

## INFORMATION NOTE

ISSUED BY FORESTRY PRACTICE

AUGUST 1998

BY DOUGLAS WRIGHT\*

### SUMMARY

The Forestry Commission has regularly carried out woodland surveys since its formation in 1919. The latest survey started in 1994. A key output of the survey is a digital map of all woodland of 2 hectares or more, while a wide range of crop and environmental data is collected by a 1% field sample. The fieldwork in Scotland is now complete and that for the rest of Great Britain is due for completion during 2001. Results from the survey are being released as Inventory Reports on a regional basis in Scotland and on a county basis in England and Wales.

### INTRODUCTION

Britain's forest and woodland area has been expanding since the beginning of this century and over the past 75 years has doubled in extent to 2.4 million hectares or 10% of the total land area.

With the sustainable management of forests becoming increasingly important there is a growing need for reliable and up to date information on Britain's woodlands. Woodland data on aspects such as the size, distribution, forest type, condition and treatment is essential for the effective regulation of existing forests, for monitoring the effectiveness of policies to increase the woodland area, and for developing wood using industries.

The Forestry Commission has been carrying out woodland surveys on a regular basis since 1919 and the latest National Inventory of Woodland and Trees started in Scotland in 1994. This survey will progressively cover the country and be completed by March 2001. The inventory will then be continually updated on an approximately 10 year cycle.

The new survey consists of two parts; the main woodland survey covering woodlands of 2 or more hectares, and the small woodland and trees survey covering small woodlands, groups of trees and individual trees.

Together they will provide an accurate assessment of our woodlands and in particular will:

- produce a digital map of all woodland of 2 hectares or more;

- provide information on the main forest types and tree species;
- provide a basis for forecasting timber production for the wood processing industry;
- assist with the targeting of advice and grant aid;
- provide data for other studies such as land use change and biomass production;
- assess the condition of woodlands and trees and provide information on woodlands as a wildlife and conservation resource.

The National Inventory of Woodland and Trees is divided into the following three phases; woodland map preparation, data collection and the publication of results.

### WOODLAND MAP PREPARATION

A digital map showing all woodland over 2 hectares is a key product of the survey (Figure 1). This is created from 1:25 000 aerial photographs and woodland is classified into broad forest types: Conifer, Broadleaved, Mixed, Coppice, Coppice with Standards, Shrub, Young Trees, Ground prepared for new planting and Felled.

New areas planted subsequent to the date of aerial photography are added by reference to woodland grant scheme information. The finalised map therefore provides an up-to-date record of the extent of woodland.

Map only available in printed publication



**Figure 1** Digital woodland map showing forest types and sample squares

## DATA COLLECTION

The digital map forms the basis for sampling woods for ground survey. Woodlands are stratified into three size categories with systematic random clusters of 1 hectare plots then being used for ground sampling.

A 1% sample of each size category is selected according to the following design:

- Woods 2.0 ha – 100 ha: Every fifth woodland selected with a cluster grid of sample plots at 5% intensity.
- Woods 100 ha – 500 ha: Two woods in five selected with a cluster grid of sample plots at 2.5% intensity.
- Woods 500 ha and larger: All woods selected with a cluster grid of sample plots at 1% intensity.

Compared with a random sample or an evenly spaced grid the cluster sampling scheme is more cost-effective by reducing travel time while ensuring that the sample plot selection remains unbiased.

After obtaining ownership permission Forestry Commission surveyors assess the 1 hectare plots. A wide range of data is entered on to hand-held Husky 16/80 computers which are programmed to hold data at six levels (Figure 2).

Locational information such as grid reference and local authority is held at the wood level. Each sample woodland is given a unique number (polygon number) which clearly identifies the wood and will enable data to be linked to the digital map. This gives the potential for using the Woodland Inventory within a geographical information system (GIS).

