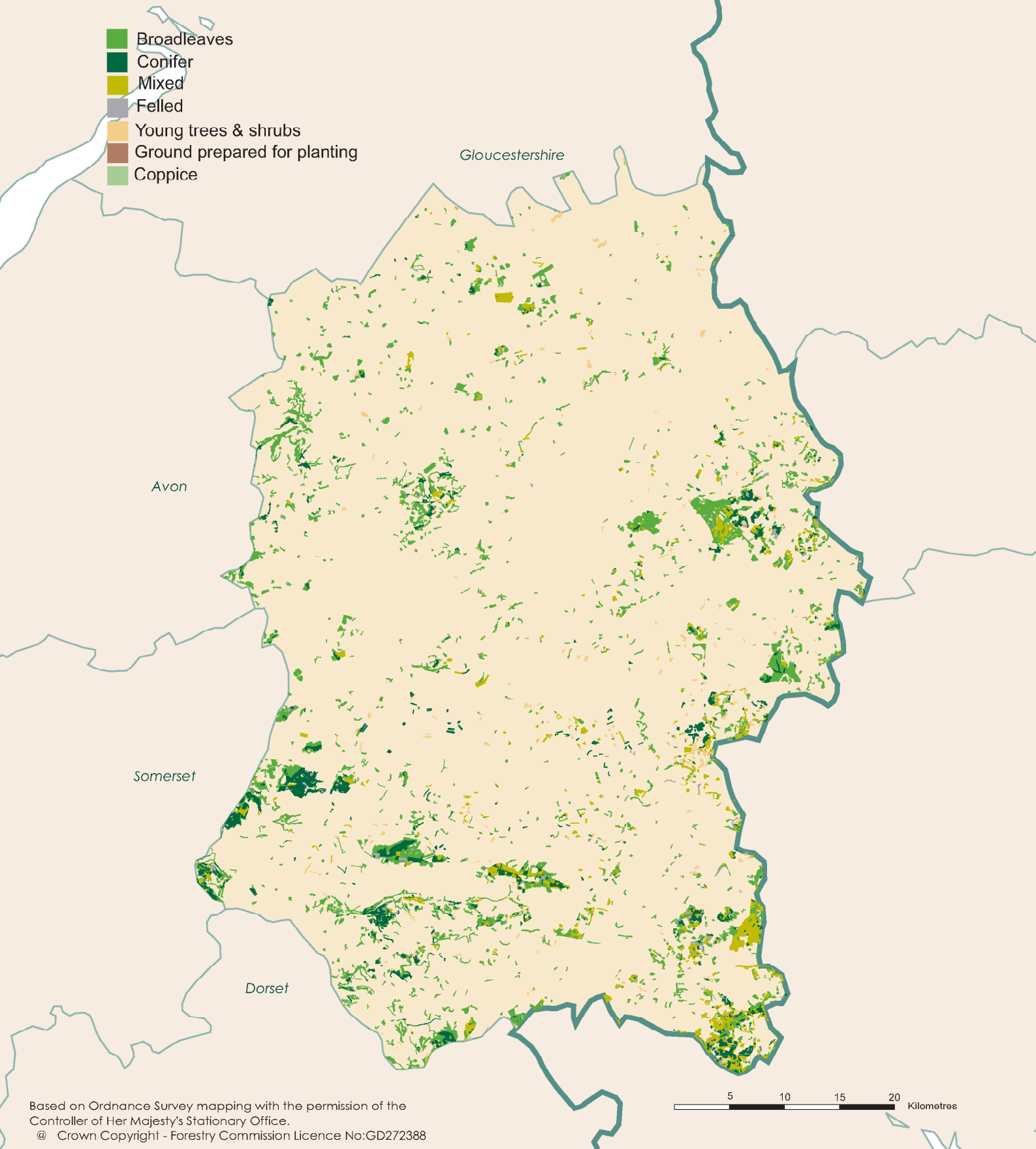
- Forestry Commission woodland
- Other woodland



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Reference Date 31 March 1996

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 Wiltshire.

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	26,624	97.4
0.25 - < 2.00	575	2.1
0.10 - < 0.25	126	0.5
Total area of woodland	27,325	100.0
% Woodland land cover	7.9	

1. Area of Wiltshire, including inland water, 347,605 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	3,724	5	3,729	13.6
Broadleaved	14,778	394	15,172	55.5
Mixed	4,371	298	4,669	17.1
Coppiced	119	0	119	0.4
Copp-w-standards	277	0	277	1.0
Windblow	0	0	0	0.0
Felled	135	0	135	0.5
Open Space	3,220	5	3,225	11.8
Total	26,624	702	27,326	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	1,201	57	1,258	21.5	5.3
Sitka spruce	15	0	15	0.3	0.1
Larch	1,259	50	1,309	22.4	5.6
Other conifers	3,138	25	3,163	54.1	13.4
Mixed conifers	100	0	100	1.7	0.4
Total conifers	5,713	132	5,845	100.0	24.8
Oak	4,505	56	4,561	25.7	19.4
Beech	2,466	187	2,653	15.0	11.3
Sycamore	1,355	86	1,441	8.1	6.1
Ash	3,934	61	3,995	22.5	16.9
Birch	1,072	0	1,072	6.0	4.5
Elm	153	25	178	1.0	0.8
Other broadleaves	2,285	140	2,425	13.7	10.3
Mixed broadleaves	1,392	10	1,402	7.9	5.9
Total broadleaves	17,160	565	17,725	100.0	75.2
Total all species***	22,873	697	23,570		100.0

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

**Species/group percentage of all species

***Excludes the 3,756 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	8%
Broadleaves	3%
Larch	20%
Oak	9%
Ash	8%
2. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).

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	11,500	109,600	10	32
Narrow Linear Features	16,600	1,361,600	82	392
Individual Trees	101,400	101,400	1	29
Total		1,572,600		452

1. Land area used to calculate tree density 347,605 ha 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	57%
Narrow Linear Features	42%
Individual Trees	25%
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	872	49	14
Narrow Linear Features	16,600	1,459	420
Total		1,508	434

1. Land area used to calculate tree density 347,605 ha based on digital boundaries used in 1991 Census of Population
2. The standard errors of the length estimates for these feature types are:

Wide Linear Features	98%
Narrow Linear Features	36%
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 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	1,279	5,376	20	4.2
10 - <20	177	2,464	9	13.9
20 - <50	113	3,426	13	30.3
50 - <100	46	3,096	12	67.3
<100	1,615	14,363	54	8.9
100 - <500	29	5,821	22	200.7
500 and >	7	6,441	24	920.1
All woods	1,651	26,624	100	16.1

Table 7b Size class distribution of woodland by ownership units

Size class (ha)	FC or Other	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	FC	7	26	0	3.7
	O	1,351	5,565	21	4.1
10 - <20	FC	1	14	0	13.8
	O	176	2,453	9	13.9
20 - <50	FC	5	149	1	29.8
	O	113	3,403	13	30.1
50 - <100	FC	6	473	2	78.8
	O	44	2,958	11	67.2
<100	FC	19	662	2	34.8
	O	1,684	14,380	54	8.5
100 - <500	FC	9	1,909	7	212.2
	O	21	4,397	17	209.4
500 and >	FC	1	1,154	4	1154.2
	O	5	4,122	15	824.3
Total	FC	29	3,725	14	128.4
	O	1,710	22,899	86	13.4

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 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	642	17.2	3,082	13.5	3,724	14.0
Broadleaved	1,757	47.2	13,021	56.9	14,778	55.5
Mixed	522	14.0	3,849	16.8	4,371	16.4
Coppice	0	0.0	119	0.5	119	0.4
Copp-w-Stds	0	0.0	277	1.2	277	1.0
Windblow	0	0.0	0	0.0	0	0.0
Felled	79	2.1	56	0.2	135	0.5
Open Space	725	19.5	2,496	10.9	3,220	12.1
Total	3,725	100.0	22,899	100.0	26,624	100.0

