



NATIONAL INVENTORY OF WOODLAND AND TREES



ENGLAND

County Report for

NORTHAMPTONSHIRE



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 Northamptonshire 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 Northamptonshire 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Northamptonshire is 14,497 hectares. This represents 6.1 % of the land area. (Table 1)
- Broadleaved woodland is the dominant forest type representing 63.2 % of all woodland. Conifer woodland represents 15.9 %, Mixed woodland 10.7 % and Open Space within woodlands 8.7 %. (Table 2)
- The main conifer species is pine covering 1,306 hectares or 43.3 % of all conifer species. The main broadleaved species is oak covering 3,817 hectares or 38.1 % of all broadleaved species. (Table 3)
- 4,045 hectares or 33 % of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 8,338 hectares or 67 % of woodland is in Other ownership. (Table 6)
- There are a total of 777 woods over 2 ha within Northamptonshire with a mean wood area of 15.9 hectares. (Table 7a) There are a total of 4,264 woods from 0.1 - <2.0 hectares with a mean wood area of 0.50 hectares. (Table 14)
- There are 652 thousand live trees outside woodland in Northamptonshire. (Table 15)
- Woodland land cover increased by over 2,300 hectares from 5.0 % to 6.0 % of the land area between 1980 and 1997. (Table 19)
- The area of broadleaves increased by 69% between 1980 and 1997, with the relative proportion of broadleaves to conifers increasing from 62 % to 78 %. (Table 20)

INVENTORY REPORTS

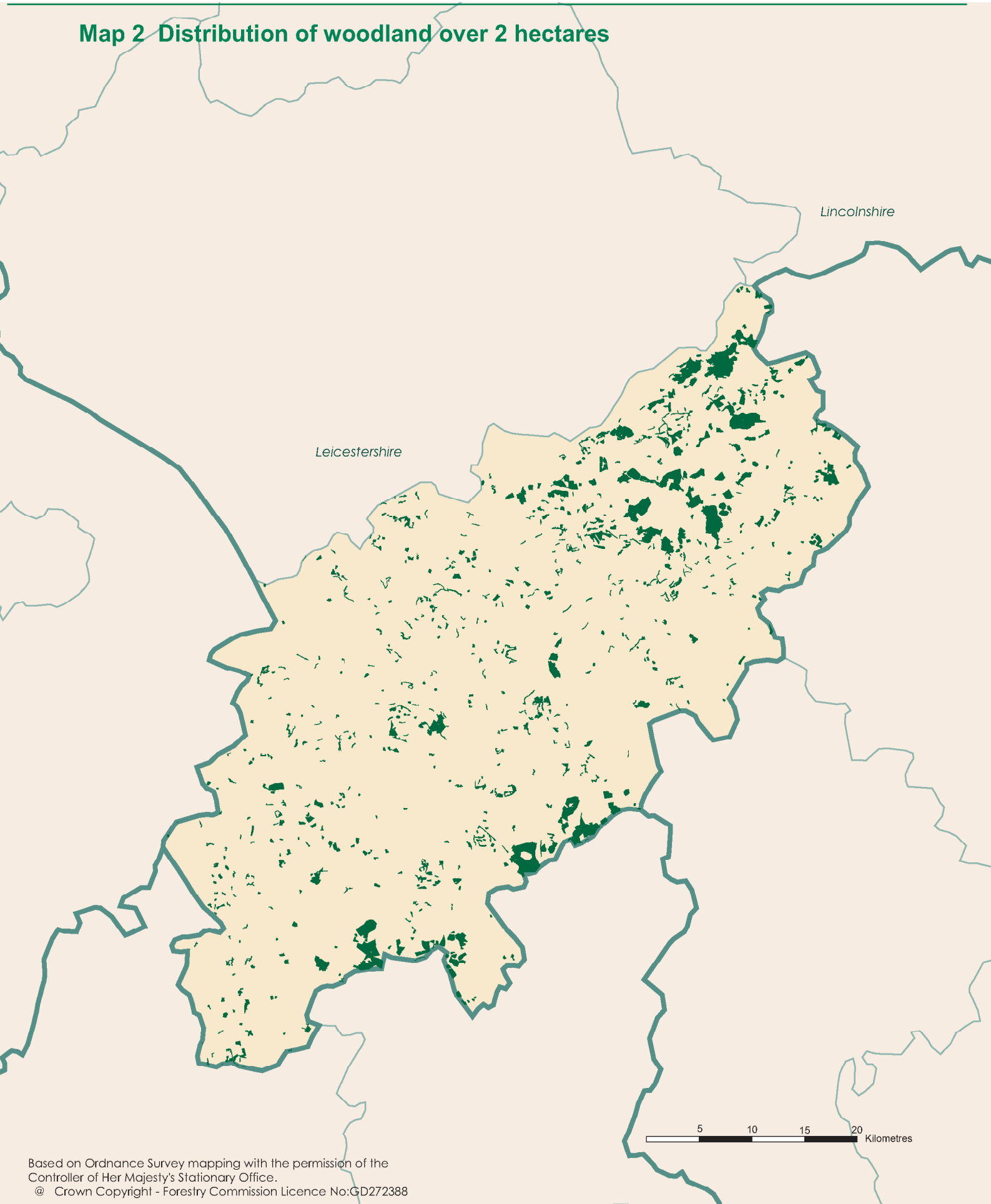
As well as this report for Northamptonshire, reports are available for the other counties in the region as shown on the map opposite. Also available are region and county reports for England as well as a report for the country as a whole. Wales and Scotland are also covered by reports.

Map 1 Regional and county boundaries



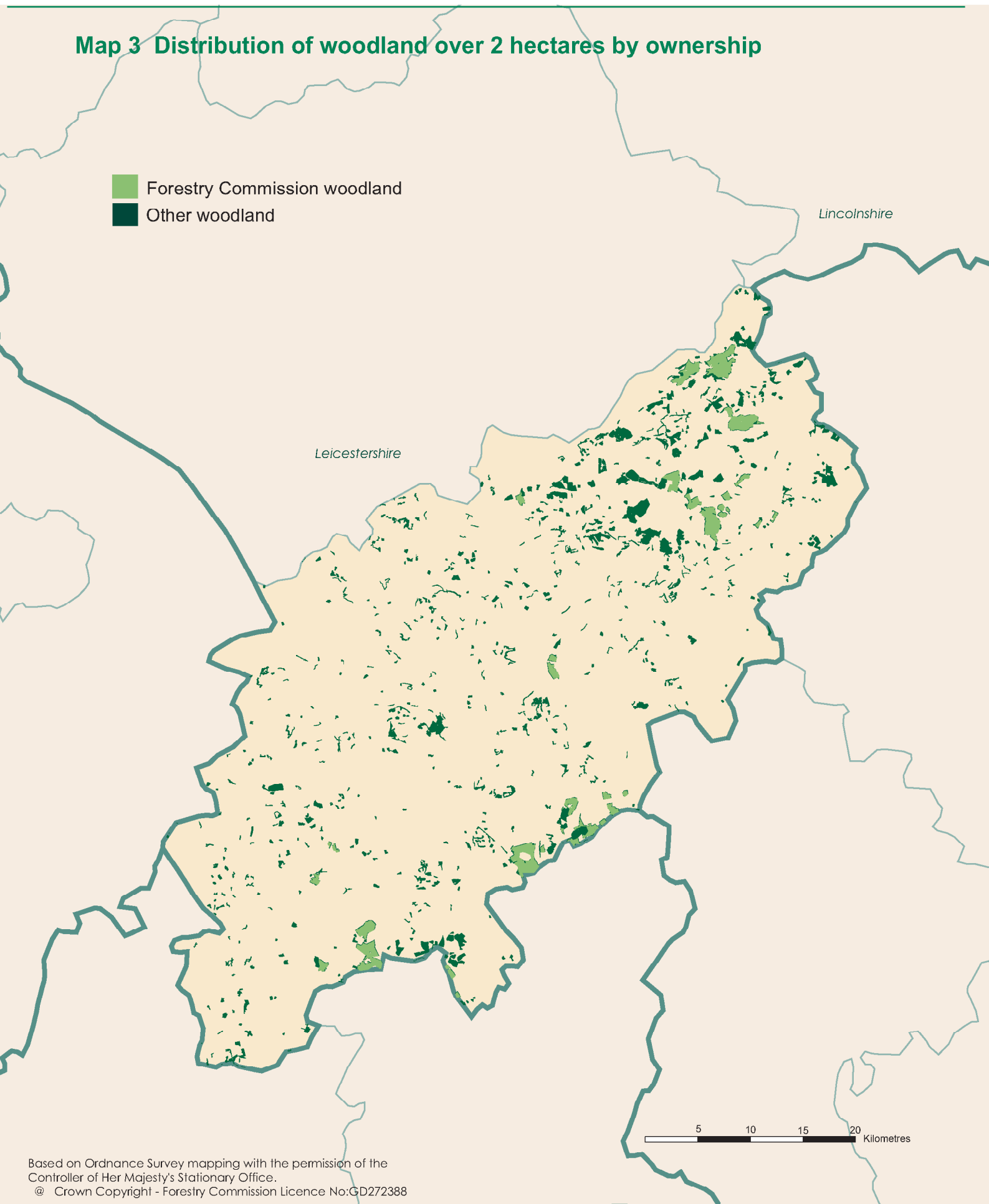
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Map 2 Distribution of woodland over 2 hectares



