

NATIONAL INVENTORY OF WOODLAND AND TREES



SCOTLAND



Forestry Commission



Forestry Commission

Inventory Report

**NATIONAL INVENTORY OF
WOODLAND AND TREES**



SCOTLAND

Forestry Commission, Edinburgh

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

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 Scotland 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 With the statistics becoming increasingly out of date the Forestry Commission decided to undertake a new survey: the *National Inventory of Woodland and Trees*.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 Scotland the main survey was based on the Land Cover of Scotland (LCS) 1988 project*, which used 1:25 000 scale aerial photography to create a land cover map. The Forestry Commission extracted the woodland components of this dataset to provide the basis for a digital woodland map showing Interpreted Forest Types. The map was then updated to 1995 for new planting within Woodland Grant Schemes and the Forest Enterprise. The map then provided the basis for sampling.

This digital map gives the extent of all woodland over 2 hectares. 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 in Scotland 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:

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

1 hectare square plots were used to sample the selected woodlands on the

*The Land Cover of Scotland 1988 (LCS88) Final Report
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ground. This was a change of practice from all previous Census surveys, where whole woods had 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 Scotland, excluding the Orkney and Shetland Isles, was stratified into coastal and inland 1 km x 1 km squares. A random sample of the 1 km² plots was 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 Woods (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 Scotland is 1 281 471 hectares. This represents 16.4% of the land area (Table 1).
- Conifer woodland is the dominant forest type representing 69.3% of all woodland. Broadleaved woodland represents 13.8%, Mixed woodland 4.2% and Open Space within woodlands 10.5% (Table 2).
- The main conifer species is Sitka spruce covering 527 591 hectares or 58% of all conifer species. The main broadleaved species is birch covering 77 780 hectares or 38% of all broadleaved species (Table 3).
- 538 154 hectares or 43% of woodland over 2 hectares is owned by or leased to the Forestry Commission, and 714 621 hectares or 57% of woodland is in Other ownerships (Table 6).
- There are a total 17 881 woods over 2 hectares within Scotland with a mean wood area of 70.2 hectares (Table 7a). There are a total of 64 525 woods from 0.1 – <2.0 hectares with a mean wood area of 0.44 hectares (Table 14).
- There are 18.58 million live trees and 0.46 million dead trees outside woodland in Scotland (Tables 17 and 18).
- Woodland land cover increased by over 360 000 hectares from 11.8% to 16.4% of the land area between 1980 and 1995 (Table 23b).
- The area of Broadleaves increased by 68% between 1980 and 1995, with the relative proportion of Broadleaves to Conifers increasing from 15% to 18% (Table 24).

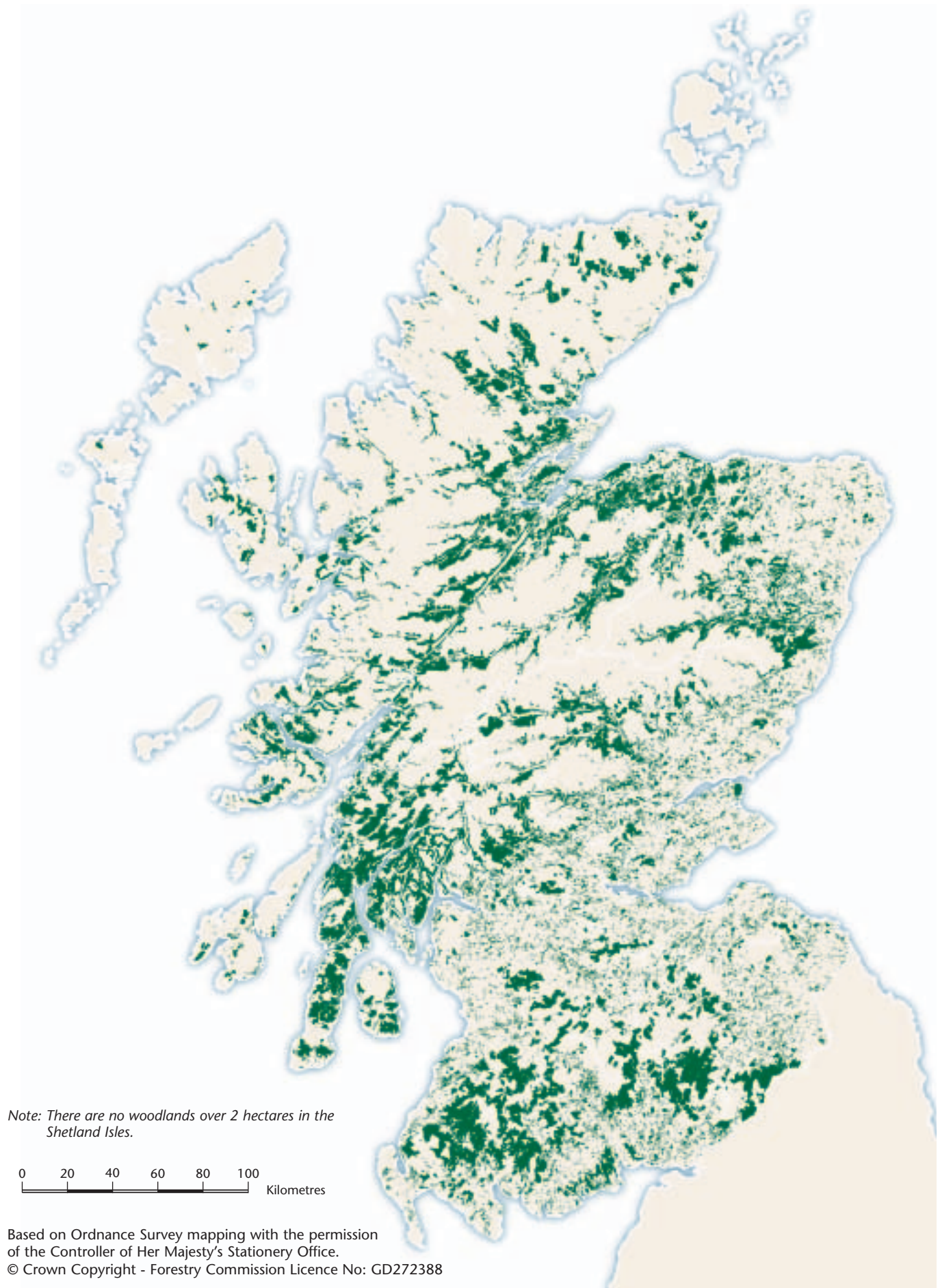
INVENTORY REPORTS

In addition to this Report for Scotland, further information is available for the Scottish regions as shown on the map opposite. Country, region and county reports for England, and country and county reports for Wales, are also available.

Map 1 Regional boundaries

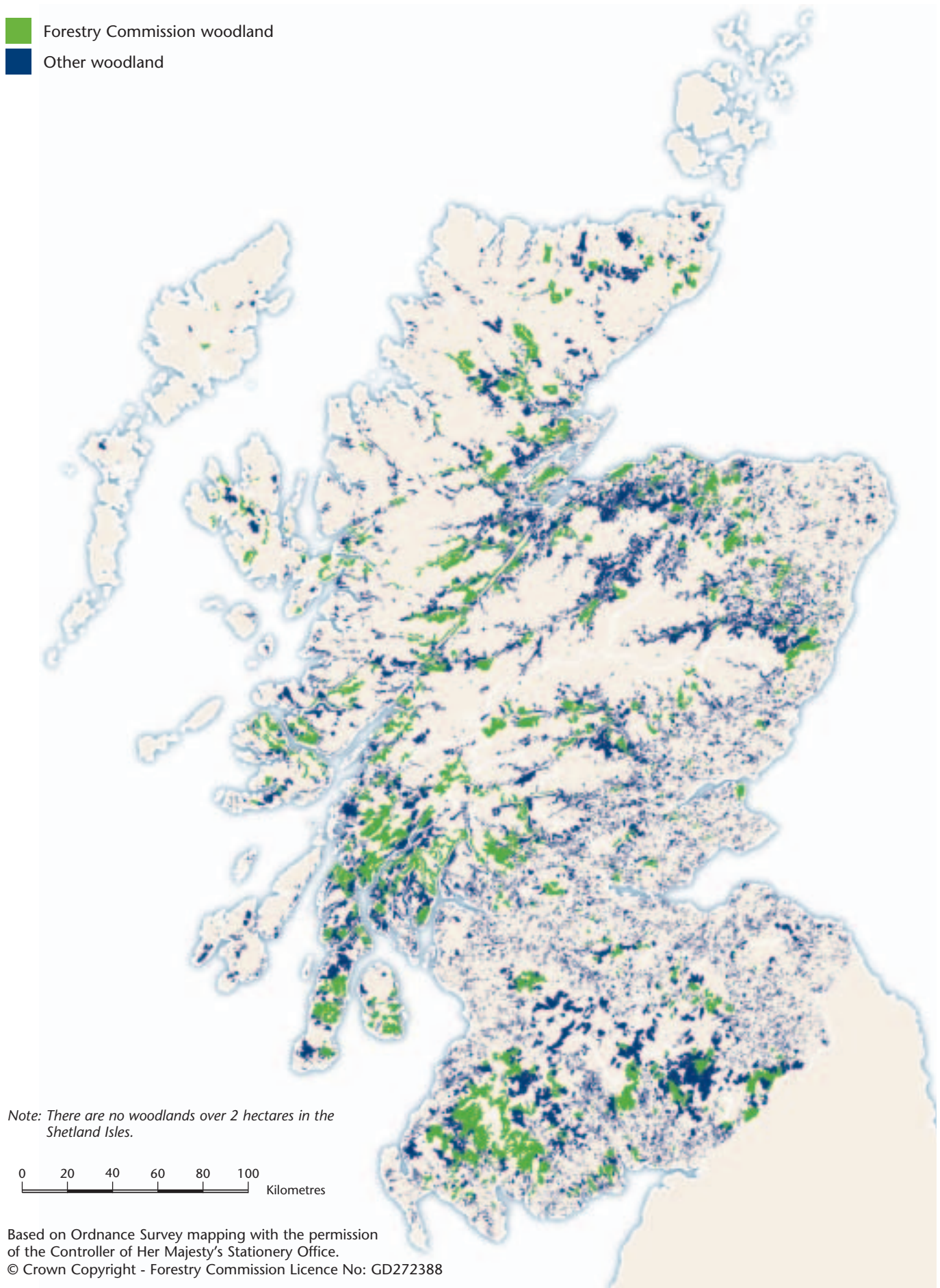


Map 2 Distribution of woodland over 2 hectares



Map 3 Distribution of woodland over 2 hectares by ownership

- Forestry Commission woodland
- Other woodland



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

- Conifers
- Broadleaves
- Mixed
- Coppice & Coppice with Standards
- Young Trees & Shrubs
- Ground Prepared for Planting
- Felled

Note: There are no woodlands over 2 hectares in the Shetland Isles.

0 20 40 60 80 100
Kilometres

Based on Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office.
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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 Scotland.

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)	% Woodland area
2.00 and over	1 252 774	97.8
0.25 – < 2.00	24 799	1.9
0.10 – < 0.25	3 898	0.3
Total area of woodland	1 281 471	100.0
% Woodland land cover	16.4	

1. Area of Scotland, including inland water, 7 813 254 ha based on digital boundaries used in the 1991 Census of Population.
2. The recorded area of new woodland planted in Scotland from 1 April 1995 to 31 March 2001 was approximately 66 000 ha. Assuming that woodland losses over the same period were minimal, then the total woodland area at 31 March 2001 was approximately 1 347 500 ha, giving a total land cover of 17.2%.