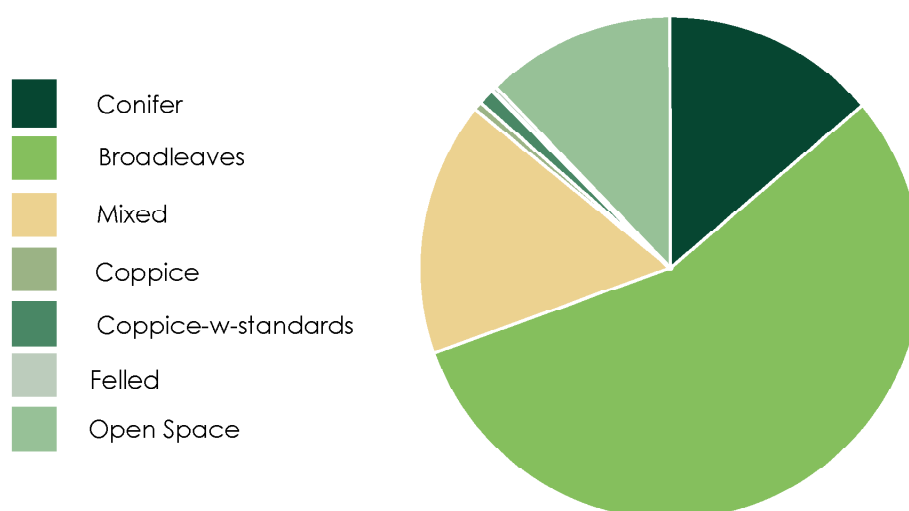
Area of woodland by forest type

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	4	0	0	1,005	21	5	1,009	18	4
Corsican pine	43	4	1	149	3	1	192	3	1
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	15	0	0	15	0	0
Norway spruce	317	33	11	620	13	3	937	16	4
European larch	8	1	0	787	17	4	795	14	3
Jap/Hybrid larch	186	19	6	279	6	1	464	8	2
Douglas fir	358	37	12	843	18	4	1,201	21	5
Other conifers	59	6	2	940	20	5	1,000	18	4
Mixed conifers	0	0	0	100	2	1	100	2	0
Total conifers	975	100	33	4,738	100	24	5,713	100	25
Oak	643	33	22	3,862	25	19	4,505	26	20
Beech	387	20	13	2,079	14	10	2,466	14	11
Sycamore	213	11	7	1,141	7	6	1,355	8	6
Ash	436	22	15	3,498	23	18	3,934	23	17
Birch	190	10	7	882	6	4	1,072	6	5
Poplar	45	2	2	487	3	2	532	3	2
Sweet chestnut	8	0	0	228	1	1	236	1	1
Elm	0	0	0	153	1	1	153	1	1
Other broadleaves	16	1	1	1,501	10	8	1,517	9	7
Mixed broadleaves	9	0	0	1,383	9	7	1,392	8	6
Total broadleaves	1,946	100	67	15,214	100	76	17,160	100	75
Total - all species	2,921		100	19,952		100	22,873		100
Felled	79			56			135		
Total High Forest	3,000			20,008			23,008		

*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 3,220 ha of other areas integral to the woodland not stocked with tree species.
2. The standard errors of the all ownerships area estimates for the most common species or species groups are as follows;

Conifers	8%
Broadleaves	3%
Douglas fir	20%
Oak	7%
Ash	8%
3. Mixtures: where possible the species in mixtures have been separately recorded. Where this has not been possible they were described as 'Mixed conifers' or 'Mixed broadleaves'.
4. Confidence Intervals: where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).

Area of High Forest by principal species and ownership

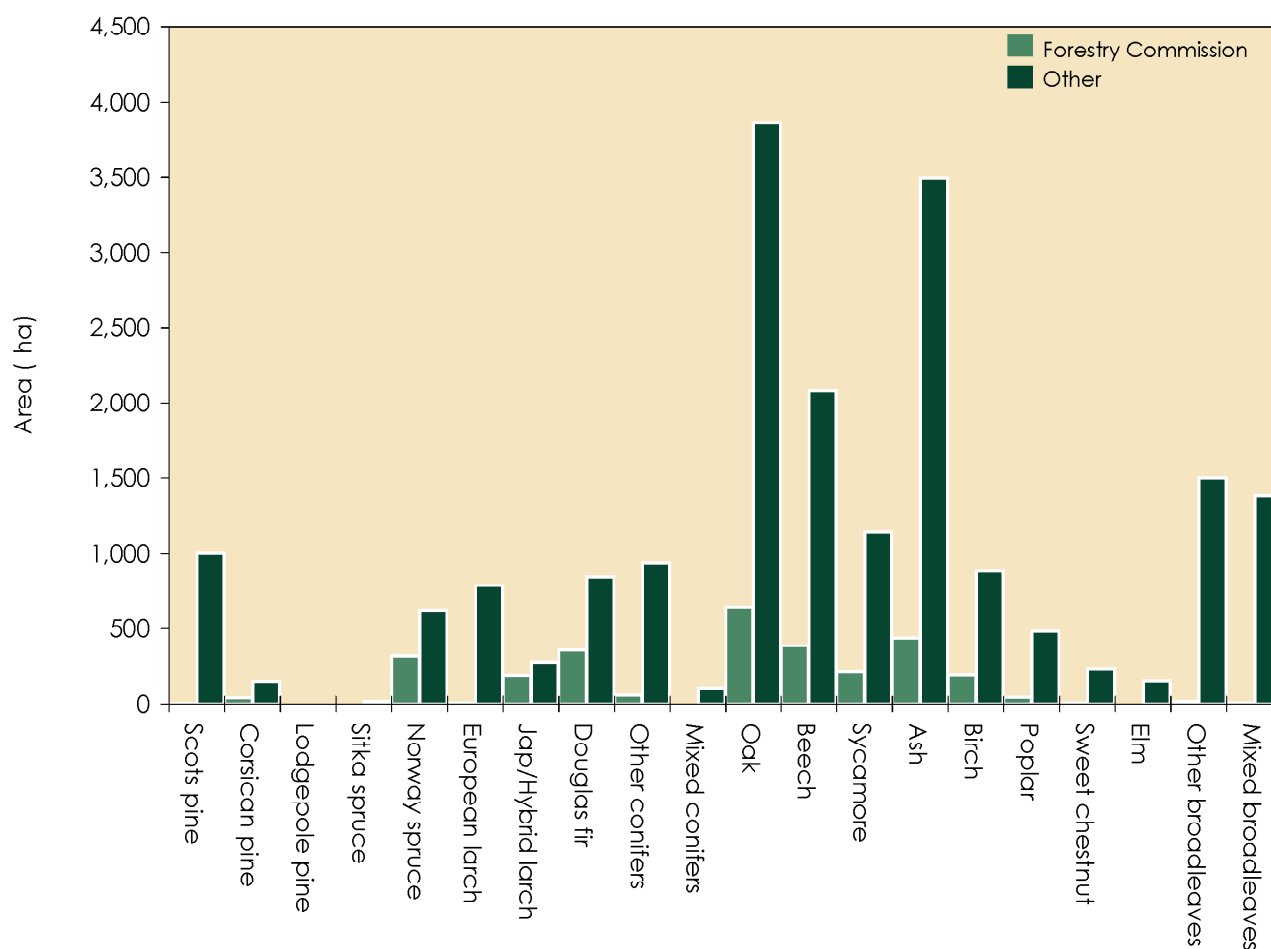


Table 9b Area of High Forest by principal species,ownership and category

Species	Forestry Commission			Other			All ownerships		
	cat. 1	cat. 2	Total (ha)	cat. 1	cat. 2	Total (ha)	cat. 1	cat. 2	Total (ha)
Scots pine	4	0	4	1,005	0	1,005	1,009	0	1,009
Corsican pine	43	0	43	149	0	149	192	0	192
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	15	0	15	15	0	15
Norway spruce	317	0	317	620	0	620	937	0	937
European larch	8	0	8	787	0	787	795	0	795
Jap/Hybrid larch	186	0	186	274	5	279	460	5	464
Douglas fir	358	0	358	843	0	843	1,201	0	1,201
Other conifers	59	0	59	882	58	940	941	58	1,000
Mixed conifers	0	0	0	81	19	100	81	19	100
Total conifers	975	0	975	4,655	83	4,738	5,630	83	5,713
Oak	643	0	643	3,698	164	3,862	4,341	164	4,505
Beech	387	0	387	2,053	26	2,079	2,440	26	2,466
Sycamore	209	4	213	1,015	126	1,141	1,224	130	1,355
Ash	436	0	436	3,328	170	3,498	3,764	170	3,934
Birch	190	0	190	743	139	882	933	139	1,072
Poplar	45	0	45	487	0	487	532	0	532
Sweet chestnut	8	0	8	228	0	228	236	0	236
Elm	0	0	0	56	96	153	56	96	153
Other broadleaves	12	4	16	923	578	1,501	935	582	1,517
Mixed broadleaves	0	9	9	804	579	1,383	804	588	1,392
Total broadleaves	1,929	17	1,946	13,335	1,879	15,214	15,265	1,895	17,160
Total - all species	2,905	17	2,921	17,990	1,961	19,952	20,895	1,978	22,873