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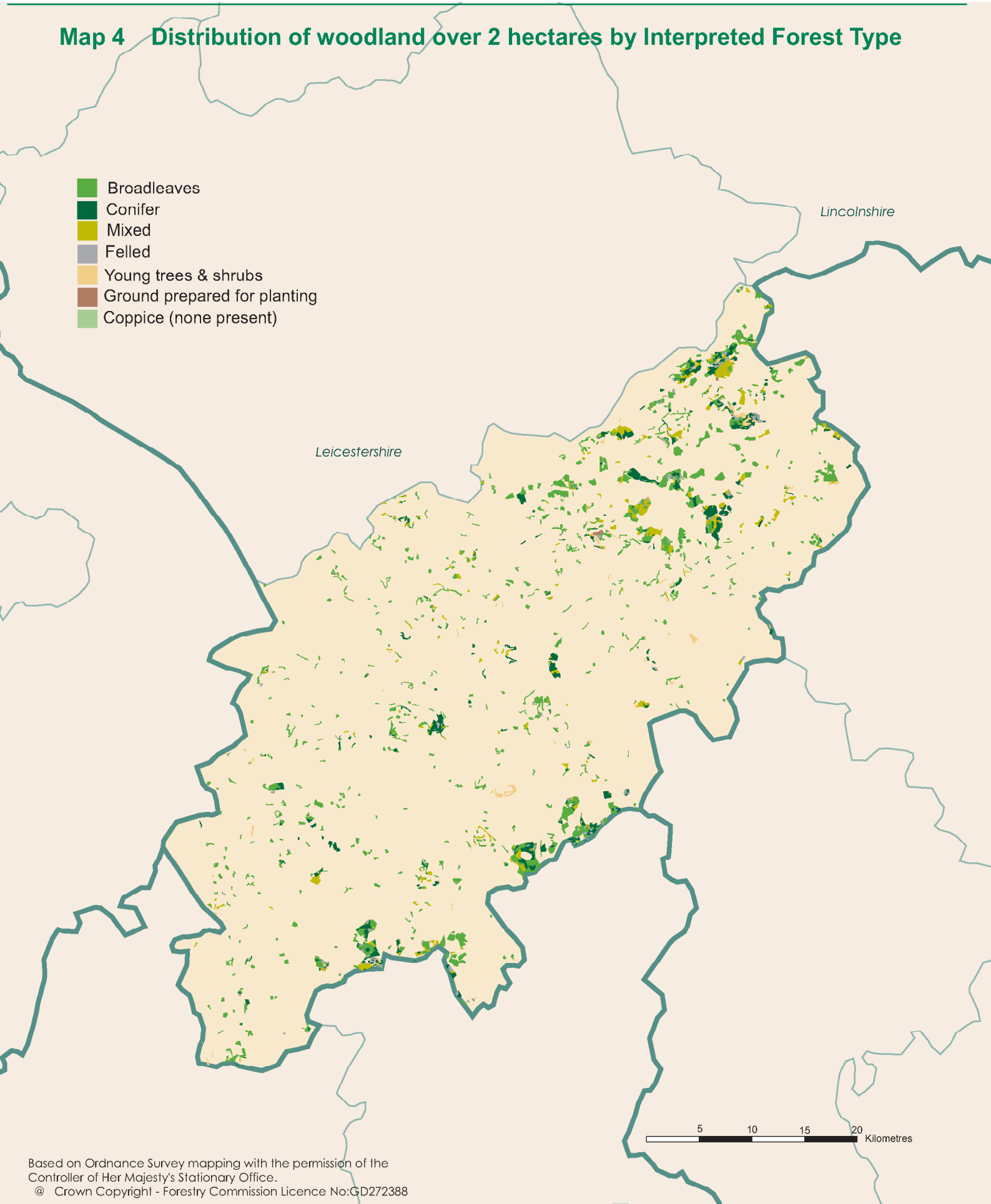
Map 3 Distribution of woodland over 2 hectares by ownership



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

- Broadleaves
- Conifer
- Mixed
- Felled
- Young trees & shrubs
- Ground prepared for planting
- Coppice (none present)



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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 Northamptonshire.

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	12,383	85.4
0.25 - < 2.00	1,879	13.0
0.10 - < 0.25	236	1.6
Total area of woodland	14,497	100.0
% Woodland land cover	6.1	

1. Area of Northamptonshire, including inland water, 236,697 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	2,033	276	2,309	15.9
Broadleaved	7,491	1,675	9,166	63.2
Mixed	1,533	25	1,558	10.7
Coppiced	0	0	0	0.0
Copp-w-standards	84	0	84	0.6
Windblow	0	0	0	0.0
Felled	124	0	124	0.9
Open Space	1,117	138	1,255	8.7
Total	12,383	2,114	14,497	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	1,193	113	1,306	43.3	10.0
Sitka spruce	5	0	5	0.2	0.0
Larch	476	0	476	15.8	3.7
Other conifers	1,005	163	1,168	38.8	9.0
Mixed conifers	34	25	59	2.0	0.5
Total conifers	2,713	301	3,014	100.0	23.1
Oak	3,629	188	3,817	38.1	29.3
Beech	180	20	200	2.0	1.5
Sycamore	332	176	508	5.1	3.9
Ash	2,345	517	2,862	28.6	22.0
Birch	282	13	295	2.9	2.3
Elm	113	25	138	1.4	1.1
Other broadleaves	947	386	1,333	13.3	10.2
Mixed broadleaves	518	351	869	8.7	6.7
Total broadleaves	8,344	1,676	10,020	100.0	76.9
Total all species***	11,057	1,976	13,033		100.0

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

**Species/group percentage of all species

***Excludes the 1.463 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	10%
Broadleaves	4%
Pine	17%
Oak	8%
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	35,400	205,000	6	8/
Narrow Linear Features	8,500	383,100	45	162
Individual Trees	64,200	64,200	1	27
Total		652,300		276

1. Land area used to calculate tree density 236,697ha 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	25%
Narrow Linear Features	29%
Individual Trees	21%
3. Where the standard errors of these summary measures are 10% or less, the confidence intervals will be approximately symmetrical; the true value is expected to be within +/- one standard error for about 68% (or about two-thirds) of all cases, and within +/- two standard errors for about 95% of all cases. Where percentage standard errors are larger, e.g. for less common species or more variable species composition, the confidence intervals will be less symmetrical (and wider).
4. See Glossary for definitions of feature types .

Table 5 Lengths of Linear Features

Feature type	Total number of features	Total length of features (km)	Density of features (m per sq km)
Wide Linear Features	0	0	0
Narrow Linear Features	8,500	1,102	466
Total		1,102	466

1. Land area used to calculate tree density 236,697ha based on digital boundaries used in 1991 Census of Population
2. The standard errors of the length estimates for these feature types are:

Wide Linear Features	-
Narrow Linear Features	24%
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	4,045	33
Other	8,338	67
Total area of woodland	12,383	100

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

Woodland area by ownership

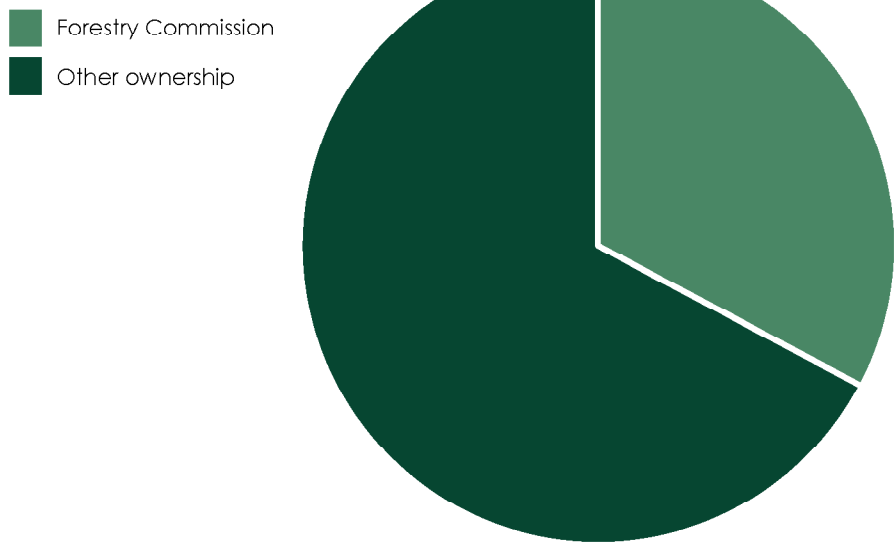


Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	574	2,418	20	4.2
10 - <20	93	1,274	10	13.7
20 - <50	68	1,979	16	29.1
50 - <100	22	1,587	13	72.1
<100	757	7,258	59	9.6
100 - <500	18	4,066	33	225.9
500 and >	2	1,060	9	529.9
All woods	777	12,383	100	15.9

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	1	5	0	4.9
	O	639	2,574	21	4.0
10 - <20	FC	5	65	1	13.0
	O	95	1,301	11	13.7
20 - <50	FC	13	393	3	30.2
	O	57	1,606	13	28.2
50 - <100	FC	8	571	5	71.3
	O	19	1,355	11	71.3
<100	FC	27	1,034	8	38.3
	O	810	6,834	55	8.4
100 - <500	FC	10	3,011	24	301.1
	O	9	1,504	12	167.1
500 and >	FC	0	0	0	0.0
	O	0	0	0	0.0
Total	FC	37	4,045	33	109.3
	O	819	8,338	67	10.2