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	879 475	8 842	888 317	69.3
Broadleaved	164 998	11 521	176 519	13.8
Mixed	46 494	7 202	53 696	4.2
Coppiced	554	0	554	0.0
Copp-w-Standards	630	0	630	0.0
Windblow	4 319	0	4 319	0.3
Felled	22 979	325	23 304	1.8
Open Space	133 325	805	134 130	10.5
Total	1 252 774	28 697	1 281 471	100.0

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	259 088	5 066	264 154	29	23.5
Sitka spruce	522 925	4 666	527 591	58	47.0
Larch	63 656	1 557	65 213	7	5.8
Other conifers	50 509	788	51 297	6	4.6
Mixed conifers	7 976	259	8 235	1	0.7
Total conifers	904 155	12 335	916 490	100	81.6
Oak	20 215	899	21 114	10	1.9
Beech	8 610	1 351	9 961	5	0.9
Sycamore	10 200	682	10 882	5	1.0
Ash	4 763	141	4 904	2	0.4
Birch	75 996	1 784	77 780	38	6.9
Elm	901	442	1 343	1	0.1
Other broadleaves	16 123	2 562	18 685	9	1.7
Mixed broadleaves	54 323	7 367	61 690	30	5.5
Total broadleaves	191 132	15 231	206 363	100	18.4
Total all species†	1 095 286	27 566	1 122 853		100.0

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

** Species - species/group percentage of all species.

† Excludes the 158 618 ha of Coppice, Felled and Open Space areas, which were included in Table 2.

1. The standard errors of the total area estimates for the most common species or species groups are as follows:

Conifers	1%
Broadleaves	2%
Pine	2%
Sitka spruce	1%
Birch	3%

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	1 349 100	7 888 700	6	104
Narrow Linear Features	233 000	8 471 400	36	112
Individual Trees	2 216 800	2 216 800	1	29
Total		18 576 900		46

1. Land area used to calculate tree density 7 570 281 ha, i.e. Scotland minus the Northern Isles, 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	9%
Narrow Linear Features	12%
Individual Trees	8%
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	20 256	2 789	37
Narrow Linear Features	233 000	15 291	202
Total		18 079	239

1. Land area used to calculate feature density 7 570 281 ha, i.e. Scotland minus the Northern Isles, 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	25%
Narrow Linear Features	11%
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.

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 the sample plots was reduced as the sampled woodlands increased in size, the general aim being to sample 1% of 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	538 154	43
Other	714 621	57
Total area of woodland	1 252 774	100

1. Woodland area from LCS map updated to 31 March 1995.
2. See Glossary for definitions of ownership types.

Woodland area by ownership

Forestry Commission
Other ownership

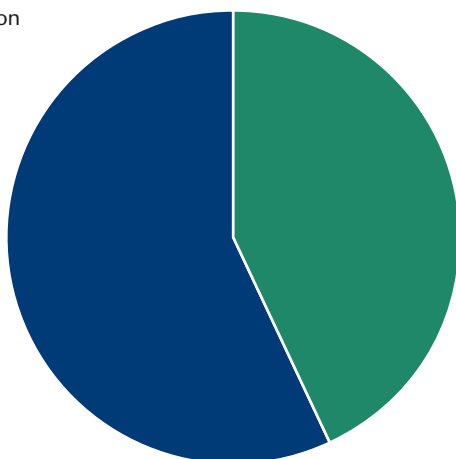


Table 7a Size class distribution of woodland

Size class (ha)	Number of woods	Total area (ha)	Percent of total area	Mean wood area (ha)
<10	11 488	51 790	4	4.5
10 – <20	2 401	33 561	3	14.0
20 – <50	1 890	59 543	5	31.5
50 – <100	815	56 511	5	69.3
<100	16 594	201 405	16	12.1
100 – <500	933	194 880	16	208.9
500 and >	354	858 544	68	2 425.3
All woods	17 881	1 254 829	100	70.2

1. The total area is 2 055 ha more than that recorded in tables based on the sample data. This is mainly due to the field samples recording some land in other land uses not differentiated from woodland in the LCS map which was prepared from aerial photographs.

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	460	1 330	0	2.9
	O	13 643	56 464	4	4.1
10 – <20	FC	131	1 960	0	15.0
	O	2 578	35 959	3	13.9
20 – <50	FC	203	6 761	1	33.3
	O	2 017	63 256	5	31.4
50 – <100	FC	178	12 554	1	70.5
	O	833	57 808	5	69.4
<100	FC	972	22 605	2	23.3
	O	19 071	213 487	17	11.2
100 – <500	FC	345	79 659	6	230.9
	O	931	192 370	15	206.6
500 and >	FC	228	436 743	35	1 915.5
	O	230	309 966	25	1 347.7
Total	FC	1 545	539 006	43	348.9
	O	20 232	715 823	57	35.4

1. Tables 7a and 7b are based solely on the digital woodland map. The other MWS tables are derived from the field sample data.
2. The total area in Tables 7a and 7b is 2 055 hectares more than that recorded in Tables 1 and 3. This is mainly due to the field samples recording some land in other land uses not differentiated from woodland in the digital map.
3. The data available from the digital map enable the identification of woodlands according to their ownerships; Forestry Commission or Other. The entries in Table 7b cannot be added to derive Table 7a as some woods may consist of both Forestry Commission and Other ownership(s).

For example, the Forestry Commission may own most of a large wood with some parts in Other ownership(s). In Table 7a the whole area would be treated as one wood and the area allocated to one size category. In Table 7b each of the ownership units would be allocated to the size category for that unit. Dividing woods by ownership can occasionally generate part-woods of less than 2 hectares.

Table 8 Area of woodland by forest type and ownership

Forest type	Forestry Commission		Other		All ownerships	
	ha	%	ha	%	ha	%
Conifer	437 696	81.3	441 780	61.8	879 475	70.2
Broadleaved	19 866	3.7	145 132	20.3	164 998	13.2
Mixed	10 059	1.9	36 435	5.1	46 494	3.7
Coppice	76	0.0	477	0.1	554	0.0
Copp-w-stds	42	0.0	587	0.1	630	0.1
Windblow	3 099	0.6	1 220	0.2	4 319	0.3
Felled	12 139	2.3	10 841	1.5	22 979	1.8
Open Space	55 176	10.3	78 150	10.9	133 325	10.6
Total	538 154	100.0	714 621	100.0	1 252 774	100.0

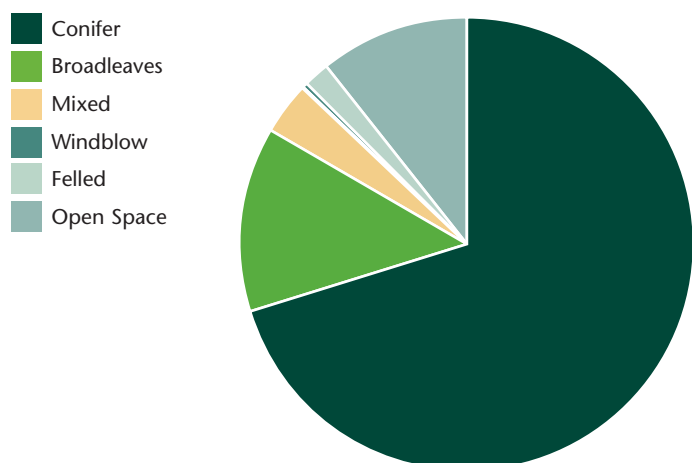
Area of woodland by forest type

Table 9a Area of High Forest by principal species and ownership

Species	Forestry Commission			Other			All ownerships		
	area (ha)	cat* %	spp† %	area (ha)	cat* %	spp† %	area (ha)	cat* %	spp† %
Scots pine	46 980	11	10	88 848	19	14	135 828	15	12
Corsican pine	1 738	0	0	462	0	0	2 200	0	0
Lodgepole pine	71 140	16	15	49 920	11	8	121 060	13	11
Sitka spruce	267 221	60	57	255 704	56	41	522 925	58	48
Norway spruce	17 439	4	4	17 305	4	3	34 744	4	3
European larch	3 173	1	1	5 449	1	1	8 622	1	1
Japanese/hybrid larch	28 766	6	6	26 268	6	4	55 034	6	5
Douglas fir	4 680	1	1	5 589	1	1	10 269	1	1
Other conifers	2 121	0	0	3 376	1	1	5 496	1	1
Mixed conifers	1 765	0	0	6 211	1	1	7 976	1	1
Total conifers	445 023	100	95	459 132	100	74	904 155	100	83
Oak	3 030	12	1	17 185	10	3	20 215	11	2
Beech	687	3	0	7 923	5	1	8 610	5	1
Sycamore	412	2	0	9 788	6	2	10 200	5	1
Ash	478	2	0	4 285	3	1	4 763	2	0
Birch	12 512	49	3	63 484	38	10	75 996	40	7
Poplar	12	0	0	479	0	0	490	0	0
Sweet chestnut	0	0	0	77	0	0	77	0	0
Elm	31	0	0	870	1	0	901	0	0
Other broadleaves	1 634	6	0	13 922	8	2	15 556	8	1
Mixed broadleaves	6 902	27	1	47 421	29	8	54 323	28	5
Total broadleaves	25 698	100	5	165 434	100	26	191 132	100	17
Total – all species	470 720		100	624 566		100	1 095 286		100
Felled	12 139			10 841			22 979		
Total High Forest	482 860			635 407			1 118 265		

*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 133 325 hectares 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	1%
Broadleaves	1%
Sitka spruce	1%
Lodgepole pine	2%
Birch	3%
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

