

Chapter (non-refereed)

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2. SCOTTISH DECIDUOUS WOODLANDS: A CAUSE FOR CONCERN?

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The management of a resource can only be effectively achieved if it is related to a detailed knowledge of the current status of the resource. For woodlands it is necessary to have information about quantity, distribution and composition. From 1976 to 1978 information of this sort was obtained for deciduous woodlands in Scotland, the data being incorporated into a computer data bank of a kind enabling easy access and facilitating detailed ecological analyses. In the hope of assessing whether changes had occurred, attempts were made to reconcile these data with those from an earlier survey done by the Forestry Commission from 1947 to 1948.

1. Survey method

In searching the 7th series 1" ordnance survey maps, all woods containing a broadleaf symbol (effectively those of 5 hectares or over) were recorded together with details of grid reference, name, district, location (and county) and altitude. Between summer 1976 and autumn 1978, field visits were made to confirm the continuing existence of the different woods and, if they existed, to determine the composition of their canopies. Twenty-one tree species or species groups were recorded (Table 1); the contribution (% cover) of each species or species group to total cover was estimated by eye having visited as many vantage points as feasible. Where more than 50% of the canopy was attributable to conifers, the entry was deleted from the inventory as also happened if less than 50% of the site had tree cover. Woods which had been underplanted with conifers or clear felled were also omitted.

2. Inventory

Data for 3,631 of 3,747 woods have so far been put in the data bank (Table 1). The percentage of the total land area covered by deciduous woods varies from 0.2% in Selkirkshire to 2.5% in Stirling, with counties in the lowland areas tending to have a larger woodland cover. Of the total of 66,000 ha of woodland, 46% is occupied by birch, this species group's widespread distribution particularly in the northerly counties reflecting its dominance in (1) early successional scrub woodlands and (2) climax birch woodlands occurring at either high altitudes (between 800 ft (250 m) and 2000 ft (600 m)), or on poor thin soils where oak and pine cannot thrive.

The straightforward county summaries can be supported by more detailed computer printed maps, on which are plotted figures indicating numbers of woods in a rectangular area of c. 45 km² in which a particular species is dominant (i.e. the species with the largest % cover). Beech dominates many woods at the northern fringe of the lowlands, including the Central valley, where it was planted in policy woods (Figure 6).

3. Assessment of change

Comparisons of the 1947-49 Forestry Commission (FC) census of woodlands and the survey described in this article suggest, if methodological differences are ignored, that the area of deciduous woodland in Scotland has decreased by 56% with very small losses of 1% in some counties (Caithness and Kinross) and very large losses, 80%, in others, notably Kincardine and Selkirk (Figure 7). Despite these variations, there are no distinct regional patterns excepting possibly smaller losses in the most northerly counties.

The species composition of Scottish woods has changed very little during the last 30 years, the most notable change being a decrease in the cover provided by beech, from 14% to 8%. It therefore seems that the loss of deciduous woodland, in part attributable to conversion to conifers, has affected all types more or less similarly.

Although the direct comparison of Forestry Commission and ITE surveys indicates the broad direction of change, it is necessary to be aware of their many methodological differences before reaching precise conclusions. Thus, in contrast to the current ITE survey, the FC census was based on 6" ordnance survey maps; it included woods between 2 and 5 ha in addition to those larger than 5 ha, and areas of mixed woodland were divided into homogenous stands which were then treated as separate units. To assess the significance of these differences in relation to assessments of rates of change, the details for Selkirkshire were considered in greater depth.

4. Selkirk

The map search in 1977 suggested that there were 17 woods, 5 ha or more, in Selkirkshire, of which 6 were deleted after making ground checks; the remaining 11 woods covered an area of 129 ha. The 1947 FC census identified a total of 649 ha of deciduous woods (including areas of mixed forest and scrub), suggesting a woodland decrease

$$\frac{(649 - 129) \times 100}{649}$$

TABLE 1 Inventory of deciduous woods in Scotland, with specific reference to tree species or species groups forming more than 1% of canopy.

Species codings are: SY = sycamore, EL = elm, BE = beech, AS = ash, EX = exotics, LI = lime, SP = Scots pine, OA = oak, CH = cherry, HA = hawthorn, WI = willow, AL = alder, HZ = hazel, AP = aspen, RO = rowan, BI = birch. Contributions of holly, hornbeam, blackthorn, whitebeam and yew to woodland canopies never exceeded 1%.