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

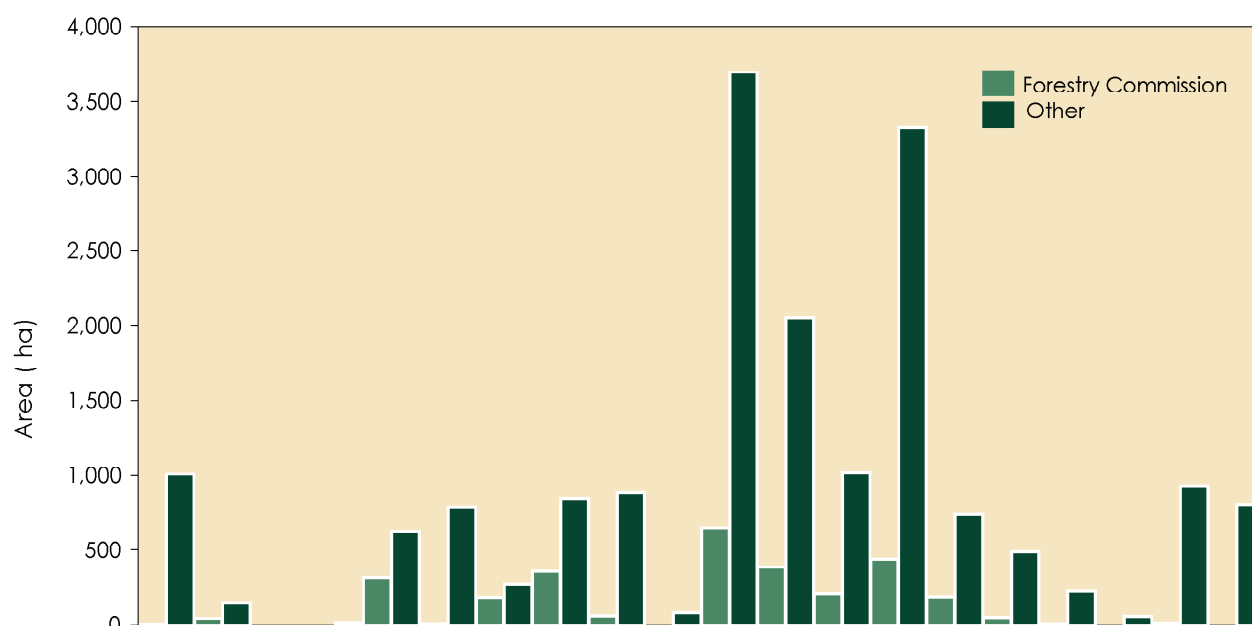
	Category 1*	Category 2*	Total High Forest
Conifers	7%	64%	8%
Broadleaves	4%	10%	3%
Douglas fir	20%	-	20%
Oak	9%	37%	9%
Ash	9%	34%	8%

*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

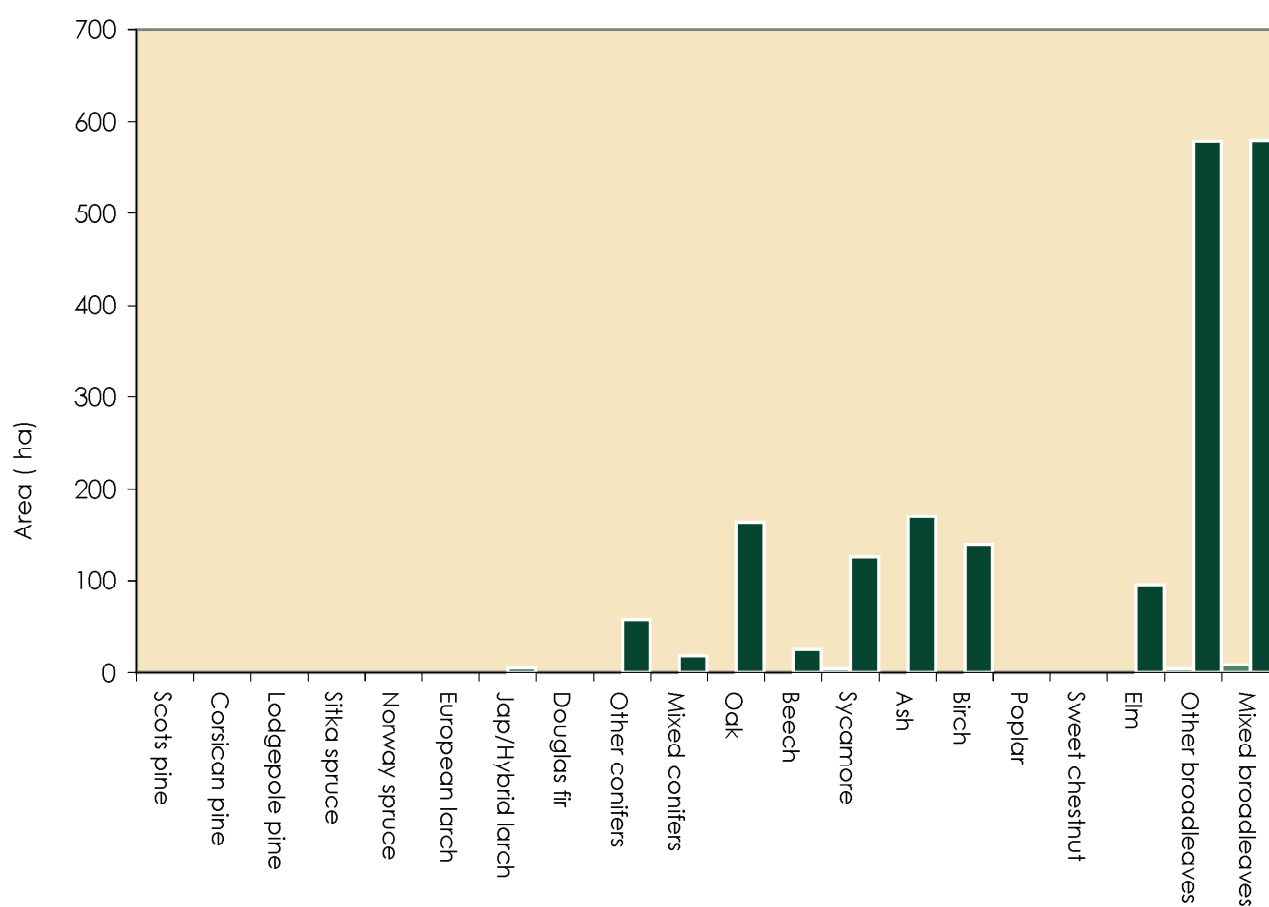
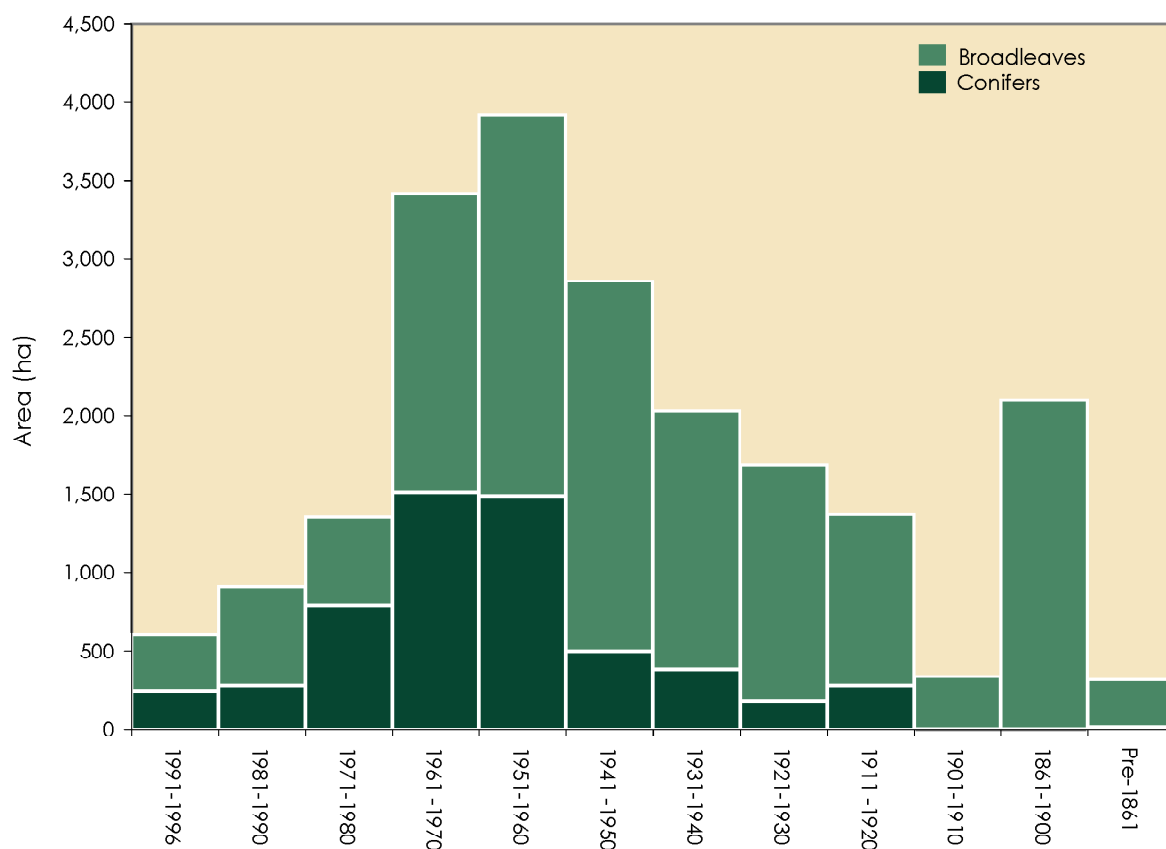