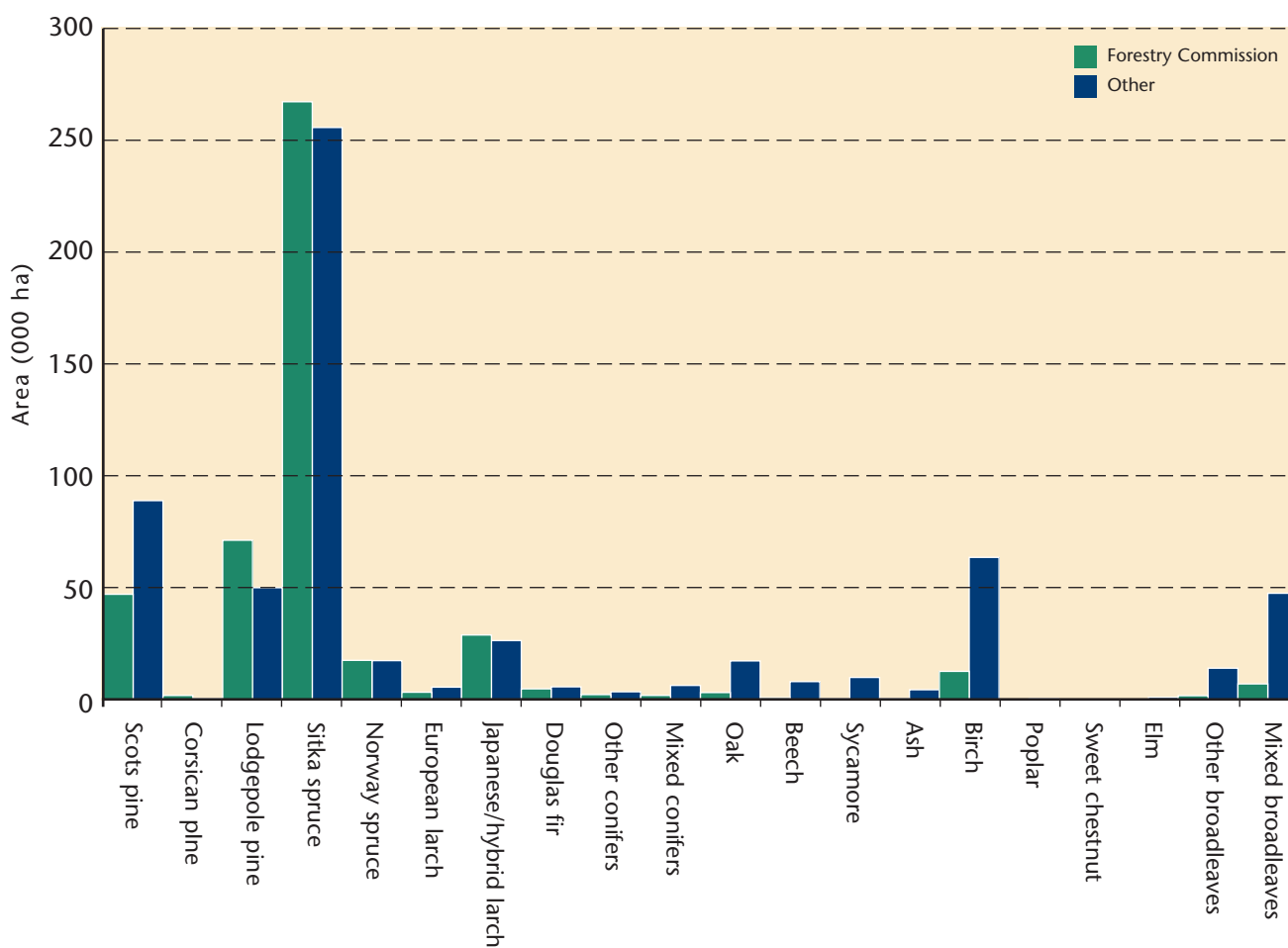


Table 9b Area of High Forest by principal species, ownership and category

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	44 653	2 327	46 980	82 944	5 903	88 848	127 597	8 230	135 828
Corsican pine	1 717	21	1 738	417	46	462	2 134	66	2 200
Lodgepole pine	59 077	12 063	71 140	42 217	7 703	49 920	101 294	19 766	121 060
Sitka spruce	260 813	6 408	267 221	249 767	5 938	255 704	510 579	12 346	522 925
Norway spruce	16 576	863	17 439	16 524	781	17 305	33 100	1 644	34 744
European larch	3 061	112	3 173	4 936	513	5 449	7 997	625	8 622
Japanese/hybrid larch	27 688	1 078	28 766	25 097	1 171	26 268	52 784	2 249	55 034
Douglas fir	4 610	69	4 680	5 517	72	5 589	10 127	142	10 269
Other conifers	1 937	183	2 121	2 792	583	3 376	4 729	767	5 496
Mixed conifers	1 512	253	1 765	4 985	1 225	6 211	6 497	1 479	7 976
Total conifers	421 644	23 377	445 023	435 196	23 935	459 132	856 841	47 314	904 155
Oak	732	2 298	3 030	6 123	11 063	17 185	6 855	13 361	20 215
Beech	447	239	687	3 882	4 040	7 923	4 330	4 280	8 610
Sycamore	158	254	412	5 870	3 918	9 788	6 028	4 173	10 200
Ash	233	245	478	1 786	2 500	4 285	2 018	2 745	4 763
Birch	3 194	9 318	12 512	11 245	52 239	63 484	14 439	61 557	75 996
Poplar	0	12	12	271	208	479	271	220	490
Sweet chestnut	0	0	0	77	0	77	77	0	77
Elm	31	0	31	293	577	870	324	577	901
Other broadleaves	263	1 371	1 634	2 366	11 556	13 922	2 629	12 927	15 556
Mixed broadleaves	1 620	5 282	6 902	14 088	33 332	47 421	15 708	38 615	54 323
Total broadleaves	6 678	19 019	25 698	46 001	119 433	165 434	52 678	138 455	191 132
Total – all species	428 322	42 398	470 720	481 197	143 369	624 566	909 519	185 767	1 095 286

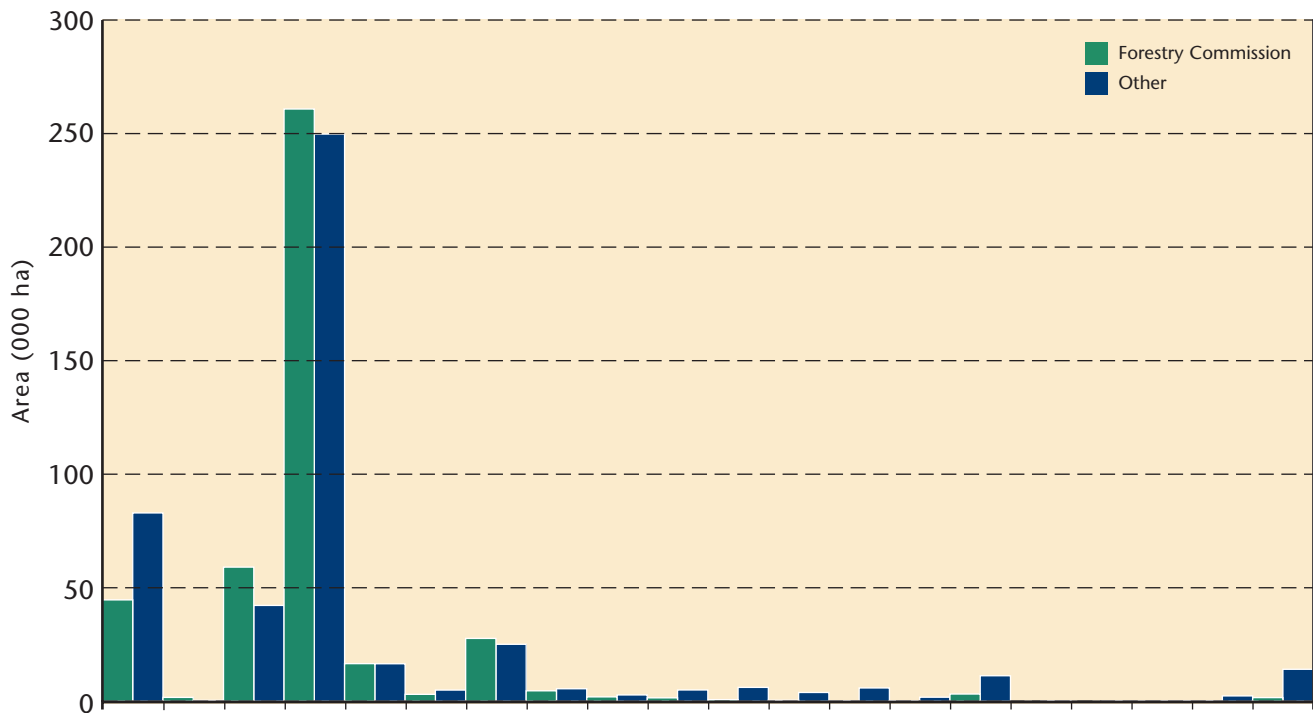
1. The standard errors of the All ownerships area estimates for the most common species or species groups (in all woodland types) are as follows:

	Category 1*	Category 2*	Total High Forest
Conifers	0%	3%	1%
Broadleaves	3%	1%	1%
Sitka spruce	1%	7%	1%
Lodgepole pine	2%	6%	2%
Birch	5%	3%	3%

*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

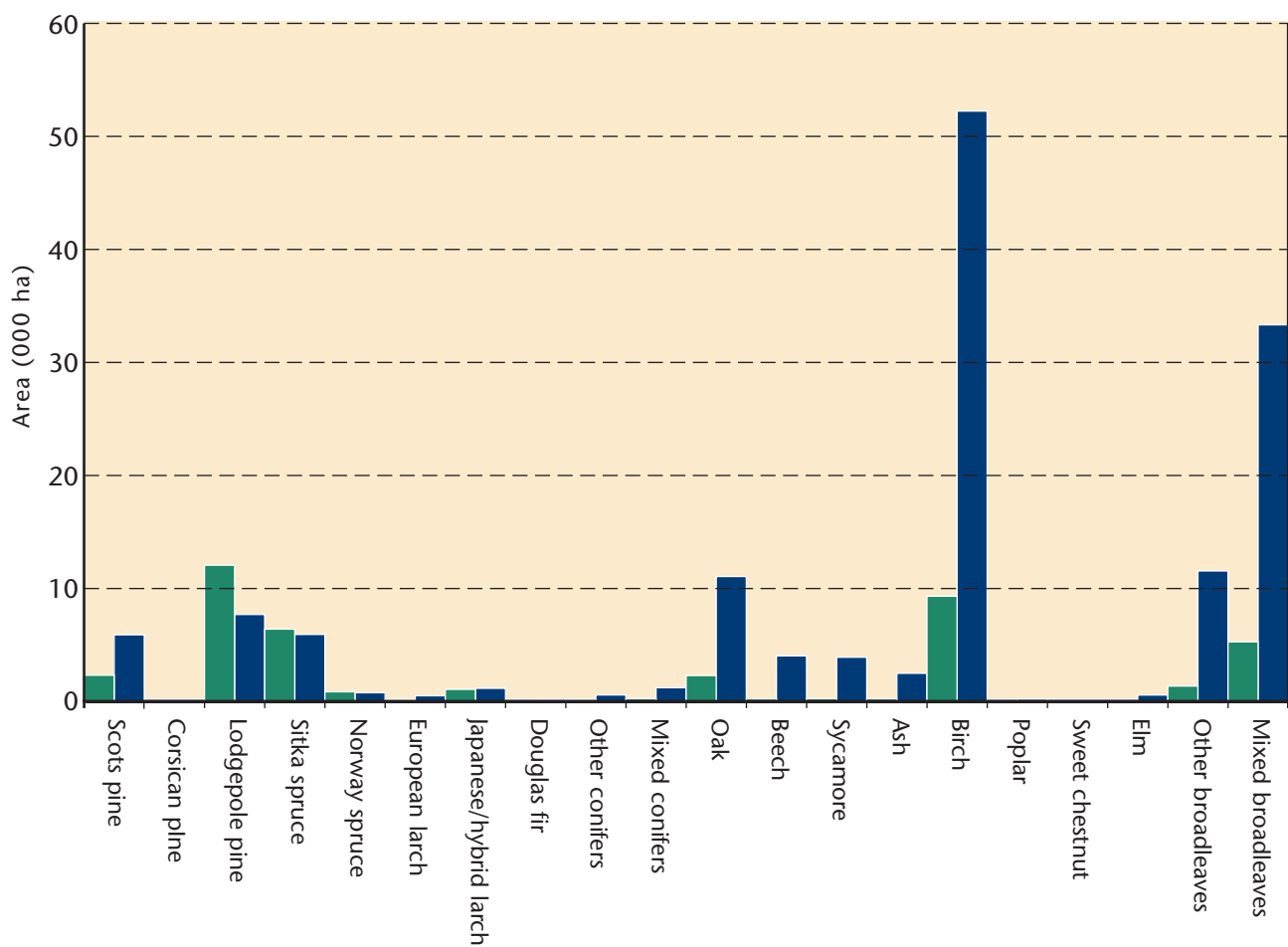
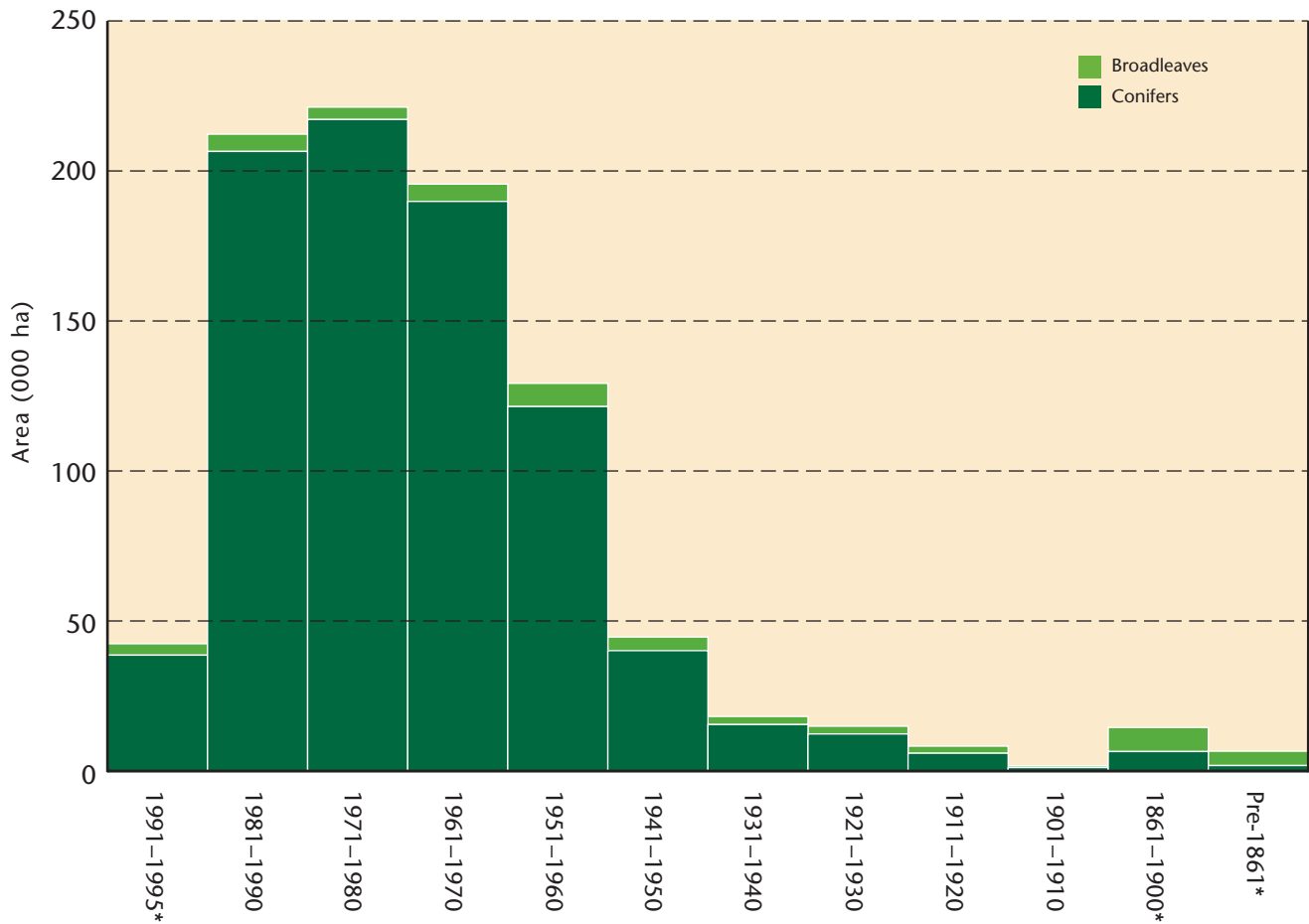