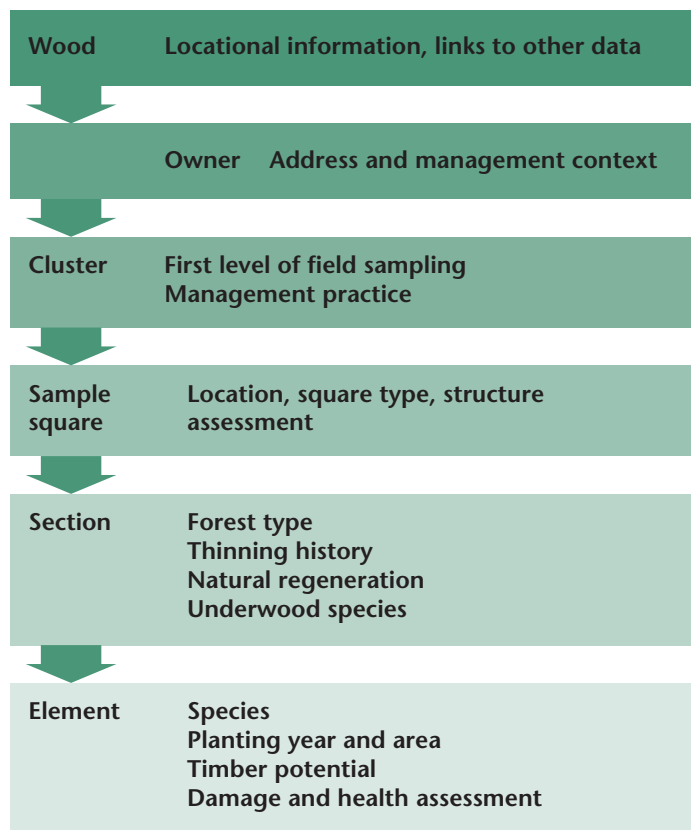
Details on ownership type and management context (i.e. farm, woodland estate, mixed or other) are entered at level 2, while the first level of field sampling occurs at level 3. The surveyor makes an assessment of the general management practice found within the cluster grid of plots, and then goes on to assess each sample square.

The 1 hectare sample square is divided into **sections** by forest type, species or age in a similar way to subcompartments within a stock map. Sections are then divided into **elements** or components which generally identify different species or age classes.

There are a number of special features within the data collected that will help to widen our knowledge on the conservation and biodiversity aspects of our woodlands. For example, a structure assessment identifies the presence of upper, lower, shrub, field and ground layers; a dead wood assessment estimates the proportion of deadwood over 15 cm; and within ancient woodlands a National Vegetation Classification assessment is carried out.

For woodlands less than 2 hectares, groups of trees and individual trees a combination of aerial survey assessment with ground sampling is carried out. The basic sampling unit is the 1 km square based on the Ordnance Survey grid with this being sub-divided into 16 250 x 250 metre squares two of which are ground assessed. Again a 1% sample is taken which means that within Great Britain a total of 2382 1 km squares and 4764 250 x 250 m plots are assessed. Similar types of field information to the main woodland survey are collected in this part of the survey.