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1996	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	49	150	191	136	99	111	63	211	0	0	0	1,009
Corsican pine	0	49	83	0	29	20	0	0	11	0	0	0	192
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	5	0	0	10	0	0	0	0	0	0	0	15
Norway spruce	79	14	140	266	382	14	0	39	5	0	0	0	937
European larch	0	57	77	175	331	107	44	0	4	0	0	0	795
Jap/Hybrid larch	0	0	16	37	184	79	129	0	15	0	0	0	460
Douglas fir	13	29	152	533	237	140	50	43	5	0	0	0	1,201
Other conifers	112	73	156	309	171	36	38	23	23	0	0	0	941
Mixed conifers	39	0	11	0	4	0	10	7	0	0	0	11	81
Total conifers	242	275	784	1,510	1,485	495	380	175	273	0	0	11	5,630
Oak	86	41	115	43	568	398	326	489	487	90	1,597	100	4,341
Beech	32	128	43	443	412	306	215	172	280	71	191	147	2,440
Sycamore	40	41	122	251	314	276	45	80	45	11	0	0	1,224
Ash	77	158	190	626	598	645	553	285	222	121	249	39	3,764
Birch	34	135	21	233	226	141	142	0	0	0	0	0	933
Poplar	28	0	28	182	123	95	29	47	0	0	0	0	532
Sweet chestnut	0	0	0	0	4	19	160	0	0	25	27	0	236
Elm	0	5	13	0	0	39	0	0	0	0	0	0	56
Other broadleaves	39	53	24	113	162	197	88	144	67	11	19	19	935
Mixed broadleaves	24	69	17	18	27	246	93	289	0	4	17	0	804
Total broadleaves	361	630	572	1,909	2,434	2,363	1,651	1,507	1,101	333	2,099	305	15,265
Total - all species	603	905	1,355	3,419	3,919	2,858	2,031	1,682	1,374	333	2,099	316	20,895

*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

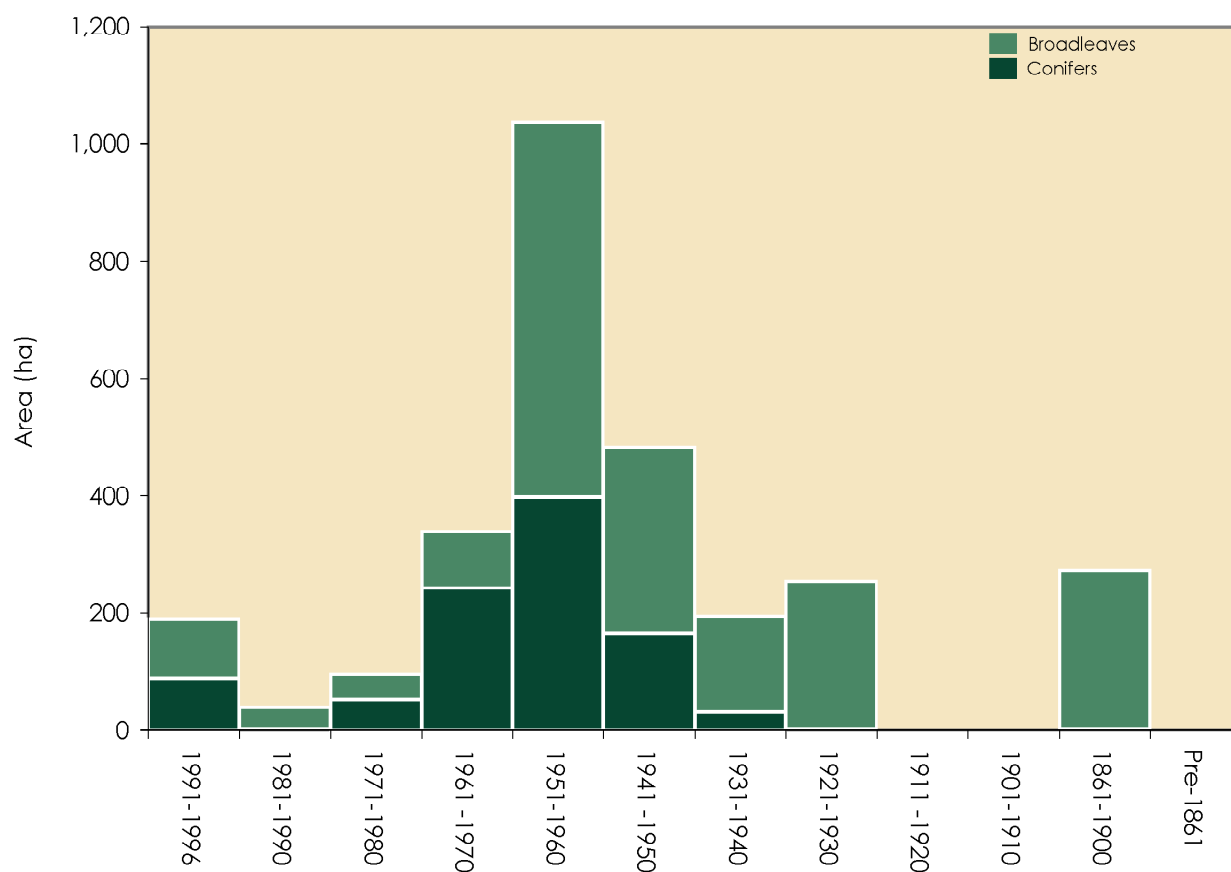


1. Most of the planting year classes cover 10 years, 1991-1996 is 6 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1996	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	0	0	4	0	0	0	0	0	0	4
Corsican pine	0	0	43	0	0	0	0	0	0	0	0	0	43
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	79	0	9	57	173	0	0	0	0	0	0	0	317
European larch	0	0	0	0	4	4	0	0	0	0	0	0	8
Jap/Hybrid larch	0	0	0	8	67	79	32	0	0	0	0	0	186
Douglas fir	8	0	0	174	98	78	0	0	0	0	0	0	358
Other conifers	0	0	0	4	55	0	0	0	0	0	0	0	59
Mixed conifers	0	0	0	0	0	0	0	0	0	0	0	0	0
Total conifers	87	0	52	242	397	165	32	0	0	0	0	0	0
Oak	59	4	12	0	67	83	55	170	0	0	193	0	643
Beech	8	4	12	0	150	138	51	4	0	0	20	0	387
Sycamore	16	0	4	28	142	20	0	0	0	0	0	0	209
Ash	0	0	8	66	154	78	36	43	0	0	51	0	436
Birch	20	32	8	4	115	0	12	0	0	0	0	0	190
Poplar	0	0	0	0	8	0	0	37	0	0	0	0	45
Sweet chestnut	0	0	0	0	4	0	4	0	0	0	0	0	8
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Other broadleaves	0	0	0	0	0	0	4	0	0	0	8	0	12
Mixed broadleaves	0	0	0	0	0	0	0	0	0	0	0	0	0
Total broadleaves	103	39	43	97	640	319	162	254	0	0	272	0	1,929
Total - all species	190	39	96	340	1,037	484	193	254	0	0	272	0	2,905