Table 10a High Forest Category 1 - Area by principal species and planting year class

Species	Planting year class*												Total (ha)
	1991 –1995	1981 –1990	1971 –1980	1961 –1970	1951 –1960	1941 –1950	1931 –1940	1921 –1930	1911 –1920	1901 –1910	1861 –1900	pre - 1861	
Scots pine	3 599	8 152	8 378	28 770	37 183	15 710	6 604	7 498	4 432	776	4 830	1 665	127 597
Corsican pine	0	228	126	186	829	142	368	249	0	5	0	0	2 134
Lodgepole pine	2 851	26 922	34 917	26 444	9 371	410	104	28	0	0	144	104	101 294
Sitka spruce	29 275	155 285	159 648	109 963	40 745	11 316	2 988	1 158	54	36	110	0	510 579
Norway spruce	450	1 407	3 358	9 476	9 403	5 390	1 881	1 255	354	32	93	0	33 100
European larch	63	467	422	863	1 776	1 175	1 361	693	532	90	535	21	7 997
Japanese/hybrid larch	1 534	9 913	7 825	10 093	16 772	4 466	1 382	512	234	30	27	0	52 784
Douglas fir	604	2 434	884	1 896	2 581	708	294	388	230	48	59	0	10 127
Other conifers	52	934	973	1 172	877	245	187	200	13	9	69	0	4 729
Mixed conifers	178	768	617	984	1 929	545	305	359	59	115	615	25	6 497
Total conifers	38 605	206 509	217 145	189 848	121 466	40 108	15 475	12 341	5 908	1 141	6 481	1 814	856 841
Oak	411	593	9	103	121	125	301	273	501	194	2 213	2 012	6 855
Beech	182	94	85	179	381	109	369	213	369	92	1 221	1 034	4 330
Sycamore	268	169	547	643	1 383	903	302	410	173	31	1 049	149	6 028
Ash	299	252	42	258	251	278	156	79	53	0	273	79	2 018
Birch	379	1 781	2 047	2 701	3 384	1 806	752	635	306	73	525	48	14 439
Poplar	0	7	75	62	21	81	20	4	0	0	0	0	271
Sweet chestnut	0	3	0	0	0	0	0	0	0	0	74	0	77
Elm	0	0	23	57	40	65	20	2	0	0	116	0	324
Other broadleaves	274	745	186	296	215	260	72	328	39	0	192	21	2 629
Mixed broadleaves	1 981	2 108	1 113	1 467	1 934	907	693	628	928	184	2 339	1 427	15 708
Total broadleaves	3 795	5 752	4 125	5 767	7 731	4 535	2 686	2 575	2 369	573	8 000	4 771	52 678
Total – all species	42 400	212 261	221 269	195 615	129 197	44 643	18 161	14 916	8 278	1 715	14 481	6 585	909 519

*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



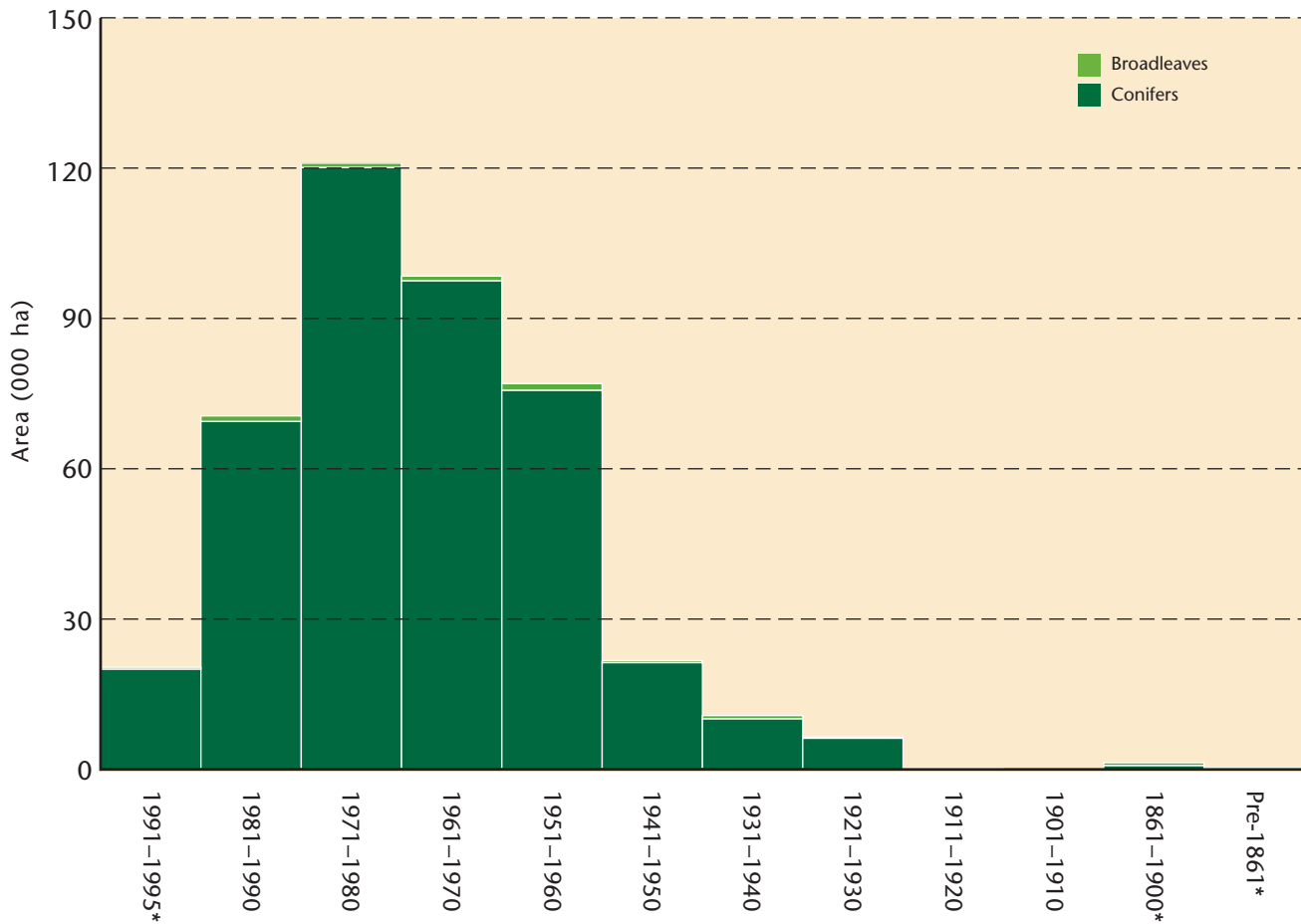
*Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991 –1995	1981 –1990	1971 –1980	1961 –1970	1951 –1960	1941 –1950	1931 –1940	1921 –1930	1911 –1920	1901 –1910	1861 –1900	pre - 1861	
Scots pine	1 142	2 343	1 435	8 398	17 652	6 209	3 257	3 386	143	37	590	61	44 653
Corsican pine	0	183	0	117	781	90	364	182	0	0	0	0	1 717
Lodgepole pine	1 295	10 447	22 067	17 790	6 986	258	104	28	0	0	0	104	59 077
Sitka spruce	16 500	50 215	91 307	61 206	29 850	8 315	2 485	908	5	0	22	0	260 813
Norway spruce	151	519	673	2 936	5 723	3 938	1 689	939	0	0	8	0	16 576
European larch	5	74	82	437	733	203	1 098	264	29	0	136	0	3 061
Japanese/hybrid larch	608	3 840	4 004	4 983	11 451	1 890	819	94	0	0	0	0	27 688
Douglas fir	293	1 159	274	932	1 287	216	168	270	0	0	11	0	4 610
Other conifers	38	514	197	513	495	75	24	81	0	0	0	0	1 937
Mixed conifers	0	152	108	221	714	121	108	67	0	0	22	0	1 512
Total conifers	20 032	69 445	120 146	97 534	75 672	21 313	10 115	6 217	177	37	790	165	421 644
Oak	5	13	0	1	32	0	79	5	79	36	318	165	732
Beech	0	25	8	22	30	0	247	8	1	33	21	49	447
Sycamore	0	0	0	2	86	0	41	6	0	0	22	0	158
Ash	24	89	0	0	31	0	89	0	0	0	0	0	233
Birch	28	710	500	782	603	306	54	40	5	0	162	5	3 194
Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	31	0	0	0	0	0	0	0	31
Other broadleaves	31	29	73	36	85	0	0	9	0	0	0	0	263
Mixed broadleaves	258	230	254	73	419	85	117	149	12	13	10	0	1 620
Total broadleaves	347	1 096	835	917	1 318	390	627	217	97	82	532	219	6 678
Total – all species	20 379	70 541	120 981	98 452	76 990	21 704	10 742	6 435	274	119	1 322	383	428 322