1. Table 7a and 7b are based solely on the digital woodland map. The other MWS tables are derived from the field sample data

2. The 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	1,047	25.9	986	11.8	2,033	16.4
Broadleaved	2,058	50.9	5,433	65.2	7,491	60.5
Mixed	808	20.0	725	8.7	1,533	12.4
Coppice	0	0.0	0	0.0	0	0.0
Copp-w-Stds	0	0.0	84	1.0	84	0.7
Windblow	0	0.0	0	0.0	0	0.0
Felled	35	0.9	90	1.1	124	1.0
Open Space	97	2.4	1,020	12.2	1,117	9.0
Total	4,045	100.0	8,338	100.0	12,383	100.0

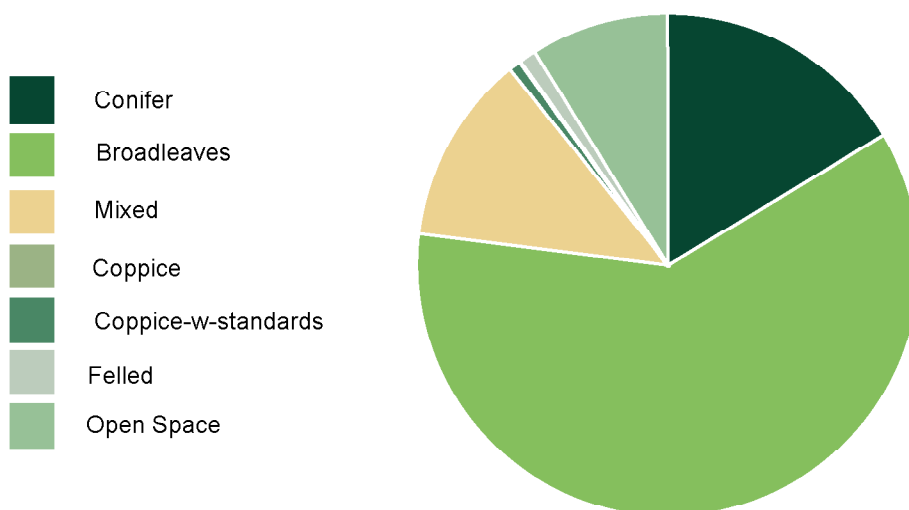
Area of woodland by forest type

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	204	14	5	443	35	6	647	24	6
Corsican pine	484	34	12	61	5	1	546	20	5
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	5	0	0	5	0	0
Norway spruce	568	40	15	285	22	4	852	31	8
European larch	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	90	6	2	386	30	5	476	18	4
Douglas fir	17	1	0	6	0	0	22	1	0
Other conifers	58	4	1	73	6	1	131	5	1
Mixed conifers	9	1	0	24	2	0	34	1	0
Total conifers	1,430	100	37	1,283	100	18	2,713	100	25
Oak	1,606	65	41	2,023	35	28	3,629	43	33
Beech	14	1	0	166	3	2	180	2	2
Sycamore	64	3	2	268	5	4	332	4	3
Ash	291	12	7	2,054	35	29	2,345	28	21
Birch	149	6	4	133	2	2	282	3	3
Poplar	101	4	3	159	3	2	260	3	2
Sweet chestnut	0	0	0	13	0	0	13	0	0
Elm	5	0	0	108	2	2	113	1	1
Other broadleaves	113	5	3	561	10	8	674	8	6
Mixed broadleaves	141	6	4	376	6	5	518	6	5
Total broadleaves	2,483	100	63	5,861	100	82	8,344	100	75
Total - all species	3,913		100	7,144		100	11,057		100
Felled	35			90			124		
Total High Forest	3,948			7,234			11,181		

*cat : species percentage of Conifer or Broadleaved in the ownership category

**spp : percentage of all species in the ownership category

1. In addition to the areas shown there are 1,117 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	10%
Broadleaves	4%
Norway spruce	20%
Oak	8%
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

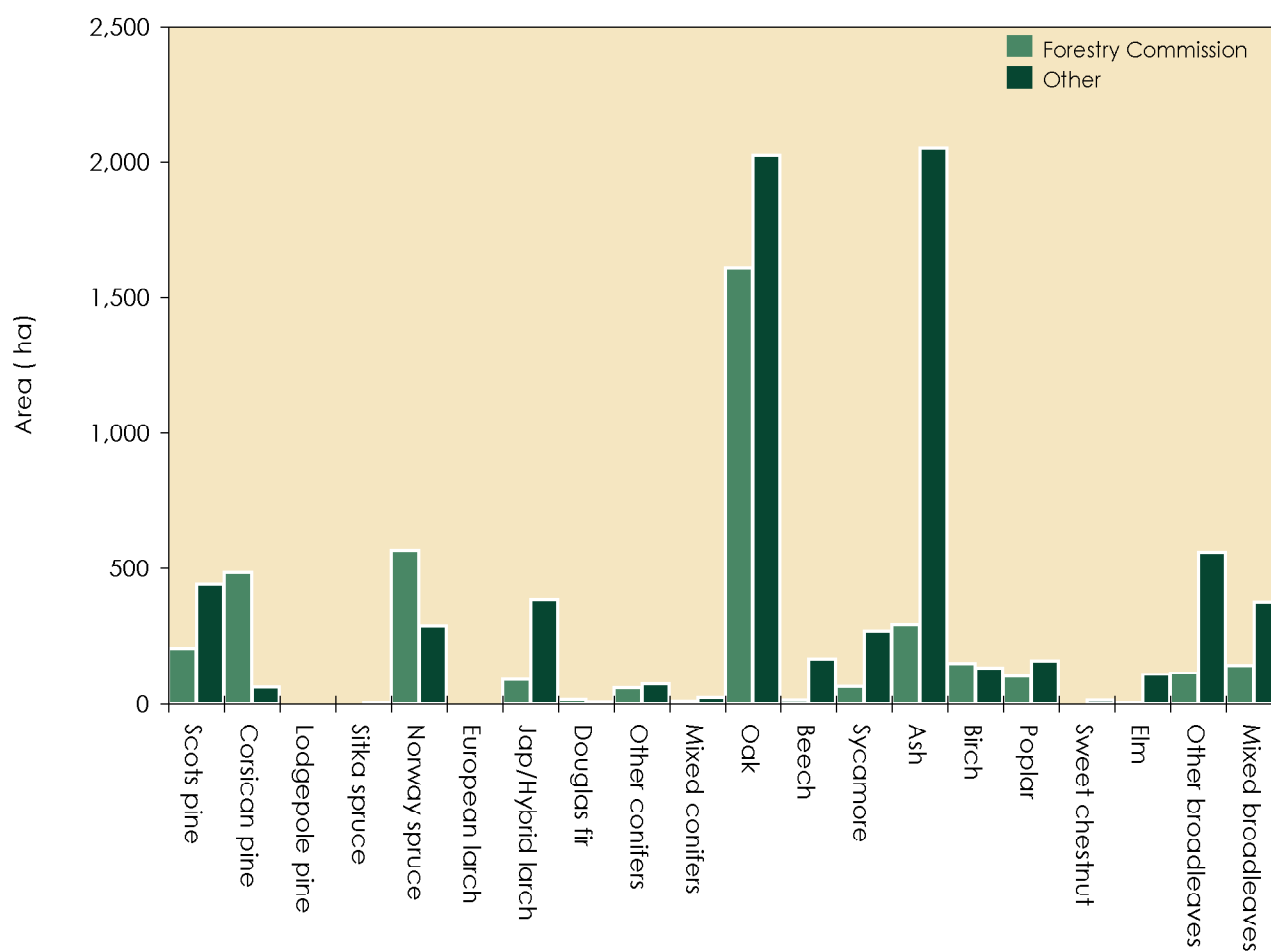


Table 9b Area of High Forest by principal species,ownership and category

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	204	0	204	439	4	443	643	4	647
Corsican pine	484	0	484	61	0	61	546	0	546
Lodgepole pine	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	2	2	5	2	2	5
Norway spruce	568	0	568	285	0	285	852	0	852
European larch	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	90	0	90	386	0	386	476	0	476
Douglas fir	17	0	17	6	0	6	22	0	22
Other conifers	58	0	58	71	2	73	129	2	131
Mixed conifers	9	0	9	24	0	24	34	0	34
Total conifers	1,430	0	1,430	1,274	9	1,283	2,704	9	2,713
Oak	1,602	5	1,606	1,476	547	2,023	3,078	552	3,629
Beech	14	0	14	159	7	166	173	7	180
Sycamore	64	0	64	217	51	268	281	51	332
Ash	286	5	291	1,803	251	2,054	2,089	256	2,345
Birch	125	23	149	105	28	133	230	51	282
Poplar	101	0	101	117	41	159	218	41	260
Sweet chestnut	0	0	0	13	0	13	13	0	13
Elm	5	0	5	33	75	108	38	75	113
Other broadleaves	113	0	113	365	195	561	478	195	674
Mixed broadleaves	141	0	141	351	26	376	492	26	518
Total broadleaves	2,451	33	2,483	4,640	1,221	5,861	7,090	1,254	8,344
Total - all species	3,880	33	3,913	5,914	1,230	7,144	9,794	1,263	11,057