*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

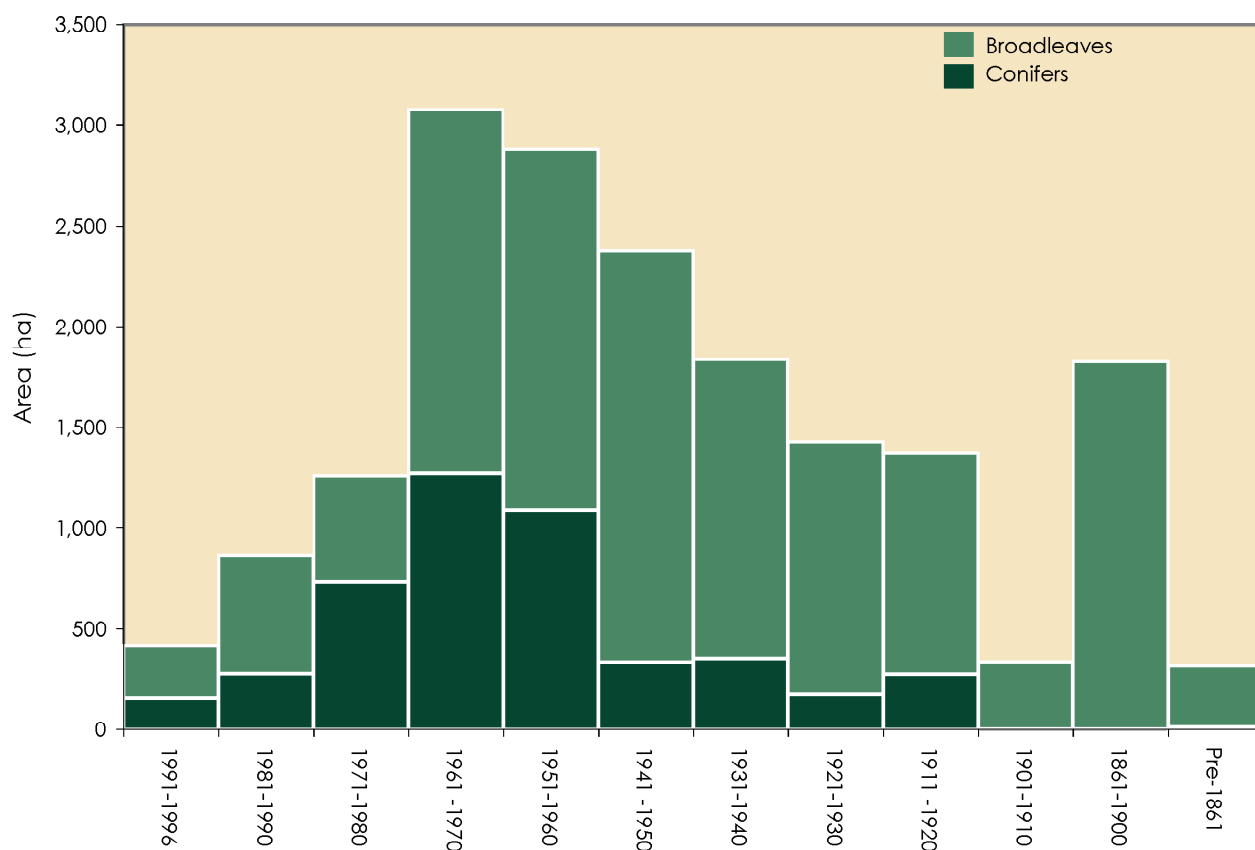
1. Most of the planting year classes cover 10 years, 1991-1996 is 6 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1996	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	49	150	191	136	95	111	63	211	0	0	0	1,005
Corsican pine	0	49	40	0	29	20	0	0	11	0	0	0	149
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Silka spruce	0	5	0	0	10	0	0	0	0	0	0	0	15
Norway spruce	0	14	131	209	209	14	0	39	5	0	0	0	620
European larch	0	57	77	175	327	103	44	0	4	0	0	0	787
Jap/Hybrid larch	0	0	16	29	117	0	97	0	15	0	0	0	274
Douglas fir	5	29	152	359	139	62	50	43	5	0	0	0	843
Other conifers	112	73	156	305	116	36	38	23	23	0	0	0	882
Mixed conifers	39	0	11	0	4	0	10	7	0	0	0	11	81
Total conifers	155	275	731	1,268	1,088	330	349	175	273	0	0	11	4,655
Oak	27	37	103	43	501	315	271	320	487	90	1,405	100	3,698
Beech	24	124	31	443	262	168	163	168	280	71	171	147	2,053
Sycamore	24	41	119	223	172	256	45	80	45	11	0	0	1,015
Ash	77	158	182	561	444	567	518	242	222	121	197	39	3,328
Birch	15	103	14	229	112	141	130	0	0	0	0	0	743
Poplar	28	0	28	182	115	95	29	10	0	0	0	0	487
Sweet chestnut	0	0	0	0	0	19	156	0	0	25	27	0	228
Elm	0	5	13	0	0	39	0	0	0	0	0	0	56
Other broadleaves	39	53	24	113	162	197	84	144	67	11	11	19	923
Mixed broadleaves	24	69	17	18	27	246	93	289	0	4	17	0	804
Total broadleaves	258	591	528	1,812	1,794	2,044	1,489	1,253	1,101	333	1,827	305	13,335
Total - all species	414	866	1,260	3,079	2,882	2,374	1,838	1,428	1,374	333	1,827	316	17,990

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

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



1. Most of the planting year classes cover 10 years, 1991-1996 is 6 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	%
1991-96	Other conifers	18	Oak	14	Norway spruce	13
1981-90	Mixed broadleaves	18	Ash	14	Birch	12
1971-80	Mixed broadleaves	14	Ash	10	Sycamore	9
1961-70	Ash	16	Douglas fir	14	Beech	12
1951-60	Ash	14	Oak	14	Beech	10
1941-50	Ash	22	Oak	14	Sycamore	10
1931-40	Ash	26	Oak	16	Beech	10
1921-30	Oak	31	Ash	22	Mixed broadleaves	15
1911-20	Oak	36	Beech	20	Ash	16
1901-10	Ash	35	Oak	30	Beech	20
1861-1900	Oak	75	Ash	12	Beech	9
Pre 1861	Beech	42	Oak	25	Ash	10
All years	Oak	20	Ash	17	Beech	11

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

Table 6 Summary of woodland area by ownership

Ownership	ha	% woodland
Forestry Commission	3,725	14
Other	22,899	86
Total area of woodland	26,624	100

1. Woodland area from aerial photographic interpretation map updated to 31 March 1996
2. See Glossary for definitions of ownership types