*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



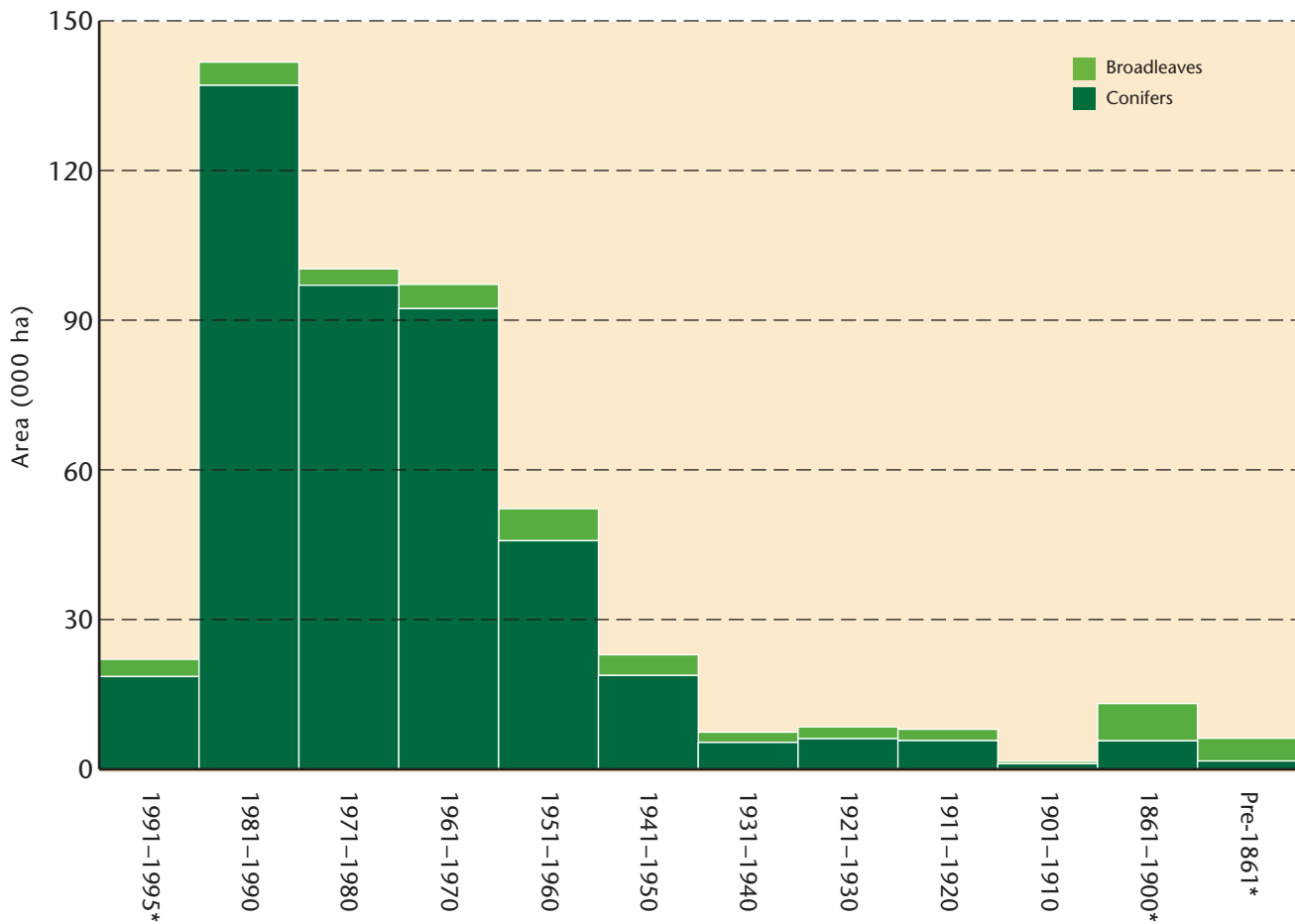
*Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

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

Species	Planting year class*												Total (ha)
	1991 -1995	1981 -1990	1971 -1980	1961 -1970	1951 -1960	1941 -1950	1931 -1940	1921 -1930	1911 -1920	1901 -1910	1861 -1900	pre - 1861	
Scots pine	2 457	5 809	6 943	20 372	19 531	9 502	3 347	4 112	4 289	739	4 239	1 604	82 944
Corsican pine	0	45	126	69	48	51	5	67	0	5	0	0	417
Lodgepole pine	1 556	16 475	12 850	8 655	2 385	153	0	0	0	0	144	0	42 217
Sitka spruce	12 775	105 071	68 342	48 757	10 894	3 001	503	250	49	36	88	0	249 767
Norway spruce	298	887	2 685	6 540	3 679	1 453	192	316	354	32	85	0	16 524
European larch	58	393	340	426	1 043	972	262	430	503	90	399	21	4 936
Japanese/hybrid larch	926	6 073	3 821	5 110	5 320	2 576	562	418	234	30	27	0	25 097
Douglas fir	311	1 276	609	964	1 294	492	126	119	230	48	48	0	5 517
Other conifers	14	419	776	657	383	170	164	119	13	9	69	0	2 792
Mixed conifers	178	616	508	763	1 215	424	198	292	59	115	593	25	4 985
Total conifers	18 573	137 064	96 999	92 313	45 794	18 794	5 360	6 123	5 731	1 104	5 691	1 649	435 196
Oak	405	580	9	102	89	125	222	268	422	158	1 895	1 847	6 123
Beech	182	68	77	157	351	109	122	205	368	59	1 200	985	3 882
Sycamore	268	169	547	640	1 296	903	261	404	173	31	1 027	149	5 870
Ash	275	163	42	258	220	278	67	79	53	0	273	79	1 786
Birch	351	1 071	1 547	1 919	2 781	1 501	699	595	302	73	363	44	11 245
Poplar	0	7	75	62	21	81	20	4	0	0	0	0	271
Sweet chestnut	0	3	0	0	0	0	0	0	0	0	74	0	77
Elm	0	0	23	57	9	65	20	2	0	0	116	0	293
Other broadleaves	243	716	112	259	130	260	72	319	39	0	192	21	2 366
Mixed broadleaves	1 723	1 877	859	1 393	1 514	823	576	479	916	171	2 329	1 427	14 088
Total broadleaves	3 448	4 656	3 289	4 850	6 413	4 145	2 058	2 358	2 272	491	7 468	4 552	46 001
Total – all species	22 021	141 719	100 288	97 163	52 207	22 939	7 418	8 481	8 004	1 595	13 159	6 202	481 197

*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

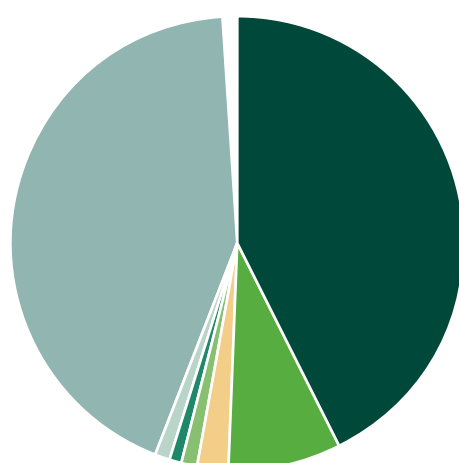


*Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

Table 11 High Forest: principal species by planting year class

Planting year class	First	%	Second	%	Third	%
1991–1995	Sitka spruce	62	Mixed broadleaves	10	Scots pine	8
1981–1990	Sitka spruce	70	Lodgepole pine	13	Japanese/hybrid larch	4
1971–1980	Sitka spruce	67	Lodgepole pine	18	Scots pine	4
1961–1970	Sitka spruce	50	Lodgepole pine	15	Scots pine	13
1951–1960	Sitka spruce	28	Scots pine	25	Japanese/hybrid larch	11
1941–1950	Scots pine	24	Birch	18	Sitka spruce	18
1931–1940	Birch	24	Scots pine	22	Sitka spruce	10
1921–1930	Birch	30	Scots pine	28	Mixed broadleaves	12
1911–1920	Scots pine	29	Birch	27	Mixed broadleaves	14
1901–1910	Birch	36	Mixed broadleaves	22	Scots pine	16
1861–1900	Mixed broadleaves	22	Oak	21	Scots pine	16
Pre-1861	Oak	40	Scots pine	27	Mixed broadleaves	16
All years	Sitka spruce	48	Scots pine	12	Lodgepole pine	11

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

Ownership type by area

Personal
Business
Forestry or timber business
Charity
Local Authority
Other public
Forestry Commission
Unidentified

Table 12 Ownership type* by area and percentage

Ownership type	Area (ha)	%
Personal	533 485	42.6
Business	100 734	8.0
Forestry or timber business	27 750	2.2
Charity	14 129	1.1
Local Authority	10 812	0.9
Other public (not FC)	13 304	1.1
Forestry Commission	539 478	43.1
Community ownership or common land	327	0
Unidentified	12 755	1.0
Total	1 252 774	100.0

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

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

Survey method

The land area of Scotland, excluding the Orkney and Shetland Isles, was stratified into coastal and inland 1 km x 1 km squares. A random sample of the 1 km² plots was 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 Woods (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:	Woodland area by forest type, woodland size and feature type
Table 16:	Woodland area by species and feature type
Table 17:	Numbers of live trees outside woodland by species and feature type
Table 18:	Numbers of dead trees outside woodland by species and feature type
Table 19:	Numbers of live Individual Trees by species and height band
Table 20:	Numbers of live trees in Groups by species and height band
Table 21:	Numbers of live trees in Narrow Linear Features by species and height band
Table 22:	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 Woodland and Trees

Feature type	Number of features	Total	Unit
Small Woods	44 269	21 202	Area (ha)
Wide Linear Features	20 256	7 495	Area (ha)
Wide Linear Features	20 256	2 789	Length (km)
Narrow Linear Features	233 000	15 291	Length (km)
Narrow Linear Features	233 000	8 472 000	Number of live trees
Groups	1 345 100	7 888 700	Number of live trees
Individual Trees	2 216 800	2 216 800	Number of live trees

1. See Glossary for definitions of feature types.

Table 14 Woodland area by feature type and woodland size

Feature type	Woodland size (ha)		Total area (ha)	Number of features	Mean size (ha)
	0.1 – <0.25	0.25 – <2.0			
Small Woods	2 932	18 270	21 202	44 269	0.48
Wide Linear Features	966	6 529	7 495	20 256	0.37
Total	3 898	24 799	28 697	64 525	0.44

1. The standard errors of the total area estimates for these feature types are:

Small Woods	18%
Wide Linear Features	26%

2. See Glossary for definitions of feature types.

Table 15 Woodland area by forest type, woodland size and feature type

Forest type	Woodland size class (ha)						Total area (ha) SW + WLF
	0.1 – <0.25		0.25 – <2.0		0.1 – <2.0		
	SW*	WLF†	SW	WLF	SW	WLF	
Conifer	714	168	6 503	1 457	7 217	1 625	8 842
Broadleaved	1 974	672	6 966	1 909	8 940	2 581	11 521
Mixed	215	126	3 962	2 899	4 177	3 025	7 202
Coppiced	0	0	0	0	0	0	0
Copp-w-stds	0	0	0	0	0	0	0
Windblow	0	0	0	0	0	0	0
Felled	0	0	325	0	325	0	325
Open Space	28	0	513	264	541	264	805
Total	2 932	966	18 270	6 529	21 202	7 495	28 697

*SW - Small Woods, †WLF - Wide Linear Features.

1. See Glossary for definitions of forest type and feature type.

Table 16 Woodland area by species and feature type

Species	Feature type		Total area (ha)	Percent of total area	
	Small Wood	Wide Linear Feature		Category	Species
Pine	3 513	1 553	5 066	41.1	18.4
Spruce	3 934	1 315	5 249	42.6	19.0
Larch	971	586	1 557	12.6	5.6
Cypress	0	0	0	0.0	0.0
Other conifers	205	0	205	1.7	0.7
Mixed conifers	159	100	259	2.1	0.9
Total conifers	8 782	3 554	12 335	100.0	44.7
Oak	766	133	899	5.9	3.3
Beech	1 037	314	1 351	8.9	4.9
Sycamore	287	395	682	4.5	2.5
Ash	141	0	141	0.9	0.5
Birch	1 558	190	1 748	11.5	6.3
Poplar	0	0	0	0.0	0.0
Sweet chestnut	0	0	0	0.0	0.0
Horse chestnut	0	0	0	0.0	0.0
Alder	393	217	610	4.0	2.2
Lime	0	0	0	0.0	0.0
Elm	152	290	442	2.9	1.6
Willow	1 135	39	1 174	7.7	4.3
Other broadleaves	779	0	779	5.1	2.8
Mixed broadleaves	5 306	2 061	7 367	48.4	26.7
Total broadleaves	11 554	3 639	15 231	100.0	55.3
Total – all species	20 336	7 193	27 566		100.0

*Areas above exclude the 1 131 ha of Felled and Open Space areas which were included in Table 15.