**Figure 2** National Inventory of Woodland and Trees data hierarchy



## PUBLICATION OF RESULTS

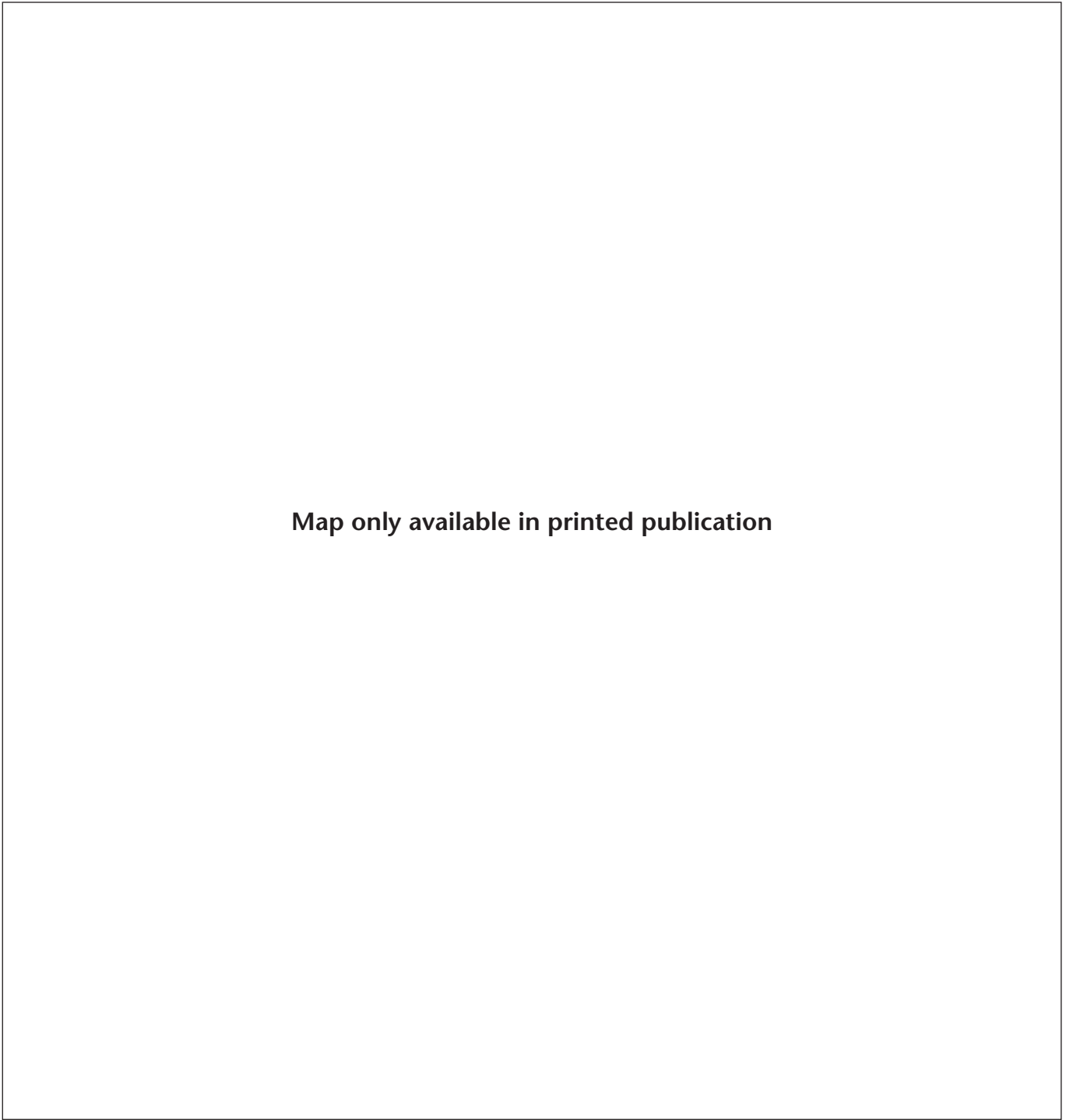
Results are being published as a series of **Inventory Reports** on a county basis for England and Wales and on a regional basis for Scotland. There will also be a report for each country and for Great Britain.

The main woodland survey information for Scotland is being released during 1998, with results for England and Wales being prepared as fieldwork in each county is completed.

Results are presented in a series of tables, charts and maps. For Grampian – the first Region to be completed – results show that there are 154 902 gross hectares of woodland (including an element of open space within woodlands). The digital map (Figure 3) shows the distribution and pattern of woodland ownership, with 37% owned (or leased) by the Forestry Commission and 63% in other ownership. Table 1 gives the net areas of woodland by main species and ownership.

**Figure 3** Distribution of woodland by ownership within Grampian Region

- FC Woodland over 2 hectares
- Other woodland over 2 hectares



The material contained in this map has been reproduced from Ordnance Survey digital data with the permission of the Controller of Her Majesty's Stationery Office © Crown Copyright 1998