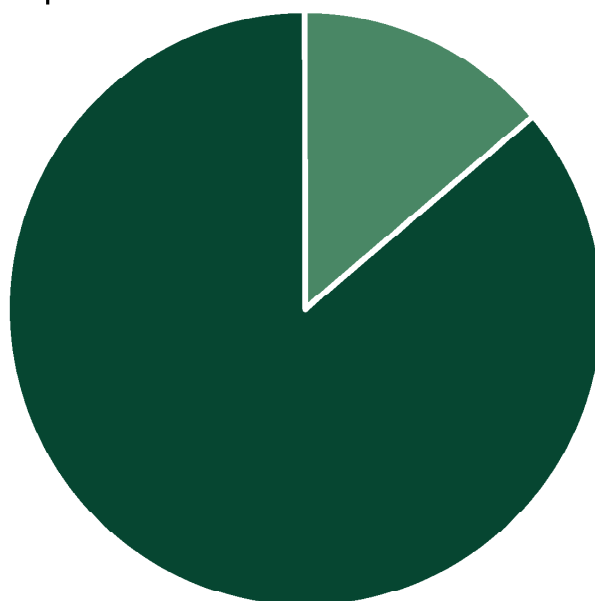
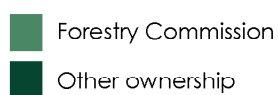
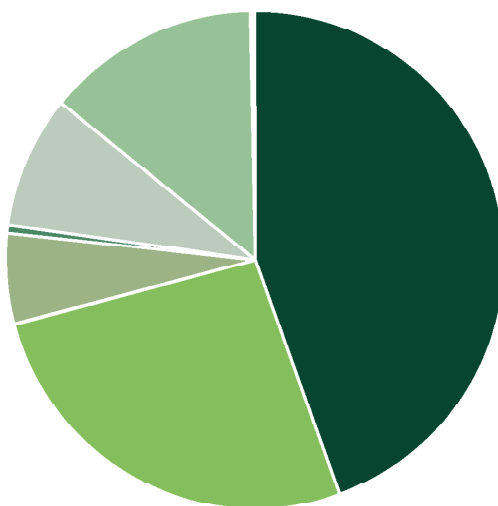
Woodland area by ownership

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	11,841	44.5
Business	6,983	26.2
Forestry or timber business	0	0.0
Charity	1,611	6.1
Local Authority	136	0.5
Other public (not FC)	2,276	8.5
Forestry Commission	3,725	14.0
Community ownership or common land	0	0.0
Unidentified	51	0.2
Total	26,624	100.0

* This table is produced from data contributed on a voluntary basis by owners or their representatives.

Ownership type by area



RESULTS FROM THE SURVEY OF SMALL WOODLAND AND TREES (SSWT)

Survey Method

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

Table 13:	Summary of information from the Survey of Small Woodland and Trees
Table 14:	Woodland area by feature type and woodland size
Table 15:	Numbers of live trees outside woodland by species and feature type
Table 16 :	Numbers of dead trees outside woodland by species and feature type
Table 17:	Numbers of live trees outside woodland by species and height band
Table 18:	Numbers of Groups by group size

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

Table 13 Summary of information from the Survey of Small Woodlands and Trees

Feature type	Number of features	Total	Unit
Small Woods	1,010	606	Area (ha)
Wide Linear Features	872	96	Area (ha)
Wide Linear Features	872	49	Length (Km)
Narrow Linear Features	16,600	1,459	Length (Km)
Narrow Linear Features	16,600	1,361,600	Number of live trees
Groups	11,500	109,600	Number of live trees
Individual Trees	101,400	101,400	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	30	575	606	1,010	0.60
Wide Linear Features	96	0	96	872	0.11
Total	126	575	702	1,882	0.37

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	0.0	0.0	18.0	54.1	72.1	95.6	4.6
Spruce	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Larch	0.0	0.0	0.0	1.7	1.7	2.3	0.1
Cypress	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other conifers	1.6	0.0	0.0	0.0	1.6	2.1	0.1
Total conifers	1.6	0.0	18.0	55.8	75.4	100.0	4.8
Oak	27.0	9.0	11.5	73.3	120.8	8.1	7.7
Beech	0.8	7.4	3.3	0.9	12.4	0.8	0.8
Sycamore	2.5	1.6	3.3	14.8	22.2	1.5	1.4
Ash	13.9	1.6	9.0	171.8	196.3	13.1	12.5
Birch	3.3	0.0	0.0	2.6	5.9	0.4	0.4
Poplar	0.8	0.0	0.0	0.0	0.8	0.1	0.1
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.8	0.0	0.0	0.8	0.1	0.1
Alder	0.8	0.0	0.0	4.4	5.2	0.3	0.3
Lime	0.0	0.8	0.0	0.0	0.8	0.1	0.1
Elm	2.5	0.0	0.0	40.1	42.6	2.8	2.7
Willow	4.1	0.0	27.0	60.2	91.3	6.1	5.8
Other broadleaves	18.0	4.9	37.6	937.7	998.2	66.7	63.5
Total broadleaves	73.6	26.2	91.6	1305.8	1497.3	100.0	95.2
Total - all species	75.2	26.2	109.6	1361.6	1572.6		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	25%
Groups	57%
Narrow Linear Features	42%
- See Glossary for definitions of feature types.

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

Species	Feature type				Total dead trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spruce	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oak	0.8	0.0	0.0	0.0	0.8	5.4	5.4
Beech	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sycamore	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Birch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poplar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alder	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	0.0	0.0	0.0	6.1	6.1	41.2	41.2
Willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other broadleaves	0.0	0.0	0.0	7.9	7.9	53.4	53.4
Total broadleaves	0.8	0.0	0.0	14.0	14.8	100.0	100.0
Total - all species	0.8	0.0	0.0	14.0	14.8		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	8.2	33.0	3.5	27.4	72.1
Spruce	0.0	0.0	0.0	0.0	0.0
Larch	0.0	1.7	0.0	0.0	1.7
Cypress	0.0	0.0	0.0	0.0	0.0
Other conifers	0.0	0.0	1.6	0.0	1.6
Total conifers	8.2	34.7	5.1	27.4	75.4
Oak	11.5	78.8	25.5	4.9	120.7
Beech	8.2	3.3	0.9	0.0	12.4
Sycamore	8.7	11.8	1.6	0.0	22.1
Ash	19.7	156.3	13.4	7.0	196.4
Birch	3.3	2.6	0.0	0.0	5.9
Poplar	0.0	0.8	0.0	0.0	0.8
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.8	0.0	0.0	0.0	0.8
Alder	0.0	5.2	0.0	0.0	5.2
Lime	0.0	0.0	0.8	0.0	0.8
Elm	2.5	12.2	27.9	0.0	42.6
Willow	60.2	29.4	1.6	0.0	91.2
Other broadleaves	892.7	105.5	0.0	0.0	998.2
Total broadleaves	1,007.6	405.9	71.7	11.9	1,497.1
Total - all species	1,015.8	440.7	76.9	39.3	1,572.6

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	2
3-5	4
6-10	2
11-20	1
21-50	2
51-100	1
>100	0
Total	12

*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 1996 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 1996 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1996 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1996 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1996 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1996 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1996 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1996 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 1996 Inventory

Woodland size (ha)	1980 Census woodland area		1996 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	23,091	93.0	26,624	97.9	15
0.25 - <2.0	1,748	7.0	575	2.1	-67
Total	24,839		27,199		10
% Woodland land cover	7.1		7.8		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1996 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1996 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1996), 347,605 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 348,070ha, (Ordnance Survey data)

Table 20 Comparison of High Forest area by species between 1980 Census and 1996 Inventory

Species	1980 Census woodland area (ha)	1996 Inventory woodland area (ha)	Change (%)
Scots pine	1,326	1,014	-24
Corsican pine	206	192	-7
Lodgepole pine	4	0	-100
Sitka spruce	206	15	-93
Norway spruce	1,356	937	-31
European larch	413	795	93
Jap/Hybrid larch	1,400	514	-63
Douglas fir	1,272	1,201	-6
Other conifers	778	1,025	32
Mixed conifers	383	100	-74
Total conifers	7,342	5,793	-21
Oak	4,047	4,561	13
Beech	2,761	2,653	-4
Sycamore	589	1,436	144
Ash	2,462	3,974	61
Birch	932	1,072	15
Poplar	436	532	22
Sweet chestnut	138	236	70
Elm	3	178	6627
Other broadleaves	898	1,608	79
Mixed broadleaves	1,192	1,402	18
Total broadleaves	13,457	17,652	31
Total all species	20,800	23,445	13
Felled	595	135	-77
Total High Forest	21,395	23,580	10

1. Differences in sampling methodology may account for some of the apparent differences.
2. In the 1980 Census the areas assigned to species included any associated open space such as roads and rides. In the Inventory open spaces are separately identified and the overall proportion is 11.8% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 11.8%.
3. The above figures from the 1996 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1996 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 1996 Inventory