1. Percentages:

Category: species percentage of conifer or broadleaved
Species: percentage of all species

2. The standard errors of the total area estimates for the most common species/groups are:

Pine	30%
Spruce	31%
Beech	51%
Birch	33%

3. See Glossary for definitions of feature types.

Table 17 Numbers of live trees outside woodland by species and feature type (000s trees)

Species	Feature type				Total live trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	8.2	49.9	253.3	442.7	754.1	28.6	4.1
Spruce	16.0	69.8	446.6	839.1	1 371.5	51.9	7.4
Larch	5.0	36.8	196.2	55.6	293.6	11.1	1.6
Cypress	6.8	6.7	66.8	69.1	149.4	5.7	0.8
Other conifers	1.6	10.3	25.2	34.9	72.0	2.7	0.4
Total conifers	37.6	173.5	988.1	1 441.4	2 640.6	100.0	14.2
Oak	27.1	55.6	165.6	128.2	376.5	2.4	2.0
Beech	58.0	19.9	258.6	472.3	808.8	5.1	4.4
Sycamore	66.5	75.6	447.8	464.3	1 054.2	6.6	5.7
Ash	84.1	78.7	399.3	410.2	972.3	6.1	5.2
Birch	41.0	343.1	1 319.1	1 053.1	2 756.3	17.3	14.8
Poplar	0.7	8.7	36.7	18.6	64.7	0.4	0.3
Sweet chestnut	0.8	0.0	0.0	0.0	0.8	0.0	0.0
Horse chestnut	0.8	3.1	12.0	14.0	29.9	0.2	0.2
Alder	19.9	37.4	324.4	729.9	1 111.6	7.0	6.0
Lime	4.6	14.0	36.0	82.8	137.4	0.9	0.7
Elm	19.5	13.5	70.9	200.3	304.2	1.9	1.6
Willow	57.8	136.6	945.2	694.5	1 834.1	11.5	9.9
Other broadleaves	356.8	481.7	2 816.7	2 359.8	6 015.0	37.7	32.4
Mixed broadleaves	0.0	0.0	68.1	401.9	470.0	2.9	2.5
Total broadleaves	737.5	1 268.0	6 900.6	7 029.9	15 935.8	100.0	85.8
Total – all species	776.0	1 440.8	7 888.7	8 471.4	18 576.9		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 8%
Groups 9%
Narrow Linear Features 12%
- See Glossary for definitions of feature types.

Table 18 Numbers of dead trees outside woodland by species and feature type (000s of trees)

Species	Feature type				Total dead trees	Percent of total trees	
	Boundary Trees	Middle Trees	Groups	Narrow Linear Features		Category	Species
Pine	0.0	3.2	11.1	5.7	20.0	24.2	4.4
Spruce	0.0	6.3	10.4	22.8	39.5	47.8	8.7
Larch	0.7	6.2	6.3	9.1	22.3	27.0	4.9
Cypress	0.0	0.8	0.0	0.0	0.8	1.0	0.2
Other conifers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total conifers	0.7	16.5	27.8	37.6	82.6	100.0	18.2
Oak	0.0	0.0	6.3	2.8	9.1	2.4	2.0
Beech	2.4	0.8	0.8	11.0	15.0	4.0	3.3
Sycamore	0.0	0.0	2.4	0.7	3.1	0.8	0.7
Ash	0.8	0.0	4.0	4.5	9.3	2.5	2.0
Birch	6.4	10.4	36.4	26.6	79.8	21.4	17.5
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	2.4	1.6	10.4	21.7	36.1	9.7	7.9
Lime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elm	8.6	4.7	25.4	31.9	70.6	19.0	15.5
Willow	0.0	0.8	9.6	21.0	31.4	8.4	6.9
Other broadleaves	9.5	8.8	60.7	29.2	108.2	29.1	23.8
Mixed broadleaves	0.0	0.0	0.8	9.0	9.8	2.6	2.2
Total broadleaves	30.1	27.1	156.8	158.4	372.4	100.0	81.8
Total – all species	30.8	43.6	184.6	196.0	455.0		100.0

1. See Glossary for definitions of feature types.

Table 19 Numbers of live Individual Trees by species and height band (000s trees)

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	25.6	26.3	6.4	0.0	58.3
Spruce	33.9	41.7	9.5	0.8	85.9
Larch	11.1	26.9	3.1	0.8	41.9
Cypress	10.3	3.2	0.0	0.0	13.5
Other conifers	9.5	1.6	0.8	0.0	11.9
Total conifers	90.4	99.7	19.8	1.6	211.5
Oak	11.1	39.4	24.4	7.8	82.7
Beech	15.0	47.7	11.2	3.9	77.8
Sycamore	59.4	71.8	9.3	1.6	142.1
Ash	55.0	79.7	27.4	0.8	162.9
Birch	178.6	203.1	2.4	0.0	384.1
Poplar	0.8	8.6	0.0	0.0	9.4
Sweet chestnut	0.0	0.8	0.0	0.0	0.8
Horse chestnut	0.0	3.1	0.8	0.0	3.9
Alder	27.9	25.4	3.9	0.0	57.2
Lime	5.4	7.9	1.6	3.7	18.6
Elm	13.2	16.6	3.2	0.0	33.0
Willow	151.6	40.5	1.6	0.8	194.5
Other broadleaves	711.1	127.5	0.0	0.0	838.6
Total broadleaves	1 229.1	672.1	85.8	18.6	2 005.6
Total – all species	1 319.5	771.8	105.6	20.2	2 216.8

Table 20 Numbers of live trees in Groups by species and height band (000s trees)

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	51.7	182.6	19.1	0.0	253.4
Spruce	143.3	257.6	43.3	2.4	446.6
Larch	60.9	114.1	20.4	0.8	196.2
Cypress	32.0	32.4	0.8	1.6	66.8
Other conifers	13.3	7.9	2.4	1.6	25.2
Total conifers	301.2	594.6	86.0	6.4	988.2
Oak	28.6	88.2	35.0	13.9	165.7
Beech	74.1	139.9	36.0	8.7	258.7
Sycamore	113.5	281.3	49.1	3.9	447.8
Ash	148.8	204.8	41.9	3.9	399.4
Birch	697.9	601.3	15.9	4.0	1 319.1
Poplar	3.9	30.4	2.4	0.0	36.7
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	0.8	8.8	1.6	0.8	12.0
Alder	159.5	149.9	13.4	1.6	324.4
Lime	3.0	18.3	11.0	3.8	36.1
Elm	27.4	34.0	7.2	2.4	71.0
Willow	712.6	232.6	0.0	0.0	945.2
Other broadleaves	2 333.5	476.0	7.2	0.0	2 816.7
Mixed broadleaves	46.4	21.7	0.0	0.0	68.1
Total broadleaves	4 350.0	2 287.2	220.7	43.0	6 900.9
Total – all species	4 651.2	2 881.8	306.7	49.4	7 888.7

Table 21 Numbers of live trees in Narrow Linear Features by species and height band (000s trees)

Species	Height band (m)				Total live trees
	2-5	5-15	15-20	>20	
Pine	34.0	373.8	34.9	0.0	442.7
Spruce	409.4	391.6	36.1	2.1	839.2
Larch	9.3	46.3	0.0	0.0	55.6
Cypress	47.2	19.6	0.8	1.6	69.2
Other conifers	11.7	11.2	4.3	7.7	34.9
Total conifers	511.6	842.5	76.1	11.4	1 441.6
Oak	21.8	70.1	24.5	11.9	128.3
Beech	134.7	217.6	112.1	7.8	472.2
Sycamore	230.3	165.7	60.9	7.4	464.3
Ash	103.5	239.8	54.6	12.3	410.2
Birch	563.5	477.1	11.7	0.8	1 053.1
Poplar	0.0	18.6	0.0	0.0	18.6
Sweet chestnut	0.0	0.0	0.0	0.0	0.0
Horse chestnut	2.3	0.8	10.9	0.0	14.0
Alder	201.8	418.3	109.7	0.0	729.8
Lime	5.5	33.8	40.3	3.2	82.8
Elm	124.8	59.8	11.9	3.7	200.2
Willow	404.0	289.9	0.7	0.0	694.6
Other broadleaves	1 788.1	559.7	12.1	0.0	2 359.8
Mixed broadleaves	65.3	314.1	22.4	0.0	401.8
Total broadleaves	3 645.6	2 865.3	471.8	47.1	7 029.9
Total – all species	4 157.2	3 707.8	547.9	58.5	8 471.4

Table 22 Number of Groups by group size

Number of trees per Group*	Number of Groups (000s)
2	304
3–5	513
6–10	259
11–20	155
21–50	84
51–100	25
>100	6
Total	1 345

*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 1995 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 photographs 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 23a:	Comparison of woodland area between 1980 Census and 1995 Inventory (based on 1980 methodology)
Table 23b:	Comparison of woodland area between 1980 Census and 1995 Inventory (based on 1995 methodology)
Table 24:	Comparison of High Forest area by species between 1980 Census and 1995 Inventory
Chart:	Comparison of High Forest area by species between 1980 Census and 1995 Inventory
Table 25:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory
Chart:	Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory
Table 26:	Comparison of numbers of live trees outside woodland between 1980 Census and 1995 Inventory
Table 27:	Comparison of density of non-woodland features between 1980 Census and 1995 Inventory

Woodland Cover

Chart:	Change in woodland cover through time (1870–2000)
Map Series:	Woodland cover by county through time (1895–1995)

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

Table 23a Comparison of woodland area between 1980 Census and 1995 Inventory (based on 1980 methodology)

Woodland size (ha)	1980 Census woodland area		1995 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
2.0 or more	898 455	97.7	1 250 322	98.1	39
0.25 – <2.0	21 470	2.3	24 799	1.9	16
Total	919 925		1 275 121		39
% Woodland land cover	12.7		17.6		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The above figures from the 1995 Inventory exclude the Western and Northern Isles, and woodland between 0.1 and <0.25 hectares, thereby matching the scope of the 1980 Census. The 1995 figures will therefore not match those in the previous sections of the report.
3. Land area used to calculate woodland cover percent, 7 256 928 hectares, i.e. Scotland minus the Western and Northern Isles, was based on the 1991 Census of Population digital boundaries.
4. The land area used in the 1980 Census was 7 321 263 hectares, hence woodland cover was quoted as 12.6% at that time.

Table 23b Comparison of woodland area between 1980 Census and 1995 Inventory (based on 1995 methodology)

Woodland size (ha)	1980 Census woodland area		1995 Inventory woodland area		Change (%)
	(ha)	(%)	(ha)	(%)	(%)
Total	925 000		1 281 472		39
% Woodland land cover	11.8		16.4		

1. Differences in sampling methodology may account for some of the apparent differences.
2. The 1980 figures above include estimates for woodland 0.1 and <0.25 hectares and woodland area in the Western and Northern Isles.
3. The land area used to calculate woodland cover percent, 7 813 254 hectares, is the total Scotland area based on the 1991 Census Population digital boundaries.