**TABLE 1 AREAS OF WOODLAND BY PRINCIPAL SPECIES AND OWNERSHIP CATEGORY IN GRAMPIAN REGION**

Species	FC			Other			All Woodland		
	Area (ha)	cat (%)	spp (%)	Area (ha)	cat (%)	spp (%)	Area (ha)	cat (%)	spp (%)
Scots pine	13353	27	26	27931	42	33	41284	36	30
Corsican pine	1127	2	2	0	0	0	1127	1	1
Lodgepole pine	8380	17	16	7098	11	8	15478	13	11
Sitka spruce	15860	32	31	19474	29	23	35334	31	26
Norway spruce	2665	5	5	2854	4	3	5519	5	4
European larch	765	2	2	1654	2	2	2419	2	2
Jap/Hybrid larch	4857	10	10	4081	6	5	8938	8	7
Douglas fir	1280	3	3	1649	2	2	2929	3	2
Other conifers	295	1	1	495	1	1	790	1	1
Mixed conifers	661	1	1	1368	2	2	2028	2	1
<b>Total conifers</b>	<b>49242</b>	<b>100</b>	<b>97</b>	<b>66604</b>	<b>100</b>	<b>78</b>	<b>115847</b>	<b>100</b>	<b>85</b>
Oak	16	1	0	582	3	1	598	3	0
Beech	113	7	0	964	5	1	1077	5	1
Sycamore	73	4	0	494	3	1	567	3	0
Ash	11	1	0	121	1	0	132	1	0
Birch	745	44	1	9422	50	11	10167	50	7
Poplar	0	0	0	72	0	0	72	0	0
Sweet chestnut	0	0	0	0	0	0	0	0	0
Elm	31	2	0	76	0	0	107	1	0
Other broadleaves	215	13	0	946	5	1	1161	6	1
Mixed broadleaves	504	29	1	6154	33	7	6658	32	5
<b>Total broadleaves</b>	<b>1710</b>	<b>100</b>	<b>3</b>	<b>18829</b>	<b>100</b>	<b>22</b>	<b>20539</b>	<b>100</b>	<b>15</b>
<b>Total - all species</b>	<b>50952</b>		<b>100</b>	<b>85433</b>		<b>100</b>	<b>136386</b>		<b>100</b>

Note: The figures in this table may not add due to rounding.

## COMPARISON WITH PREVIOUS SURVEYS

An important application of the data is in monitoring changes from previous surveys.

In Grampian Region the woodland area has increased by 23 990 hectares since the last survey in 1980 and now covers 17.7% of the land area. Scots pine remains the principal species but with Sitka spruce, larch and Douglas fir increasing in importance (Figure 4).