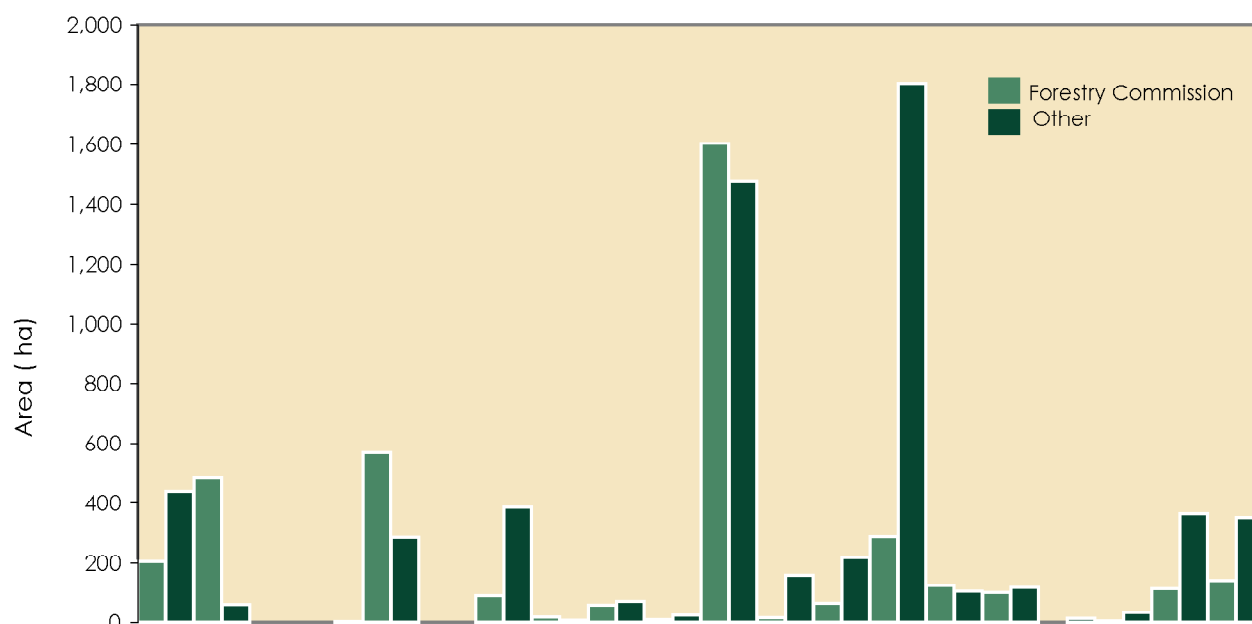
1. The standard errors of the all ownerships area estimates for the most common species or species groups (in all woodland types) are as follows

	Category 1*	Category 2*	Total High Forest	
Conifers	10%	51%	10%	
Broadleaves	5%	8%	4%	
Norway spruce	20%	-	20%	
Oak	9%	18%	8%	*See Glossary for Category 1 and Category 2 descriptions
Ash	9%	23%	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).

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

High Forest Category 1 - Area by principal species and ownership



High Forest Category 2 - Area by principal species and ownership

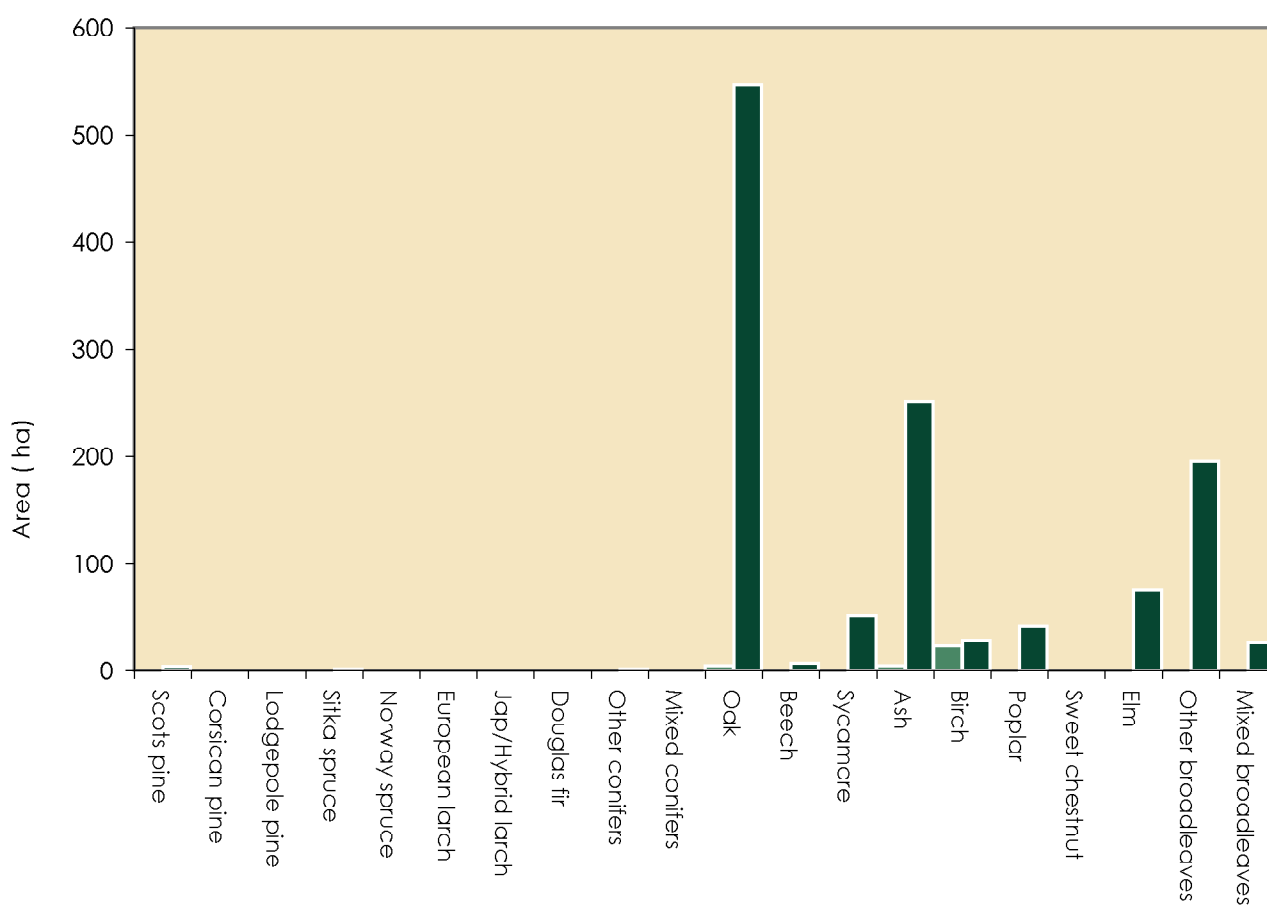
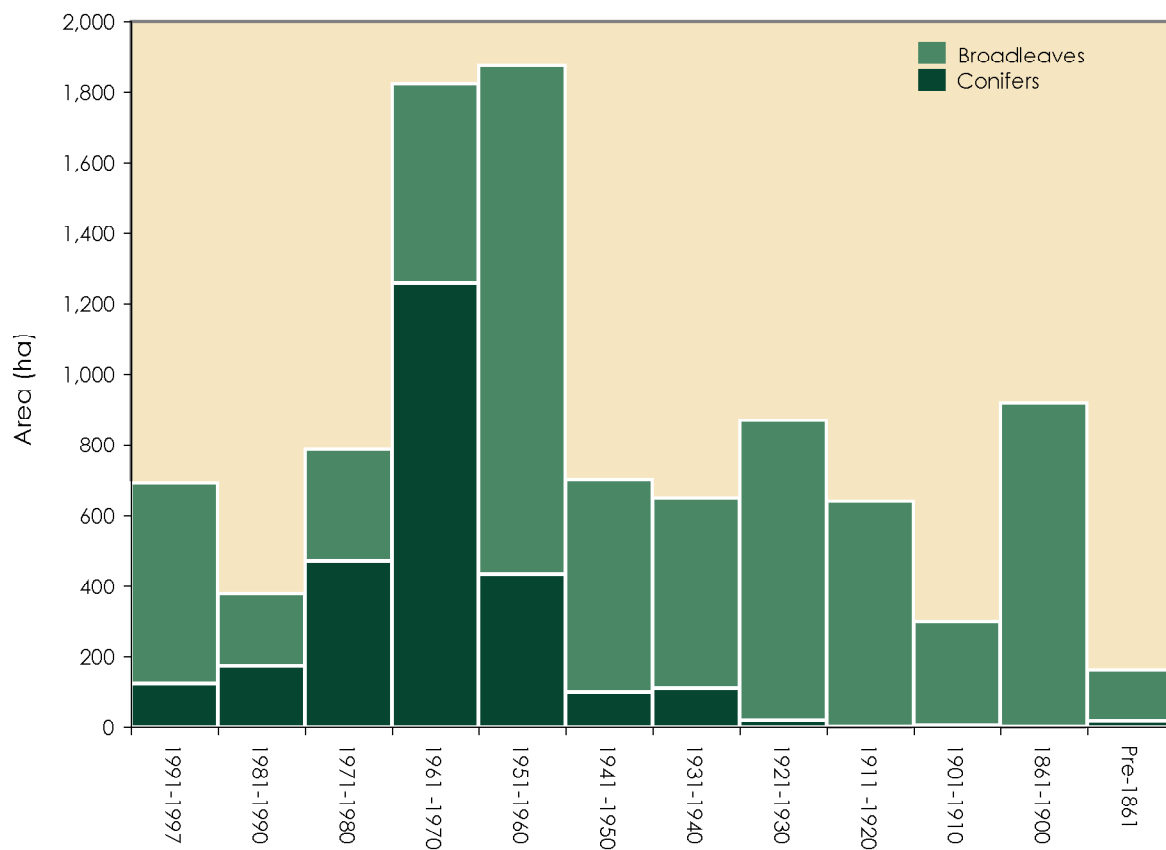