Table 24 Comparison of High Forest area by species between 1980 Census and 1995 Inventory

Species	1980 Census woodland area (ha)	1995 Inventory woodland area (ha)	Change (%)
Scots pine	129 212	140 011	8
Corsican pine	2 995	2 200	-27
Lodgepole pine	93 012	119 149	28
Sitka spruce	326 318	526 543	61
Norway spruce	48 963	35 209	-28
European larch	14 282	8 778	-39
Japanese/hybrid larch	46 671	56 378	21
Douglas fir	10 407	10 474	1
Other conifers	5 649	5 496	-3
Mixed conifers	9 179	8 235	-10
Total conifers	686 687	912 473	33
Oak	18 486	21 114	14
Beech	9 624	9 961	4
Sycamore	8 737	10 610	21
Ash	4 008	4 904	22
Birch	52 258	76 978	47
Poplar	294	490	66
Sweet chestnut	14	77	438
Elm	3 232	1 293	-60
Other broadleaves	15 351	17 392	13
Mixed broadleaves	9 236	60 641	557
Total broadleaves	121 240	203 461	68
Total – all species	807 927	1 115 934	38
Felled	15 389	23 397	52
Total High Forest	823 316	1 139 331	38

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 10.5% (Table 2). To obtain meaningful comparisons between the two datasets the 1980 Census data have therefore been reduced by 10.5%.
3. The above figures from the 1995 Inventory exclude woodland between 0.1 and <0.25 ha, thereby matching the scope of the 1980 Census. The 1995 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 1995 Inventory

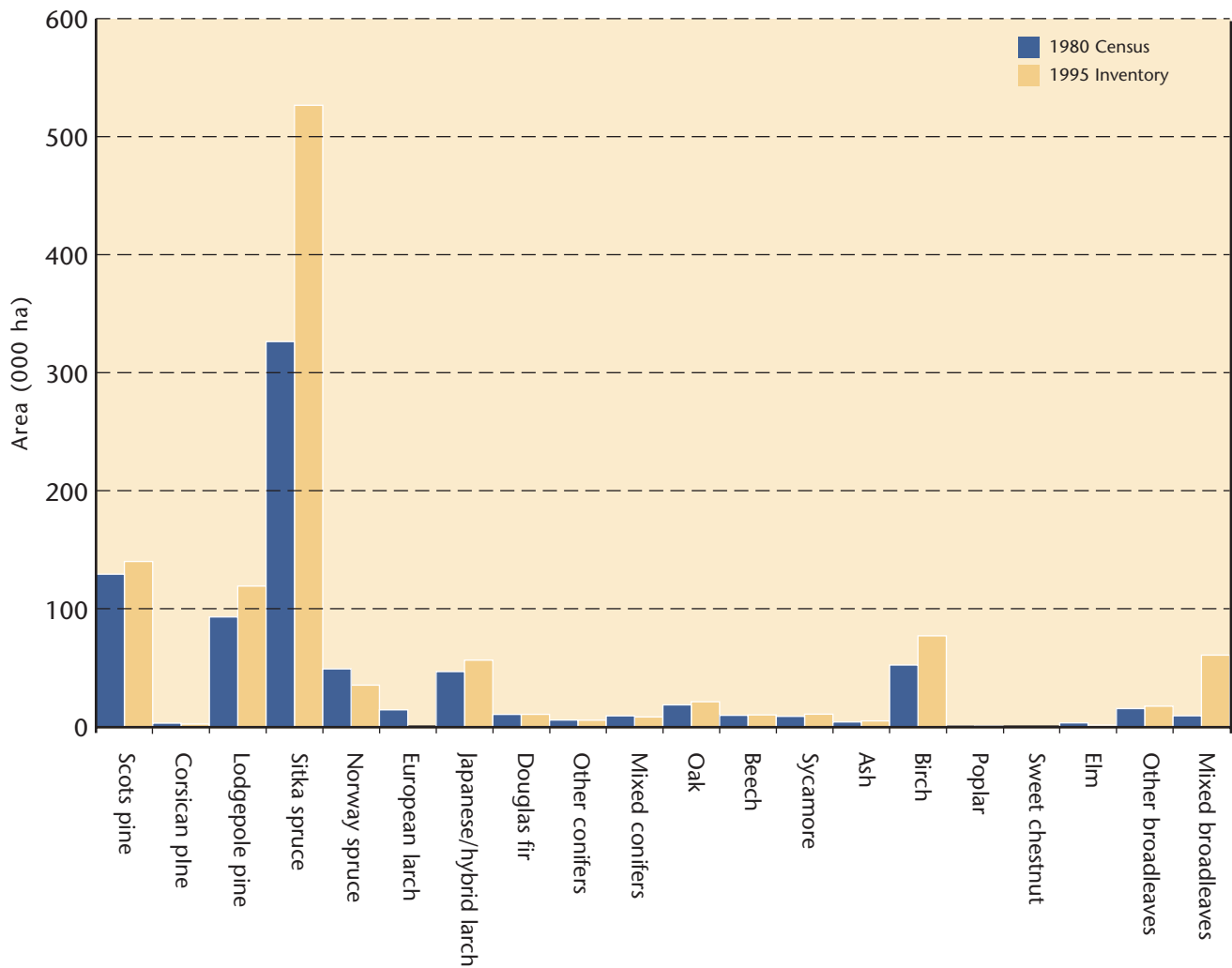


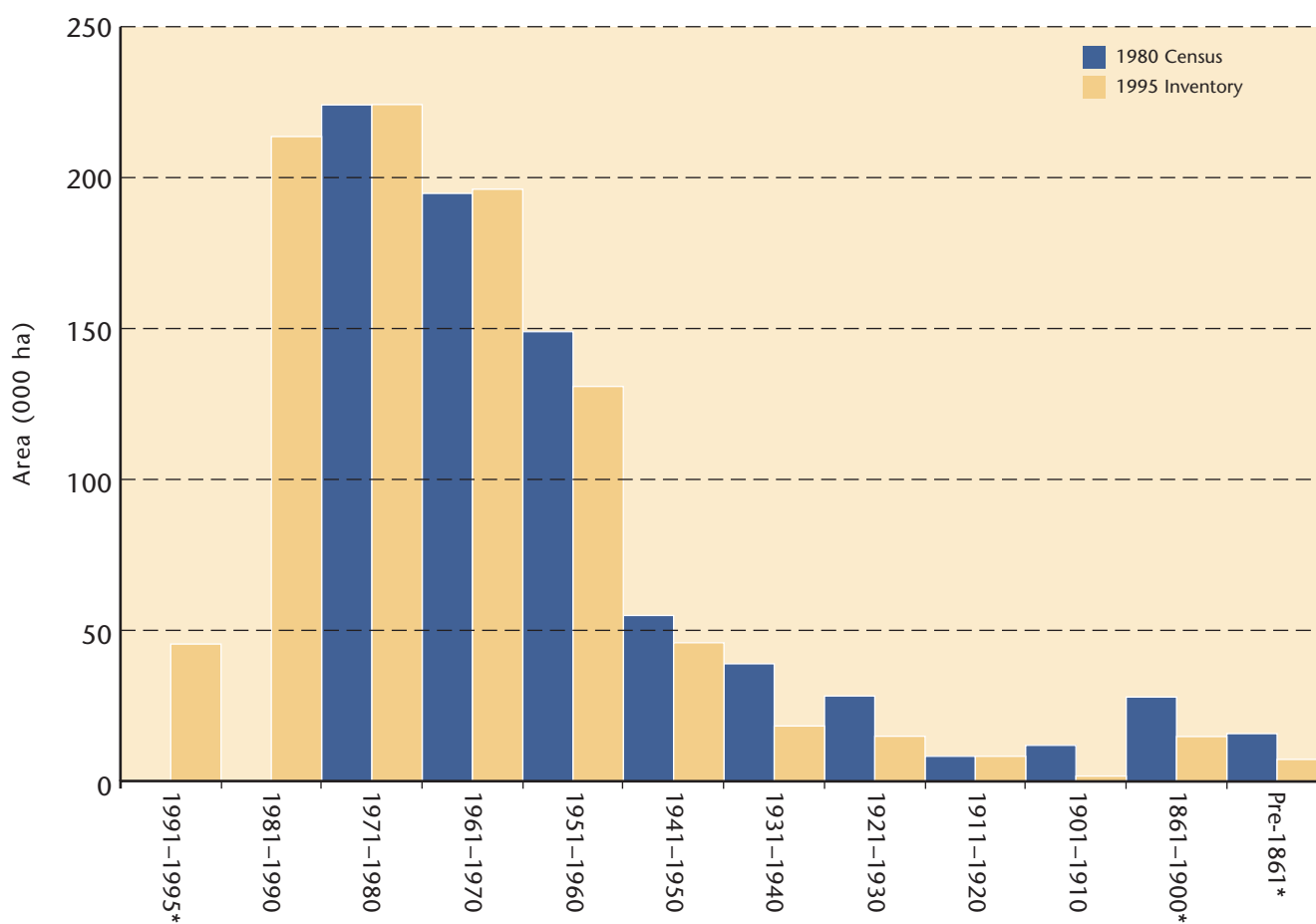
Table 25 Comparison of High Forest Category 1 area by planting year class between 1980 Census and 1995 Inventory

Planting year class	1980 Census woodland area (ha)	1995 Inventory woodland area (ha)	Change (%)
1991–1995	0	45 458	.*
1981–1990	0	213 592	.*
1971–1980	224 080	224 199	0
1961–1970	194 759	196 151	1
1951–1960	148 962	130 814	-12
1941–1950	54 933	45 903	-16
1931–1940	38 924	18 310	-53
1921–1930	28 253	14 916	-47
1911–1920	8 275	8 277	0
1901–1910	11 905	1 714	-86
1861–1900	27 901	14 819	-47
Pre-1861	15 776	7 242	-54
Total: all years	753 769	921 395	22

* These classes cover the period since the 1980 Census therefore no comparison can be made.

1. The comparison cannot be made on an 'All High Forest' basis as information in the 1980 Census for planting year classes was not reported for stands with timber potential lower than Category 1.
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 1995 Inventory



*Most of the planting year classes cover 10 years, 1991-1995 is 5 years, and the classes prior to 1901 are 40 years or more.

Table 26 Comparison of numbers of live trees outside woodland between 1980 Census and 1995 Inventory (000s trees)

Feature type	1980 Census	1995 Inventory	Change (%)
Boundary tree	581	577	-1
Middle tree	1 075	1 248	16
Total Individual Trees	1 656	1 825	10
Groups	5 328	3 334	-37
Linear Features	5 965	4 596	-23
Total	12 949	9 754	-25

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 1995 Inventory figures have been adjusted accordingly. The 1995 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 1995 Inventory, the two surveys are not directly comparable - 1980 used 7cm diameter at breast height and 1995 used 2 m height as minimum criteria for inclusion.
4. See Glossary for definitions of feature types.

Table 27 Comparison of density of non-woodland features between 1980 Census and 1995 Inventory

Feature type	1980 Census	1995 Inventory	Change (%)
Individual Trees (per km ²)	22.6	25.1	11
Groups (per km ²)	11.2	14.6	30
Linear Features (m per km ²)	180.0	200.0	11

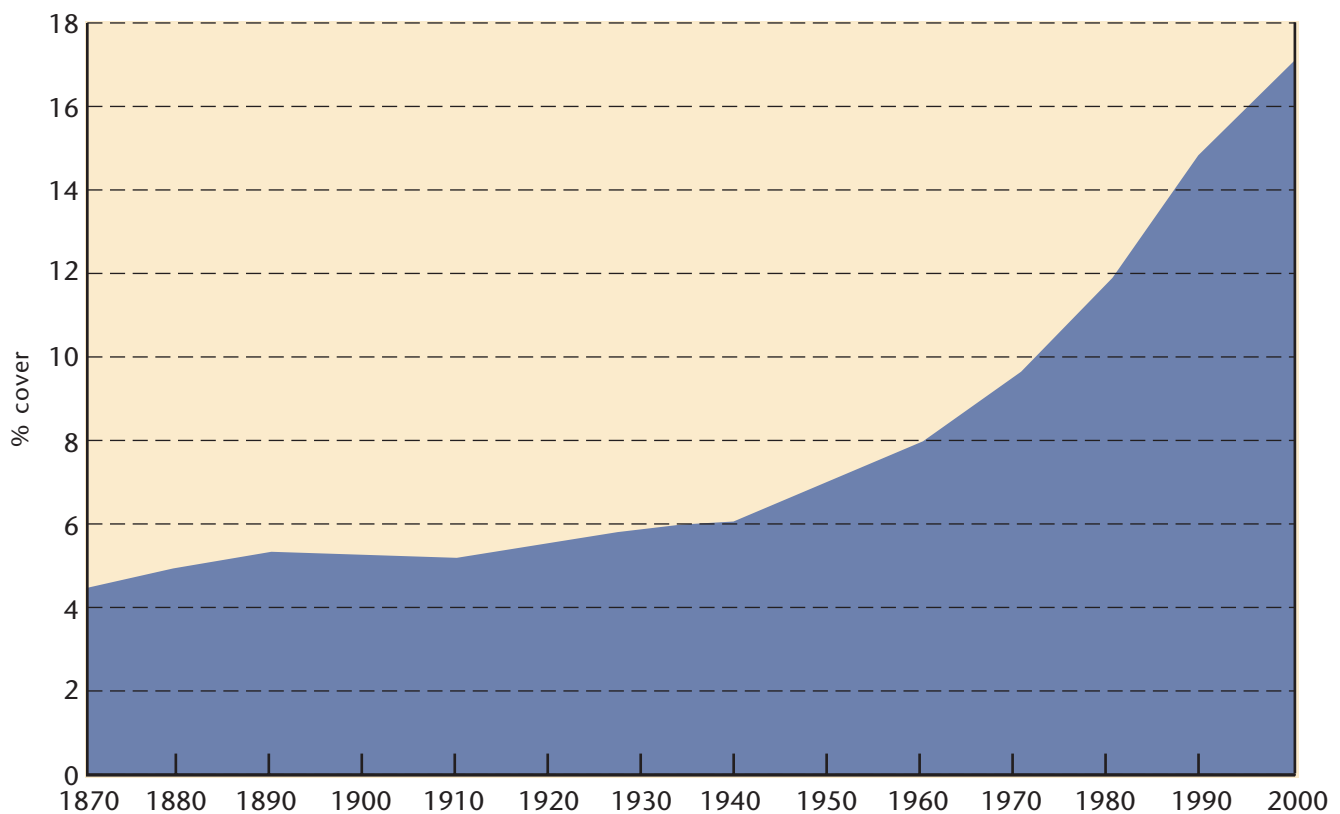
1. The Survey of Small Woodland and Trees did not record information referring to tree features (i.e. Individual trees, Groups and Narrow Linear features) within developed land.
2. In the 1980 Census hazel, hawthorn, blackthorn and goat willow were excluded; the 1999 Inventory figures have been adjusted accordingly. The 1999 figures above will therefore not match those in the previous sections of the report.
3. Land area used to calculate density of features, 7 256 928 ha, i.e. Scotland minus the Western and Northern Isles, was based on the 1991 Census of Population digital boundaries.
4. Changes stated in this table are indicative only. Even with adjustments to the 1999 Inventory, the two surveys are not directly comparable - 1980 used 7 cm diameter at breast height and 1999 used 2 m height as minimum criteria for inclusion.
5. See Glossary for definitions of feature types.