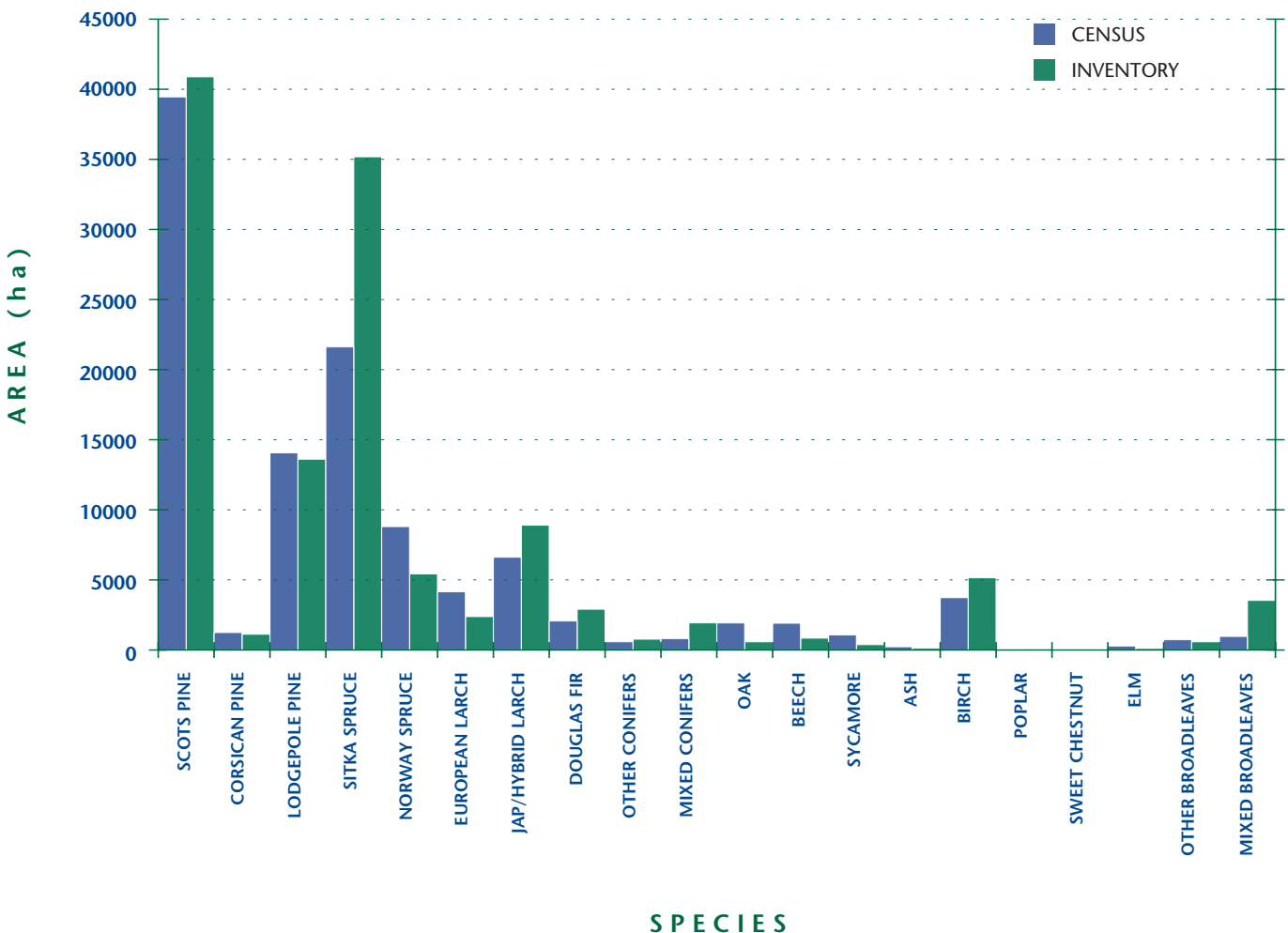
Another key use of the data is for updating and refining the forecast of timber production from woodlands (other than those owned by the Forestry Commission) using information on age distribution, timber potential and thinning history.

With the digital capture of woodland areas the dataset has a key role in providing a baseline for the future, with substantial potential in monitoring the pattern of woodland change and condition within Great Britain.