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	37	0	144	246	134	82	0	0	0	0	0	0	643
Corsican pine	54	9	105	377	0	0	0	0	0	0	0	0	546
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	2	0	0	0	0	0	0	0	0	2
Norway spruce	23	143	158	409	114	0	4	0	0	0	0	0	852
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	6	17	36	146	148	16	96	12	0	0	0	0	476
Douglas fir	0	0	0	4	19	0	0	0	0	0	0	0	22
Other conifers	0	0	27	59	19	0	5	3	0	0	0	16	129
Mixed conifers	3	3	0	12	0	2	6	3	0	3	0	0	34
Total conifers	123	172	470	1,256	434	100	111	19	0	3	0	16	2,704
Oak	132	112	52	171	377	284	259	259	496	143	650	142	3,078
Beech	0	0	2	23	18	14	11	4	0	0	101	0	173
Sycamore	0	0	15	26	77	3	67	42	25	6	19	0	281
Ash	94	41	61	168	560	212	167	485	120	106	76	0	2,089
Birch	51	3	9	18	148	0	0	0	0	0	0	0	230
Poplar	99	0	4	9	73	25	9	0	0	0	0	0	218
Sweet chestnut	0	3	0	0	0	0	3	7	0	0	0	0	13
Elm	0	2	11	0	7	11	0	0	0	0	6	0	38
Other broadleaves	20	17	105	117	124	23	13	9	0	37	8	3	478
Mixed broadleaves	173	26	55	37	56	29	8	45	0	3	59	0	492
Total broadleaves	568	205	315	568	1,441	601	539	851	641	296	919	145	7,090
Total - all species	691	378	785	1,824	1,875	701	650	870	641	299	919	161	9,794

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

High Forest Category 1 - Area by planting year class

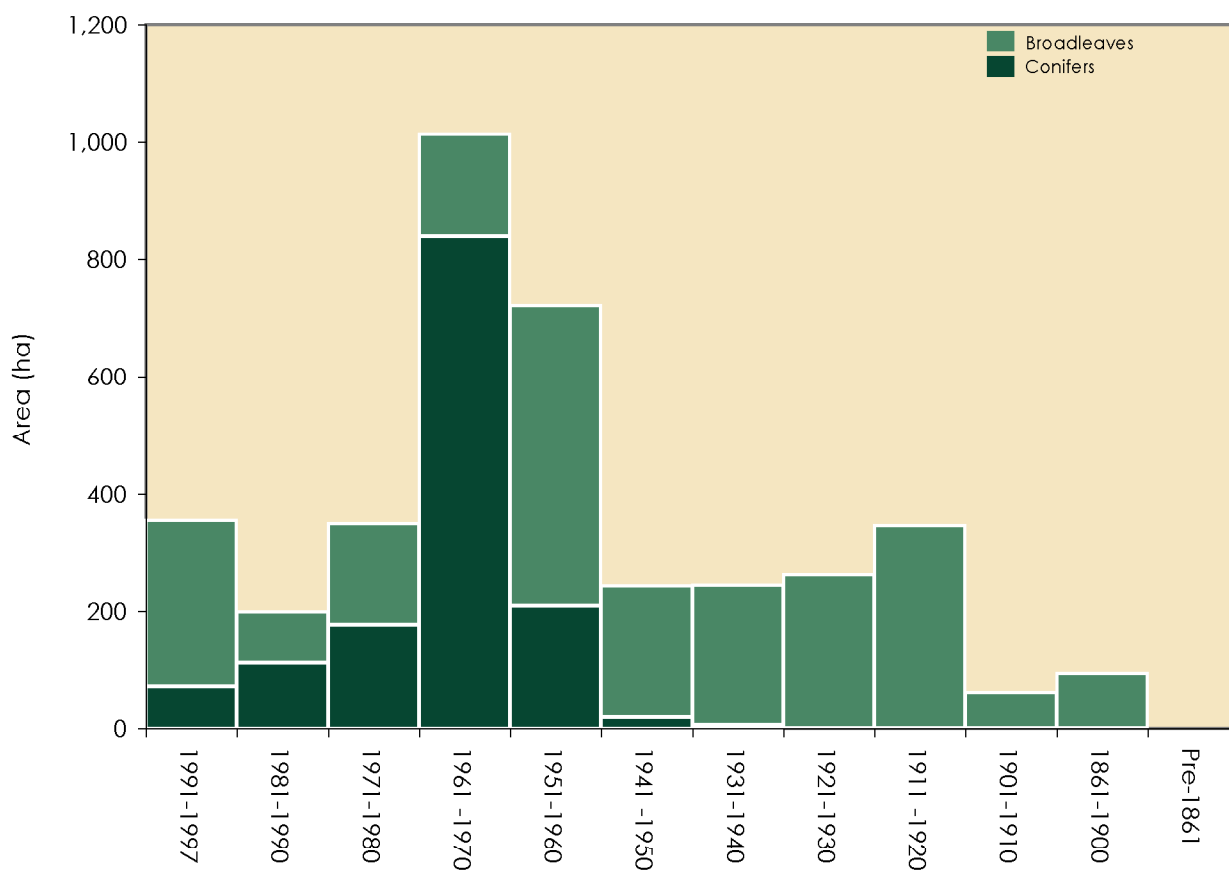


1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	28	0	0	107	50	19	0	0	0	0	0	0	204
Corsican pine	19	0	89	377	0	0	0	0	0	0	0	0	484
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	23	107	88	280	70	0	0	0	0	0	0	0	568
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	0	5	0	13	72	0	0	0	0	0	0	0	90
Douglas fir	0	0	0	4	13	0	0	0	0	0	0	0	17
Other conifers	0	0	0	49	4	0	5	0	0	0	0	0	58
Mixed conifers	0	0	0	9	0	0	0	0	0	0	0	0	9
Total conifers	70	111	177	839	209	19	5	0	0	0	0	0	0
Oak	89	79	41	87	251	209	204	153	336	60	94	0	1,602
Beech	0	0	0	0	5	0	9	0	0	0	0	0	14
Sycamore	0	0	9	0	54	0	0	0	0	0	0	0	64
Ash	0	0	37	36	79	5	21	98	9	0	0	0	286
Birch	42	0	9	9	65	0	0	0	0	0	0	0	125
Poplar	93	0	0	0	8	0	0	0	0	0	0	0	101
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	5	0	0	0	0	0	0	0	0	0	5
Other broadleaves	5	0	46	25	33	0	0	5	0	0	0	0	113
Mixed broadleaves	56	9	22	17	18	9	5	5	0	0	0	0	141
Total broadleaves	284	88	171	174	512	223	238	261	345	60	94	0	2,451
Total - all species	354	199	348	1,013	722	242	243	261	345	60	94	0	3,880