WOODLAND COVER

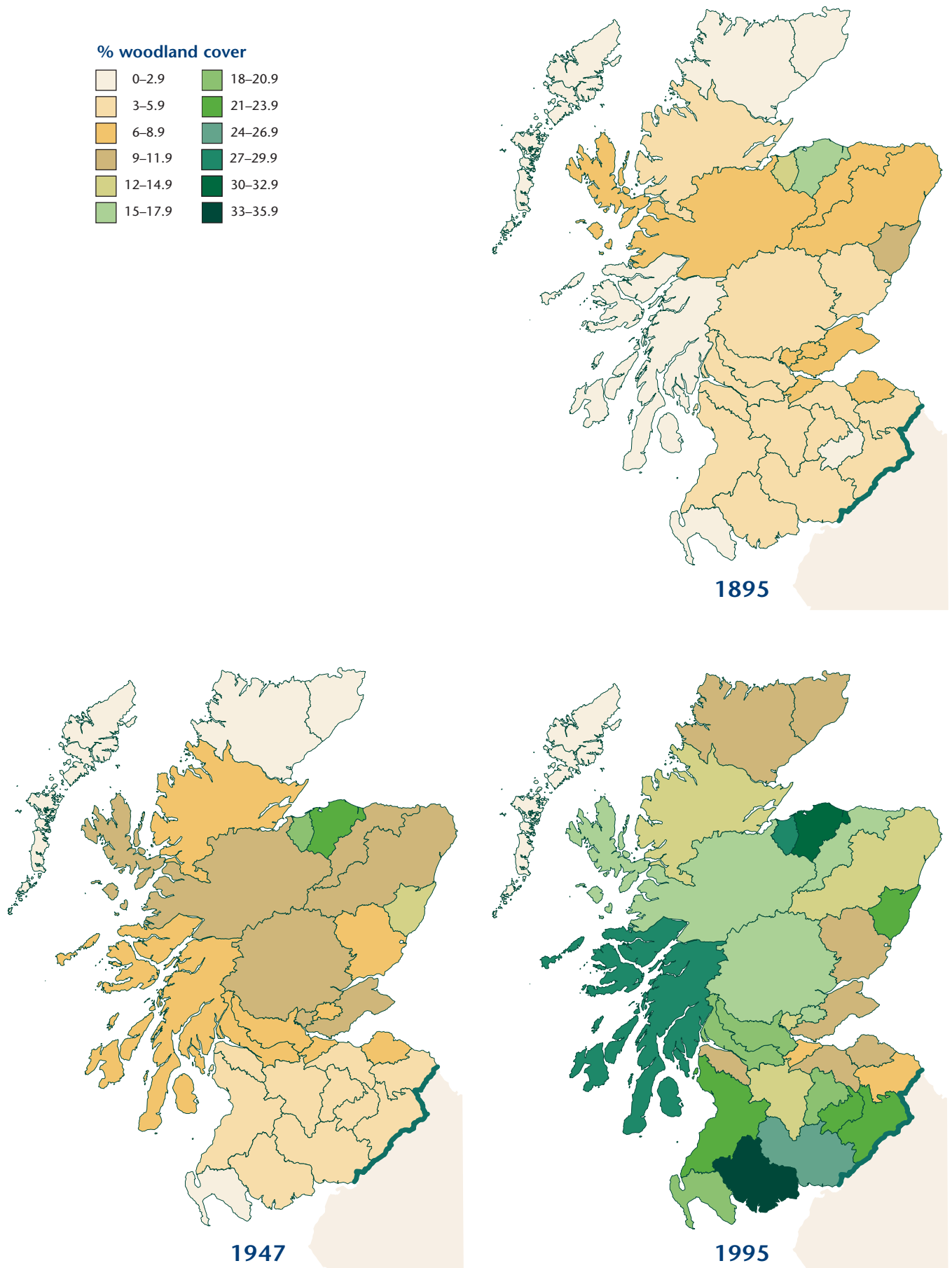
Woodland area data is available from Ministry of Agriculture surveys since 1871, and from Forestry Commission national woodland inventories since 1924. The following chart and maps show the changes in woodland area through time.

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

Change in woodland cover through time (1870–2000)



Map 5 Woodland cover by county through time (1895–1995)



APPENDICES

The following tables summarise the results of the Main Woodland Survey and the Survey of Small Woodland and Trees by region in Scotland. Full reports of the results are available separately by region.

- Appendix 1 Summary of woodland area by region and woodland size
- Appendix 2 Summary of woodland area by region and forest type
- Appendix 3 Summary of live trees outside woodland by region and feature type
- Appendix 4 Summary of number and length of Linear Features by region

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

APPENDIX 1

Summary of woodland area by region and woodland size

Region*	Woodland size (ha)**		Total area (ha)	Woodland cover (%)
	2.0 or more	0.1 – <2.0		
Borders	81 139	6 296	87 435	18.5
Central	51 111	2 254	53 365	20.1
Dumfries & Galloway	170 848	1 709	172 557	26.8
Fife	13 661	1 683	15 344	11.6
Grampian†	154 902	3 404	158 306	18.1
Highland	348 507	1 604	350 111	13.6
Lothian	15 944	2 008	17 952	10.4
Strathclyde	316 393	3 527	319 920	23.5
Tayside	97 818	6 214	104 032	13.8
Western Isles	2 418	0	2 418	0.8
Orkney	34	0	34	0.0
Shetland	0	0	0	0.0
Scotland	1 252 774	28 698	1 281 472	16.4

*Areas of regions used to derive woodland cover % based on digital boundaries used in 1991 Census of Population.

**Area of woodland blocks of 2.0 ha and over derived from the Main Woodland Survey. Area of woodland blocks 0.1– < 2.0 ha derived from the Survey of Small Woodland and Trees.

†Grampian (pilot area) published using Land Cover Scotland 1988 data for area of region.

1. The Orkney and Shetland Islands were included in the Main Survey but not the Survey of Small Woodland and Trees.

APPENDIX 2

Summary of woodland area by region and forest type

Region	Forest type								Total
	Conifer	Broad-leaved	Mixed	Coppice	Coppice-w-stds	Wind-blow	Felled	Open Space	
Borders	64 817	5 718	3 167	52	0	116	2 272	7 504	83 647
Central	31 659	11 126	2 784	0	0	321	961	6 160	53 011
Dumfries & Galloway	133 586	15 471	3 964	0	0	756	3 447	14 811	172 035
Fife	6 214	5 564	2 183	55	0	24	105	1 198	15 344
Grampian	113 569	16 019	8 870	0	0	304	4 133	14 407	157 300
Highland	245 294	48 664	11 271	115	40	1 449	5 355	37 489	349 677
Lothian	6 782	6 776	2 124	0	0	85	213	1 972	17 952
Strathclyde	222 082	45 118	6 795	331	524	829	5 166	38 797	319 642
Tayside	61 206	19 440	9 482	0	66	435	1 651	10 638	102 917
Western Isles	1 453	41	33	0	0	0	0	891	2 418
Orkney	34	0	0	0	0	0	0	0	34
Shetland	0	0	0	0	0	0	0	0	0
Total	886 696	173 937	50 673	553	630	4 319	23 303	133 867	1 273 977

1. See Glossary for definitions of forest types.

APPENDIX 3

Summary of live trees outside woodland by region and feature type (000s trees and features)

Region*	Total number	Feature type			Total live trees	Tree density (per km ²)
		Groups	Narrow Linear Feature	Individual Trees		
Borders	Features	52.1	19.0			
	Live trees	269.2	475.9	122.1	867.2	183
Central	Features	73.7	6.8			
	Live trees	341.2	105.3	220.3	666.8	251
Dumfries & Galloway	Features	244.5	54.5			
	Live trees	1 445.0	1 814.7	340.8	3 600.5	559
Fife	Features	51.4	7.9			
	Live trees	238.1	114.4	94.2	446.7	338
Grampian	Features	153.6	30.6			
	Live trees	1 052.0	1 472.2	256.0	2 780.2	318
Highland	Features	143.3	24.6			
	Live trees	854.4	1 345.5	238.7	2 438.6	95
Lothian	Features	52.3	13.5			
	Live trees	247.8	432.9	65.5	746.2	434
Strathclyde	Features	410.1	66.3			
	Live trees	2 359.7	2 192.5	566.8	5 119.0	376
Tayside	Features	168.0	9.6			
	Live trees	1 081.3	509.7	312.5	1 903.5	252
Western Isles	Features	0.0	0.3			
	Live trees	0.0	8.4	0.0	8.4	3
Total	Features	1 349.1	233.0			
	Live trees	7 888.7	8 471.4	2 216.8	18 576.9	245

*Areas of regions used to derive tree density per km² based on digital boundaries used in 1991 Census of Population.

1. See Glossary for definitions of feature types
2. The Northern Isles were included in the Main Woodland Survey but not the Survey of Small Woodland and Trees.

APPENDIX 4

Summary of number and length of Linear Features by region

Region*	Total number of features (000s)	Total length of features (km)	Density (m per km ²)
Borders	27.0	2 198	464
Central	7.4	465	175
Dumfries & Galloway	56.8	3 258	506
Fife	7.9	442	335
Grampian	34.5	2 726	312
Highland	26.8	2 617	101
Lothian	13.5	979	569
Strathclyde	67.6	4 392	323
Tayside	11.5	994	132
Western Isles	0.3	8	3
Total	253.4	18 079	239

* Areas of regions used to derive length per km² based on digital boundaries used in 1991 Census of Population.

1. The Orkney and Shetland Islands were included in the Main Woodland Survey but not the Survey of Small Woodland and Trees.

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 with 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 50 m 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 50 m, 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 1 m 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 leased to the Forestry Commission.

Feature types

- **Small Wood**

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

- **Group**

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

- **Individual Tree**

A tree with a crown that 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 a 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 50 m wide or as narrow as a single line of trees. Two types of Linear Feature are recognised:

- Narrow Linear Features (with a width of 16 m or less).
- Wide Linear Features (with a width greater than 16 m).

NOTES



Forestry Commission
231 Corstorphine Road
Edinburgh
EH12 7AT

www.forestry.gov.uk

£15