*Assessment by a Forestry Commission surveyor in a broadleaved woodland.*

**Figure 4** Comparison between 1980 Census and current Inventory

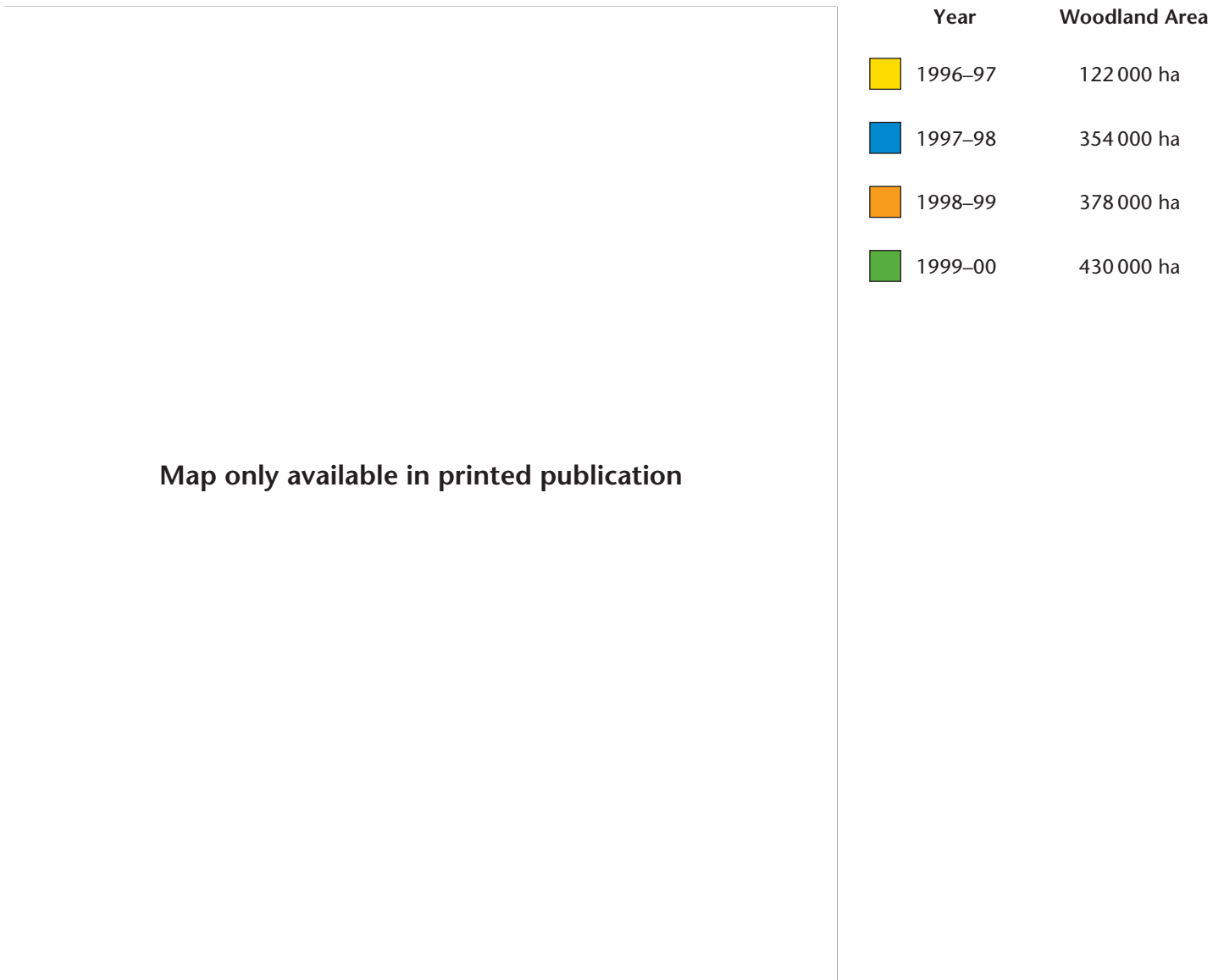


## TIMETABLE FOR SURVEY

Fieldwork is complete in Scotland and work is now well underway in England and Wales. During 1998 the woodland map for Wales will be finalised and progress will move from the southern counties of England into the Midlands. The map for the eastern and northern parts of England is scheduled for preparation during 1998-1999.

The target date for completing the fieldwork of the main woodland survey is March 2000, and March 2001 for the small woodland survey. The fieldwork programme for the main woodland survey in England and Wales is shown in Figure 5.

**Figure 5** Main Woodland Survey fieldwork timetable



Map only available in printed publication

The material contained in this map has been reproduced from Ordnance Survey digital data with the permission of the Controller of Her Majesty's Stationery Office © Crown Copyright 1998

## ACKNOWLEDGEMENTS

The author is grateful to many people who are involved with the Woodland Inventory Project. In particular he would like to thank Woodland Survey Branch staff Graham Bull, Chris Brown, Esther Whitton, Robert Beck, Justin Gilbert and Fiona Ferrie. Also the Research field teams for carrying out the field work and Simon Gillam, Head of Statistics, for providing statistical advice.

## REFERENCES

LOCKE, G. M. L. (1987)  
*Census of Woodlands and Trees 1979–82*  
Forestry Commission Bulletin 63  
HMSO, London.

FORESTRY COMMISSION (1997).  
*National Inventory of Woodland and Trees,  
Scotland - Grampian Region.*  
*Part 1 - Woodlands of 2 hectares and over.*  
Forestry Commission Inventory Report  
Forestry Commission, Edinburgh.

Inventory Reports for the following Scottish Regions are in preparation, and will be published during 1998:  
Borders, Lothian, Fife, Dumfries & Galloway.

Enquiries regarding the Woodland Inventory Project should be directed to:

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

Tel: 0131 314 6357  
Fax: 0131 314 6173

E-mail: [steve.s@forestry.gov.uk](mailto:steve.s@forestry.gov.uk)