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

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

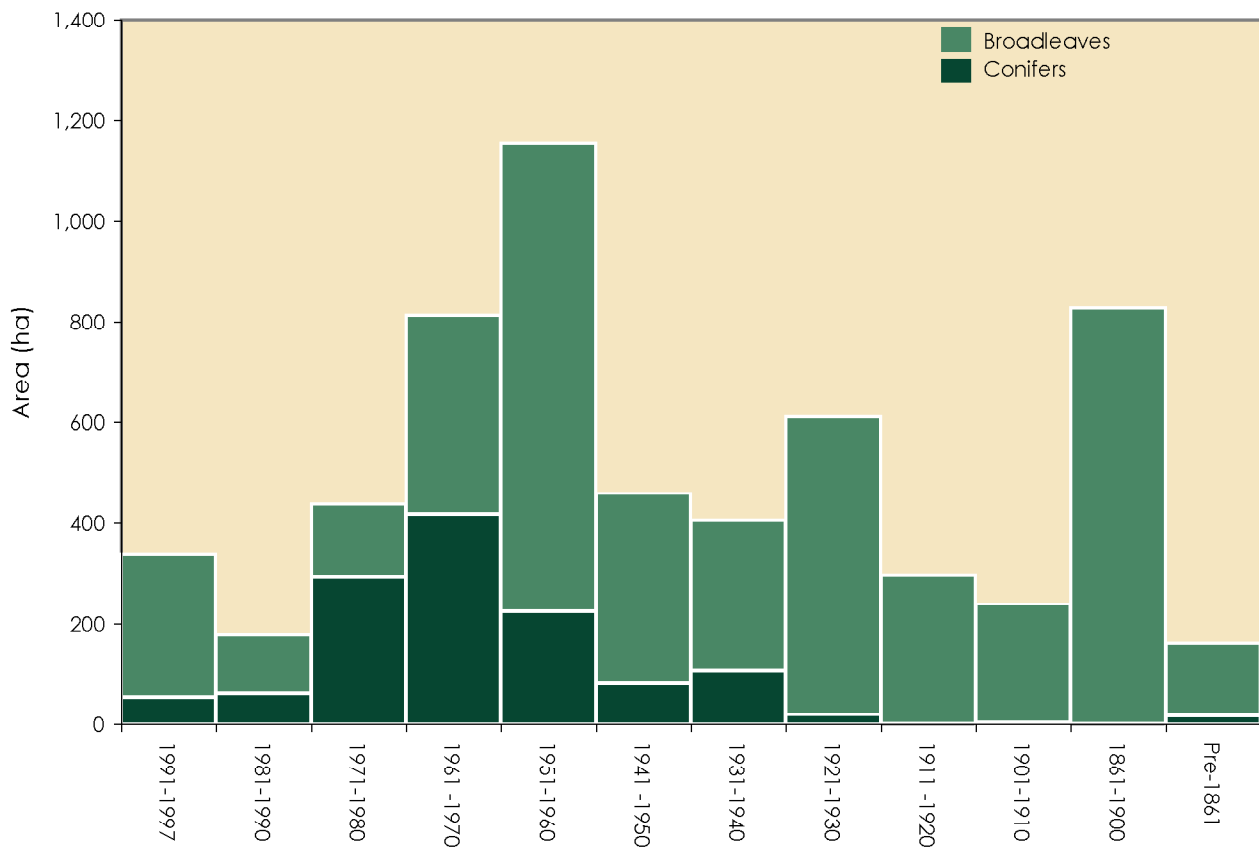
1. Most of the planting year classes cover 10 years, 1991-1997 is 7 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991-1997	1981-1990	1971-1980	1961-1970	1951-1960	1941-1950	1931-1940	1921-1930	1911-1920	1901-1910	1861-1900	Pre-1861	
Scots pine	9	0	144	140	84	64	0	0	0	0	0	0	439
Corsican pine	36	9	16	0	0	0	0	0	0	0	0	0	61
Lodgepole pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Sitka spruce	0	0	0	2	0	0	0	0	0	0	0	0	2
Norway spruce	0	36	71	129	44	0	4	0	0	0	0	0	285
European larch	0	0	0	0	0	0	0	0	0	0	0	0	0
Jap/Hybrid larch	6	12	36	133	76	16	96	12	0	0	0	0	386
Douglas fir	0	0	0	0	6	0	0	0	0	0	0	0	6
Other conifers	0	0	27	10	15	0	0	3	0	0	0	16	71
Mixed conifers	3	3	0	3	0	2	6	3	0	3	0	0	24
Total conifers	53	61	293	417	224	82	106	19	0	3	0	16	1,274
Oak	43	33	11	84	127	75	56	106	160	83	556	142	1,476
Beech	0	0	2	23	13	14	2	4	0	0	101	0	159
Sycamore	0	0	6	26	23	3	67	42	25	6	19	0	217
Ash	94	41	23	132	480	207	146	387	110	106	76	0	1,803
Birch	9	3	0	9	84	0	0	0	0	0	0	0	105
Poplar	6	0	4	9	64	25	9	0	0	0	0	0	117
Sweet chestnut	0	3	0	0	0	0	3	7	0	0	0	0	13
Elm	0	2	6	0	7	11	0	0	0	0	6	0	33
Other broadleaves	15	17	59	92	91	23	13	4	0	37	8	3	365
Mixed broadleaves	117	17	32	21	39	19	3	40	0	3	59	0	351
Total broadleaves	284	117	144	395	929	377	300	591	296	236	826	145	4,640
Total - all species	337	179	437	812	1,153	459	406	609	296	239	826	161	5,914

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

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



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

Table 11 High Forest : principal species by planting year class

Planting year class	First	%	Second	%	Third	%
1991-97	Mixed broadleaves	25	Oak	19	Poplar	14
1981-90	Norway spruce	33	Oak	26	Ash	10
1971-80	Norway spruce	17	Scots pine	16	Other broadleaves	14
1961-70	Norway spruce	22	Corsican pine	20	Scots pine	13
1951-60	Ash	29	Oak	19	Birch	8
1941-50	Oak	42	Ash	26	Scots pine	10
1931-40	Oak	35	Ash	29	Jap/Hybrid larch	12
1921-30	Ash	54	Oak	29	Sycamore	7
1911-20	Oak	76	Ash	18	Sycamore	4
1901-10	Ash	51	Oak	39	Other broadleaves	7
1861-1900	Oak	74	Beech	9	Ash	7
Pre 1861	Oak	93	Other conifers	6	Other broadleaves	1
All years	Oak	33	Ash	21	Norway spruce	8

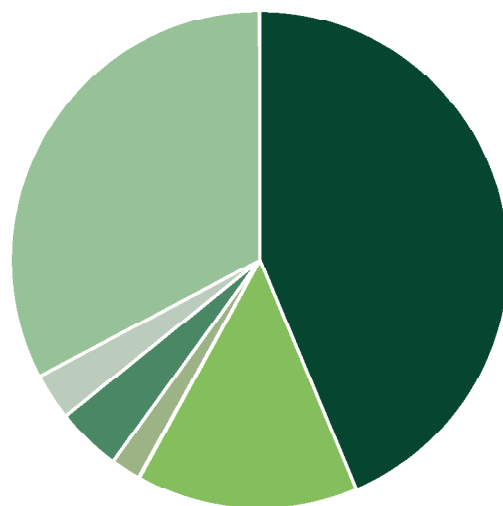
1. Principal species as a percentage of area in the planting year class.

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	5,398	43.6
Business	1,775	14.3
Forestry or timber business	0	0.0
Charity	253	2.0
Local Authority	516	4.2
Other public (not FC)	396	3.2
Forestry Commission	4,045	32.7
Community ownership or common land	0	0.0
Unidentified	0	0.0
Total	12,383	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	4,264	2,114	Area (ha)
Wide Linear Features	0	0	Area (ha)
Wide Linear Features	0	0	Length (Km)
Narrow Linear Features	8,500	1,102	Length (Km)
Narrow Linear Features	8,500	383,100	Number of live trees
Groups	35,400	205,000	Number of live trees
Individual Trees	64,200	64,200	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	236	1,879	2,114	4,264	0.50
Wide Linear Features	0	0	0	0	0.00
Total	236	1,879	2,114	4,264	0.50

1. See Glossary for definitions of feature types.

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

Species	Feature type				Total live trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	0.0	1.6	0.6	2.2	12.2	0.3
Spruce	0.0	0.0	0.0	2.4	2.4	13.3	0.4
Larch	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	0.0	0.0	4.3	4.3	23.8	0.7
Other conifers	0.8	1.6	2.5	4.3	9.2	50.8	1.4
Total conifers	0.8	1.6	4.1	11.6	18.1	100.0	2.8
Oak	21.4	3.3	26.3	54.2	105.2	16.6	16.1
Beech	1.6	0.0	12.3	0.0	13.9	2.2	2.1
Sycamore	4.1	0.8	10.7	8.5	24.1	3.8	3.7
Ash	17.3	0.0	44.5	71.3	133.1	21.0	20.4
Birch	0.0	0.8	2.5	12.8	16.1	2.5	2.5
Poplar	0.0	0.0	4.1	45.7	49.8	7.9	7.6
Sweet chestnut	0.0	0.0	0.0	4.9	4.9	0.8	0.8
Horse chestnut	1.6	0.0	2.5	3.0	7.1	1.1	1.1
Alder	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lime	0.0	0.0	0.0	3.0	3.0	0.5	0.5
Elm	0.0	0.0	0.0	3.7	3.7	0.6	0.6
Willow	3.3	0.0	28.0	46.9	78.2	12.3	12.0
Other broadleaves	5.8	1.6	70.0	117.6	195.0	30.8	29.9
Total broadleaves	55.2	6.6	200.9	371.5	634.1	100.0	97.2
Total - all species	56.0	8.2	205.0	383.1	652.3		100.0

- Percentages

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

Individual Trees	21%
Groups	25%
Narrow Linear Features	29%
- 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	1.6	0.0	0.0	0.0	1.6	64.0	64.0
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	0.8	0.0	0.0	0.0	0.8	32.0	32.0
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	2.5	0.0	0.0	0.0	2.5	100.0	100.0
Total - all species	2.5	0.0	0.0	0.0	2.5		100.0

1. See Glossary for definitions of feature types.

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

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	0.8	0.8	0.6	0.0	2.2
Spruce	0.0	2.4	0.0	0.0	2.4
Larch	0.0	0.0	0.0	0.0	0.0
Cypress	0.0	4.3	0.0	0.0	4.3
Other conifers	0.0	5.5	1.2	2.5	9.2
Total conifers	0.8	13.0	1.8	2.5	18.1
Oak	24.9	49.9	28.6	1.8	105.2
Beech	4.1	9.1	0.8	0.0	14.0
Sycamore	12.9	8.8	2.5	0.0	24.2
Ash	52.6	45.2	35.2	0.0	133.0
Birch	11.4	0.8	3.9	0.0	16.1
Poplar	0.0	21.8	28.0	0.0	49.8
Sweet chestnut	0.0	4.9	0.0	0.0	4.9
Horse chestnut	3.9	0.0	3.3	0.0	7.2
Alder	0.0	0.0	3.0	0.0	3.0
Lime	0.0	0.0	0.0	0.0	0.0
Elm	3.7	0.0	0.0	0.0	3.7
Willow	37.0	39.7	0.6	0.8	78.1
Other broadleaves	178.4	16.6	0.0	0.0	195.0
Total broadleaves	328.9	196.8	105.9	2.6	634.2
Total - all species	329.6	209.8	107.8	5.1	652.3

Table 18 Number of Groups by group size

Number of trees per Group*	Number of Groups (000's)
2	2
3-5	13
6-10	8
11-20	12
21-50	0
51-100	0
>100	0
Total	35