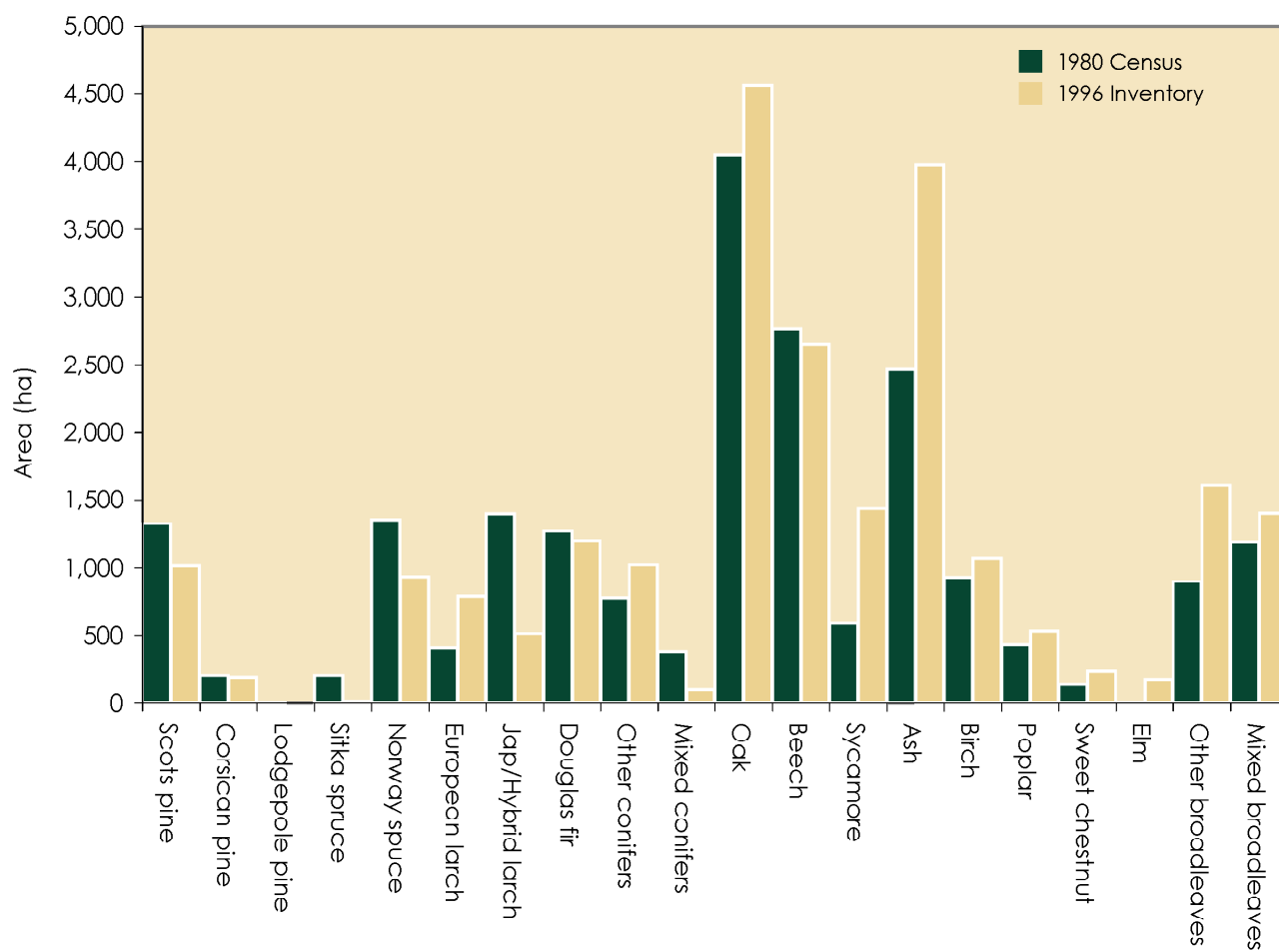


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1996 Inventory

Planting year class	1980 Census woodland area (ha)	1996 Inventory woodland area (ha)	Change (%)
1991-1996	0	835	see note
1981-1990	0	905	see note
1971-1980	1,184	1,381	17
1961-1970	3,145	3,419	9
1951-1960	4,770	3,949	-17
1941-1950	2,870	2,858	0
1931-1940	1,495	2,031	36
1921-1930	799	1,682	110
1911-1920	518	1,394	169
1901-1910	250	333	33
1861-1900	3,477	2,170	-38
Pre 1861	1,170	316	-73
Total all years	19,677	21,273	8

1. The first two classes, 1991-1996 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.

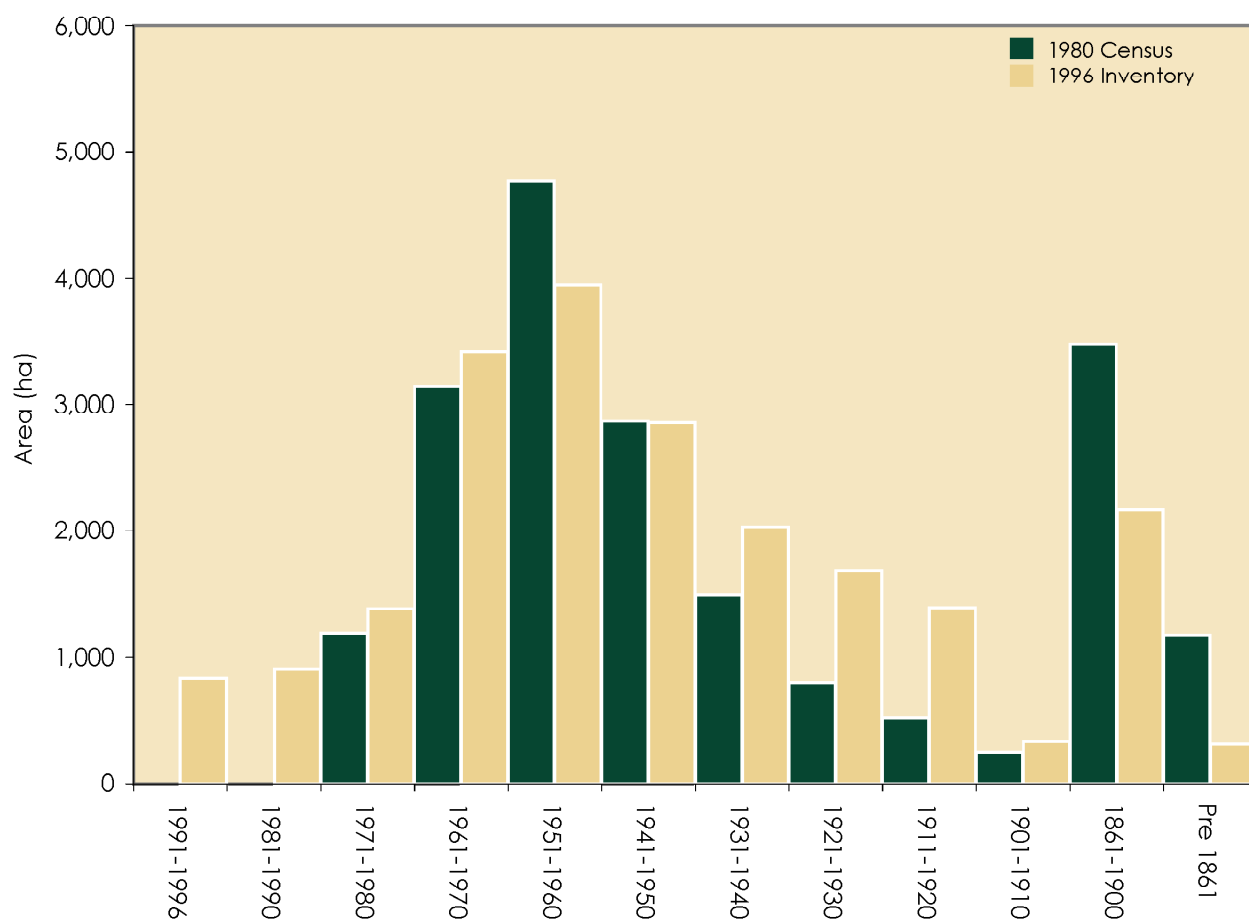
Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1996 Inventory

Table 22 Comparison of numbers of live trees outside woodland between 1980 Census and 1996 Inventory (000's)

Feature type	1980 Census	1996 Inventory	Change (%)
Boundary Tree	300	69	-77
Middle Tree	191	25	-87
Total Individual Trees	491	93	-81
Groups	658	80	-88
Linear Features	307	596	94
Total	1,455	769	-47

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 1996 Inventory figures have been adjusted accordingly. The 1996 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 1996 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1996 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 1996 Inventory