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

COMPARISON OF RESULTS WITH THE 1980 CENSUS AND PREVIOUS SURVEYS

Survey Method

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

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

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

Table 19:	Comparison of woodland area between 1980 Census and 1997 Inventory
Table 20:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1997 Inventory
Table 21:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory
Table 22:	Comparison of numbers of live trees outside woodland between 1980 Census and 1997 Inventory
Table 23:	Comparison of density of non-woodland features between 1980 Census and 1997 Inventory

Woodland cover

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

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

Table 19 Comparison of woodland area between 1980 Census and 1997 Inventory

Woodland size (ha)	1980 Census woodland area		1997 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	10,795	90.6	12,383	86.8	15
0.25 - <2.0	1,114	9.4	1,879	13.2	69
Total	11,909		14,262		20
% Woodland land cover	5.0		6.0		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent (1997), 236,697 ha, was based on the 1991 Census of Population digital boundaries.
4. Land area used to calculate woodland cover percent (1980), 236,734ha, (Ordnance Survey data)

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

Species	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
Scots pine	783	710	-9
Corsican pine	420	546	30
Lodgepole pine	0	0	-
Sitka spruce	16	5	-70
Norway spruce	1,202	1,015	-16
European larch	628	0	-100
Jap/Hybrid larch	117	476	307
Douglas fir	65	22	-66
Other conifers	294	131	-55
Mixed conifers	269	59	-78
Total conifers	3,794	2,964	-22
Oak	2,141	3,817	78
Beech	283	180	-36
Sycamore	441	508	15
Ash	1,672	2,837	70
Birch	133	295	121
Poplar	215	260	21
Sweet chestnut	69	13	-81
Elm	49	138	180
Other broadleaves	611	970	59
Mixed broadleaves	608	1,500	147
Total broadleaves	6,223	10,518	69
Total all species	10,018	13,482	35
Felled	509	124	-76
Total High Forest	10,526	13,606	29

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 8.7% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 8.7%.
3. The above figures from the 1997 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1997 figures above will therefore not match those in the previous sections of the report.
4. The 1980 figures include scrub to enable comparison

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

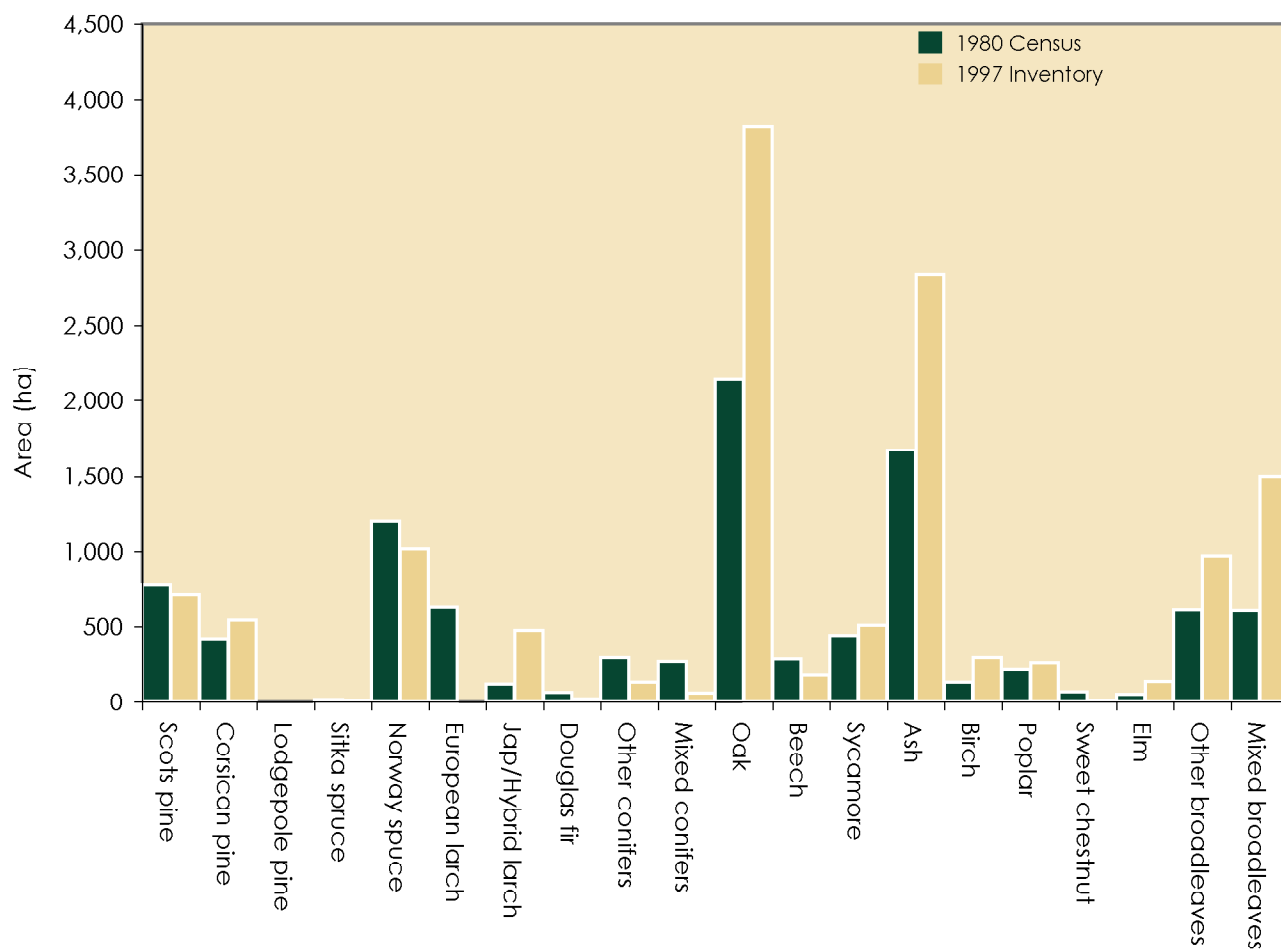


Table 21 Comparison of High Forest Category 1 area by planting year class
between 1980 Census and 1997 Inventory

Planting year class	1980 Census woodland area (ha)	1997 Inventory woodland area (ha)	Change (%)
1991-1997	0	1,343	see note
1981-1990	0	427	see note
1971-1980	920	888	-3
1961-1970	1,654	1,824	10
1951-1960	1,437	1,875	30
1941-1950	1,068	826	-23
1931-1940	1,270	650	-49
1921-1930	1,129	870	-23
1911-1920	371	817	120
1901-1910	467	299	-36
1861-1900	448	944	110
Pre 1861	839	161	-81
Total all years	9,602	10,925	14

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

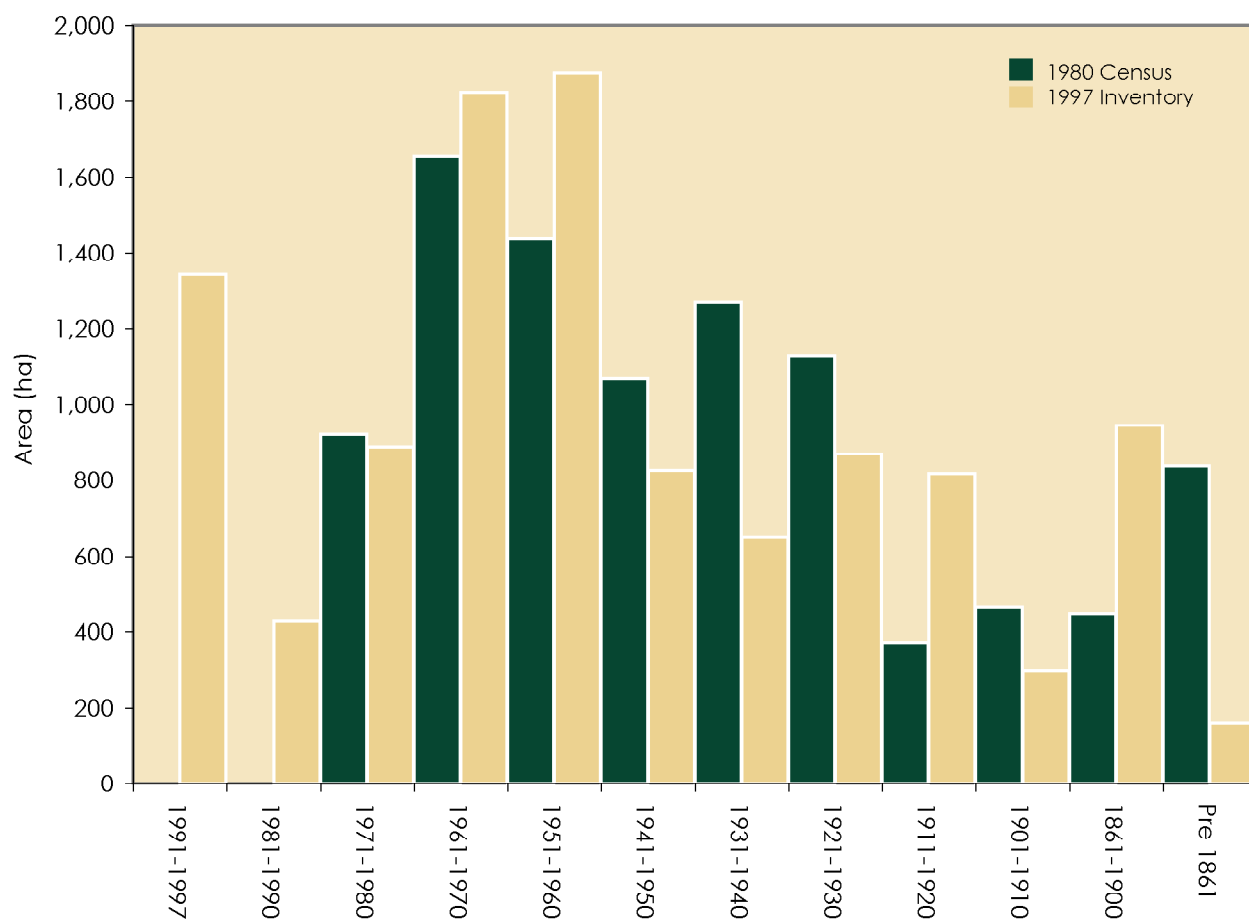
Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1997 Inventory

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

Feature type	1980 Census	1997 Inventory	Change (%)
Boundary Tree	102	56	-45
Middle Tree	34	7	-78
Total Individual Trees	136	63	-53
Groups	383	153	-60
Linear Features	116	288	148
Total	635	505	-21

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

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

Feature type	1980 Census	1997 Inventory	Change (%)
Individual Trees (per sq km)	57.3	26.8	-53
Groups (per sq km)	13.2	13.2	0
Linear Features (m per sq km)	223.9	465.7	108

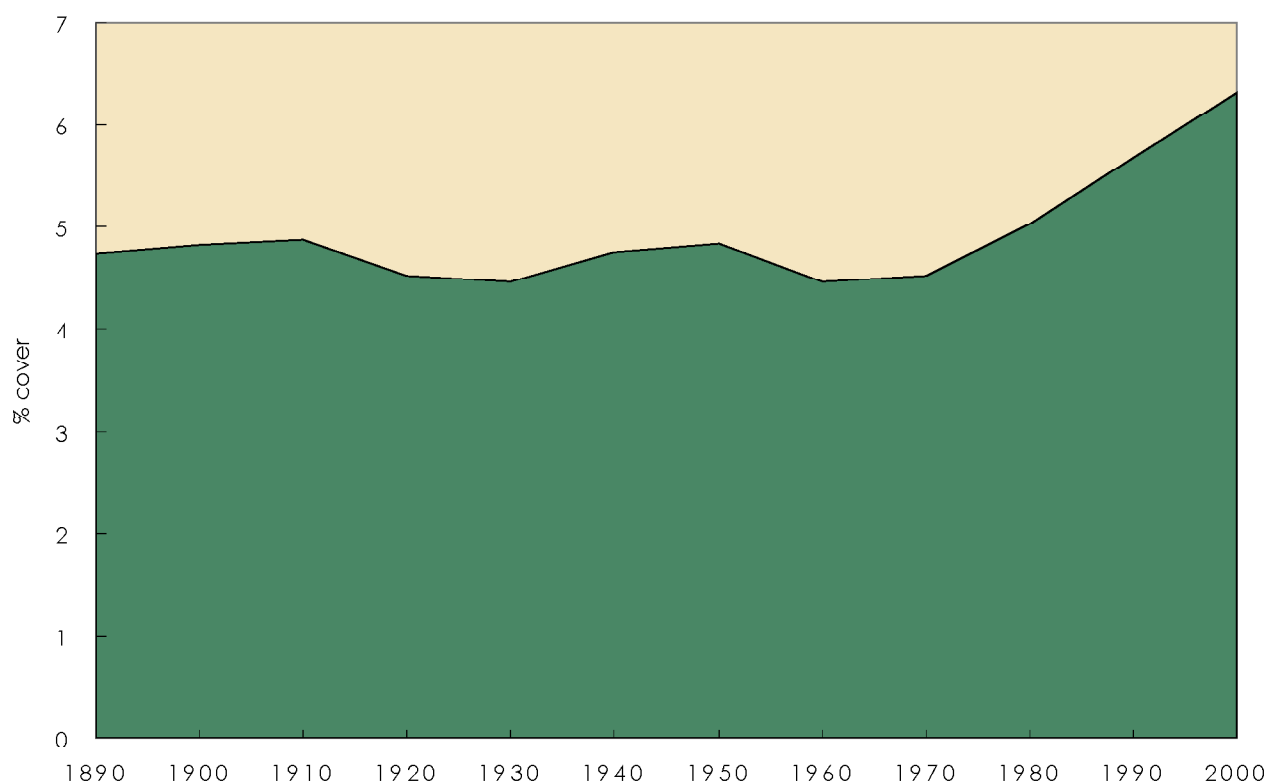
1. The Survey of Small Woodland and Trees did not record information referring to tree features (I.e. Individual trees, Groups and Narrow Linear Features) within developed land.
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WOODLAND COVER

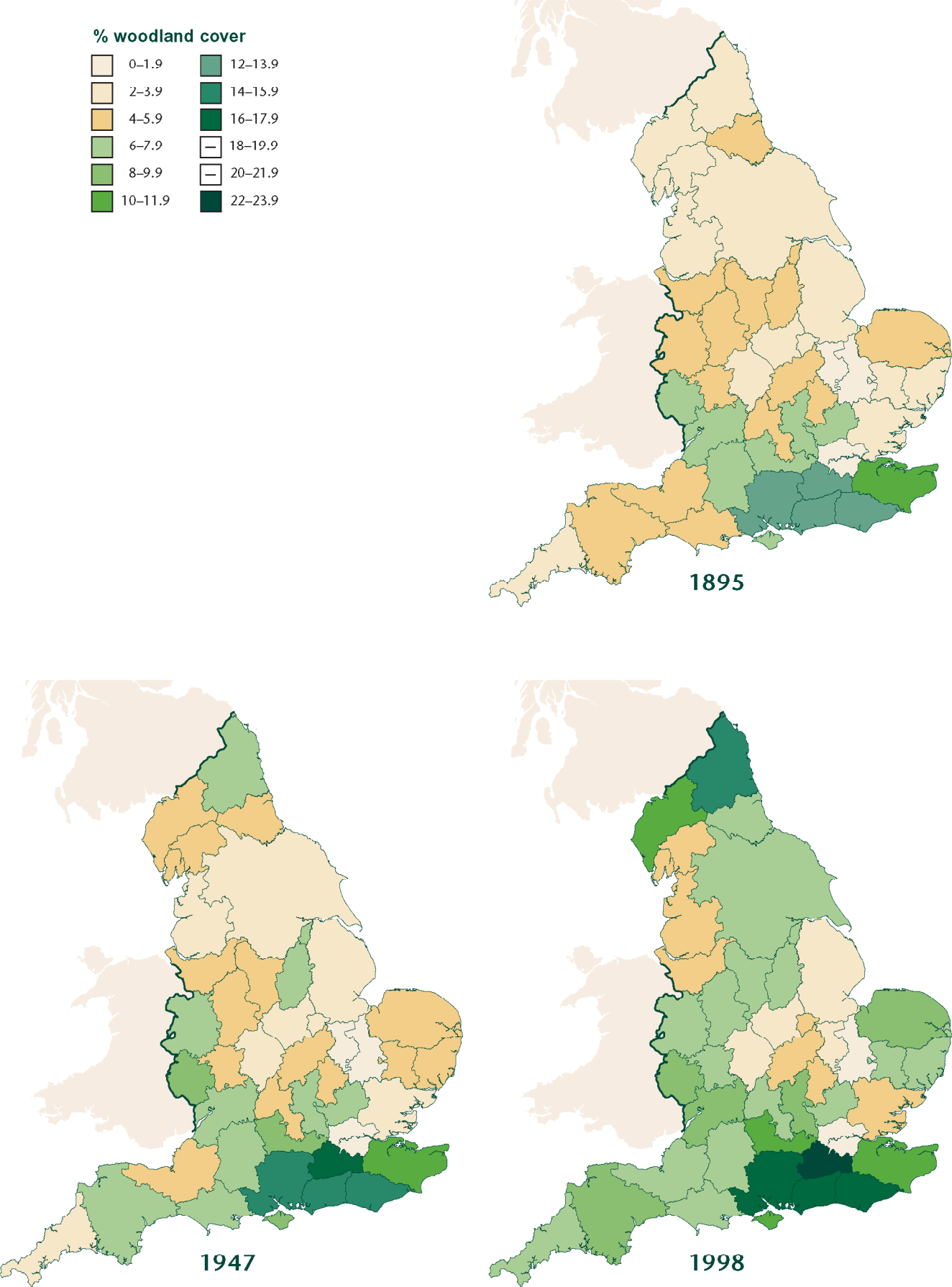
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

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)



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



GLOSSARY

Woodland

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

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

Interpreted Forest Types

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

High Forest

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

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

Mixtures

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

Forest Types

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

- **Coppice**

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

- **Coppice with Standards**

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

- **Felled**

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

- **Windblow**

Areas of blown woodland which remain uncleared and not regenerated.

- **Open Space**

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

Ownership types

- **Other Ownership**

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

- **Personal**

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

- **Private forestry or timber business**

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

- **Other private business**

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

- **Local Authority**

Region, County, District or other Council

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

Government department/agency, nationalised industry, etc.

- **Charitable organisations**

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

- Community ownership or common land

the common property of all members of the community.

- **Forestry Commission**

Land owned by or land leased to the Forestry Commission

Feature types

- **Small Wood**

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

- **Group**

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

- **Individual Tree**

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

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

- **Linear Feature**

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

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

NOTES



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