Feature type	1980 Census	1996 Inventory	Change (%)
Individual Trees (per sq km)	141.2	26.8	-81
Groups (per sq km)	50.7	3.0	-94
Linear Features (m per sq km)	287.3	407.3	42

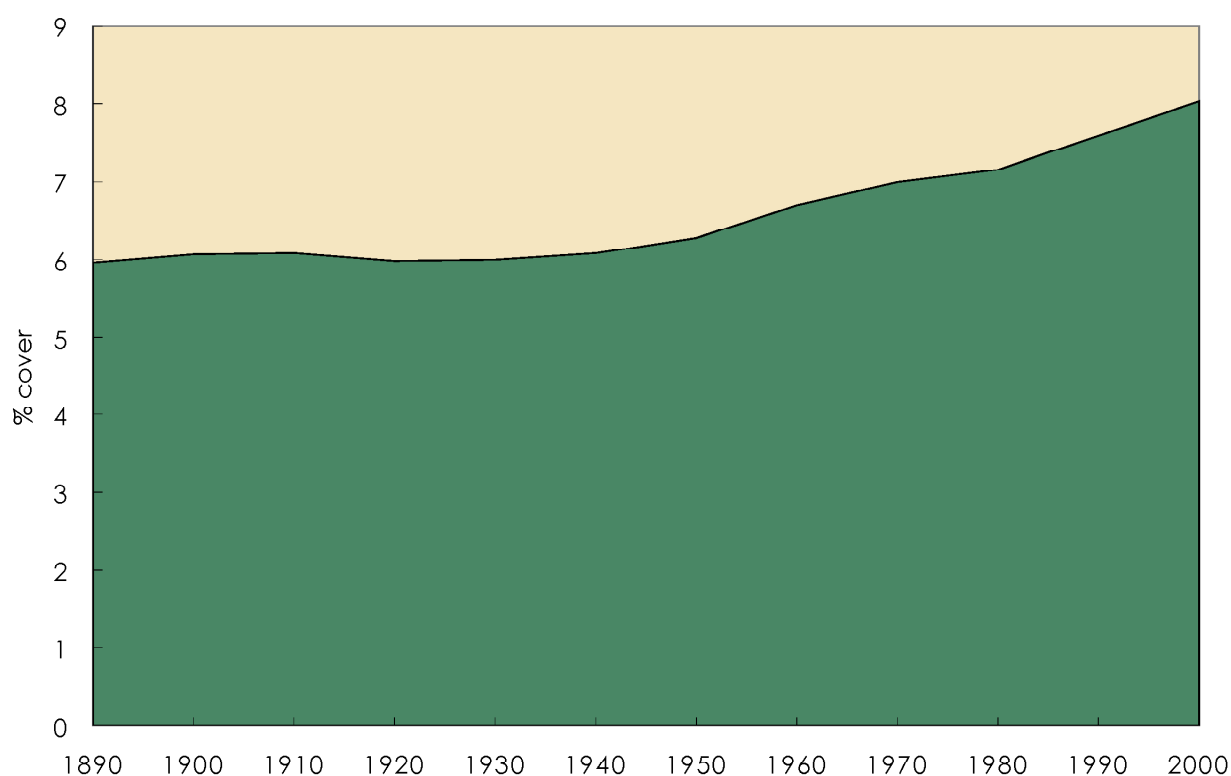
1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded, the 1996 Inventory figures have been adjusted accordingly. The 1996 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 1996 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height, and 1996 used 2m height, as minimum criteria for inclusion.
4. See Glossary for definitions of feature type.

WOODLAND COVER

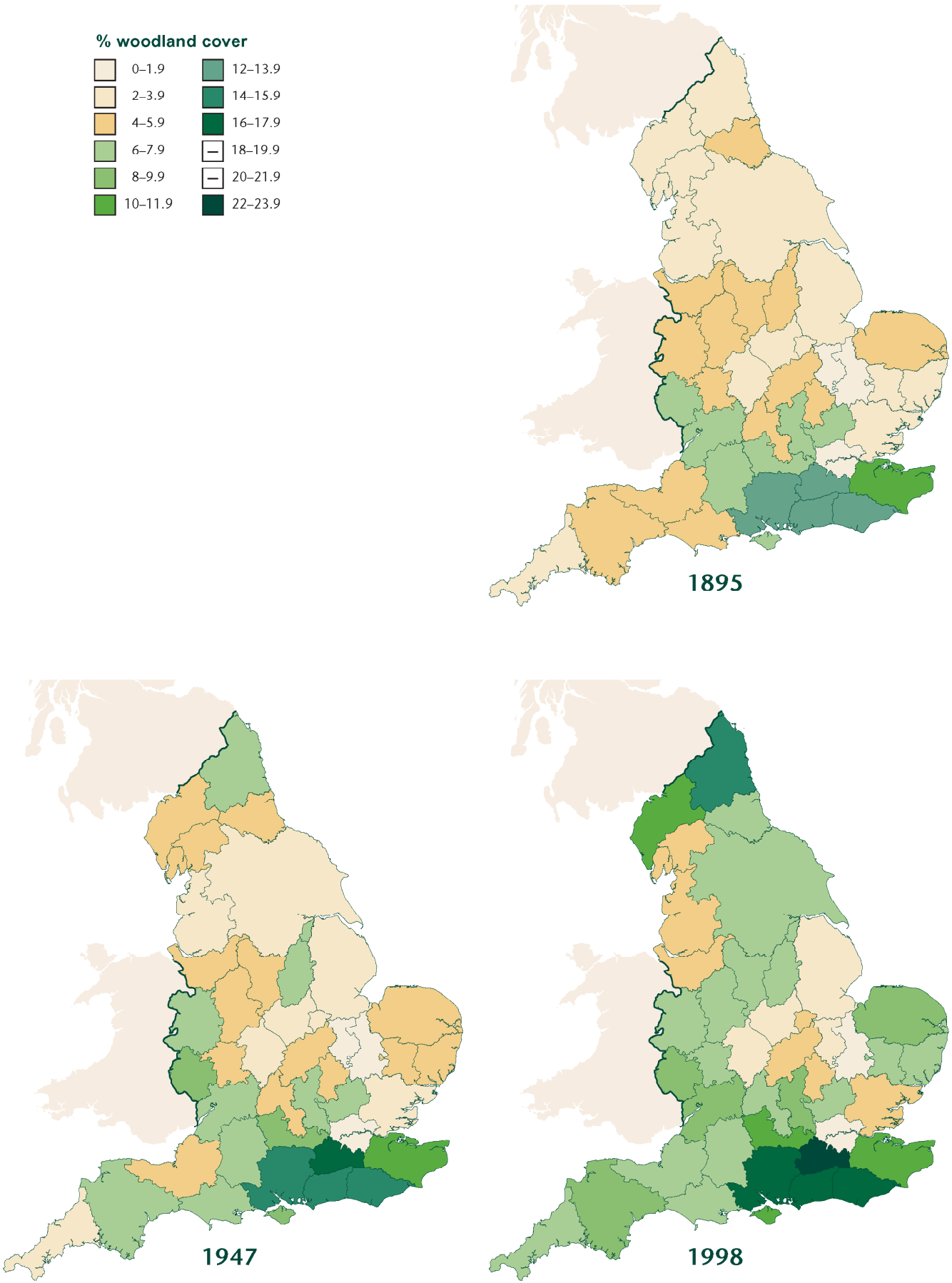
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

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

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



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



GLOSSARY

Woodland

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

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

Interpreted Forest Types

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

High Forest

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

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

Mixtures

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

Forest Types

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

- **Coppice**

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

- **Coppice with Standards**

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

- **Felled**

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

- **Windblow**

Areas of blown woodland which remain uncleared and not regenerated.

- **Open Space**

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

Ownership types

- **Other Ownership**

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

- **Personal**

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

- **Private forestry or timber business**

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

- **Other private business**

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

- **Local Authority**

Region, County, District or other Council

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

Government department/agency, nationalised industry, etc.

- **Charitable organisations**

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

- Community ownership or common land

the common property of all members of the community.

- **Forestry Commission**

Land owned by or land leased to the Forestry Commission

Feature types

- **Small Wood**

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

- **Group**

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

- **Individual Tree**

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

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

- **Linear Feature**

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

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

NOTES



Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT

www.forestry.gov.uk