| County | Areas of deciduous woodland (ha) | Areas of woodland as % of area of county | | | | | | | | | | | | | | | | |
|---------------|----------------------------------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | SY | EL | BE | AS | EX | LI | SP | OA | CH | HA | WI | AL | HZ | AP | RO | BI |
| Sutherland | 2900 | 0.6 | 1 | 0 | 1 | 1 | 3 | 0 | 2 | 4 | 0 | 0 | 2 | 6 | 2 | 1 | 3 | 74 |
| Caithness | 500 | 0.3 | 14 | 5 | 15 | 9 | 8 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 43 |
| Ross | 4020 | 0.6 | 1 | 0 | 4 | 1 | 4 | 0 | 7 | 9 | 0 | 0 | 1 | 2 | 2 | 0 | 2 | 67 |
| Inverness* | 10100 | 0.9 | 0 | 0 | 1 | 2 | 4 | 0 | 9 | 12 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 68 |
| Nairn | 630 | 1.5 | 1 | 0 | 11 | 6 | 10 | 0 | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |
| Moray | 1910 | 1.6 | 1 | 0 | 5 | 0 | 9 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 81 |
| Banff | 1250 | 0.8 | 4 | 2 | 9 | 5 | 14 | 1 | 11 | 5 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 45 |
| Aberdeen* | 2860 | 0.6 | 3 | 1 | 10 | 3 | 12 | 0 | 2 | 5 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 60 |
| Kincardine* | 440 | 0.4 | 3 | 3 | 9 | 3 | 7 | 0 | 5 | 4 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 62 |
| Angus* | 1360 | 0.6 | 3 | 4 | 23 | 3 | 9 | 0 | 4 | 8 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 43 |
| Argyll | 10190 | 1.3 | 3 | 1 | 4 | 4 | 6 | 0 | 1 | 36 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 39 |
| Perth | 7230 | 1.1 | 2 | 3 | 7 | 4 | 13 | 0 | 1 | 23 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 44 |
| Stirling* | 2960 | 2.5 | 10 | 4 | 8 | 5 | 7 | 0 | 2 | 31 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 30 |
| Kinross | 300 | 1.4 | 4 | 2 | 15 | 2 | 6 | 1 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| Dunbarton | 1440 | 2.3 | 7 | 1 | 5 | 5 | 5 | 0 | 3 | 41 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 28 |
| Clackmannan | 280 | 2.0 | 7 | 6 | 12 | 10 | 13 | 0 | 3 | 5 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 39 |
| Fife* | 1400 | 1.1 | 16 | 9 | 14 | 7 | 11 | 1 | 2 | 9 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 29 |
| Renfrew | 770 | 1.3 | 21 | 4 | 19 | 8 | 7 | 1 | 1 | 8 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 29 |
| Bute* | 670 | 1.2 | 5 | 1 | 15 | 4 | 6 | 2 | 1 | 10 | 0 | 0 | 1 | 7 | 1 | 0 | 0 | 47 |
| Ayr | 2480 | 0.8 | 11 | 5 | 16 | 12 | 8 | 1 | 1 | 12 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 28 |
| Lanark | 2390 | 1.0 | 11 | 7 | 17 | 7 | 9 | 3 | 3 | 8 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 29 |
| W. Lothian | 350 | 1.1 | 15 | 19 | 14 | 6 | 9 | 3 | 3 | 14 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 13 |
| Midlothian | 1410 | 1.5 | 14 | 10 | 18 | 9 | 21 | 1 | 3 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| E. Lothian | 1030 | 1.5 | 15 | 8 | 12 | 11 | 15 | 3 | 8 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| Peebles | 350 | 0.4 | 6 | 7 | 17 | 8 | 18 | 2 | 12 | 7 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 19 |
| Berwick* | 920 | 0.8 | 18 | 6 | 17 | 6 | 9 | 1 | 4 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| Selkirk | 130 | 0.2 | 5 | 11 | 9 | 21 | 15 | 1 | 2 | 21 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 14 |
| Roxburgh* | 730 | 0.4 | 10 | 12 | 17 | 7 | 13 | 1 | 4 | 25 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 9 |
| Wigtown | 1180 | 0.9 | 17 | 5 | 18 | 10 | 10 | 0 | 1 | 14 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 18 |
| Kirkcudbright | 1860 | 0.8 | 8 | 2 | 9 | 8 | 5 | 0 | 0 | 37 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 27 |
| Dumfries | 1990 | 0.7 | 5 | 3 | 14 | 10 | 7 | 0 | 1 | 30 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 27 |
| Totals | 66030 | | | | | | | | | | | | | | | | | |
| Means | | 0.9 | 5 | 3 | 8 | 5 | 8 | 0 | 3 | 18 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 45 |

Asterisk indicates that survey was less than 98% complete.

of 80% during the last 30 years. To assess the accuracy of this direct comparison, woods (or groups of stands) in the FC census with areas of 5 ha or over, and with a deciduous tree cover of at least 50%, were identified. There were 26 woods amounting to 473 ha. The balance (649-473) of 176 ha (27% of the total) consisted of either small areas of deciduous woods less than 5 ha, or small areas of deciduous trees in larger blocks of coniferous woods.

Of the 26 woods 14, with a total area of 133 ha (or 20% of total), were not included in the 1977

survey because, although individually larger than 5 ha, they tended to be long and thin, eg riverine woods, roadside woods and shelter belts, and of insufficient width to contain a broadleaf symbol on 1" ordnance survey maps.

Thus, of the 649 ha of broadleaf woodland identified by the FC in 1947, 27% were in woods of less than 5 ha and 20% were excluded in the 1977 survey because small scale maps were used. With their omission, the balance (649-176-133) of 340 ha recorded in 1947/49 should be compared with 129 ha confirmed in 1976/78. The deciduous

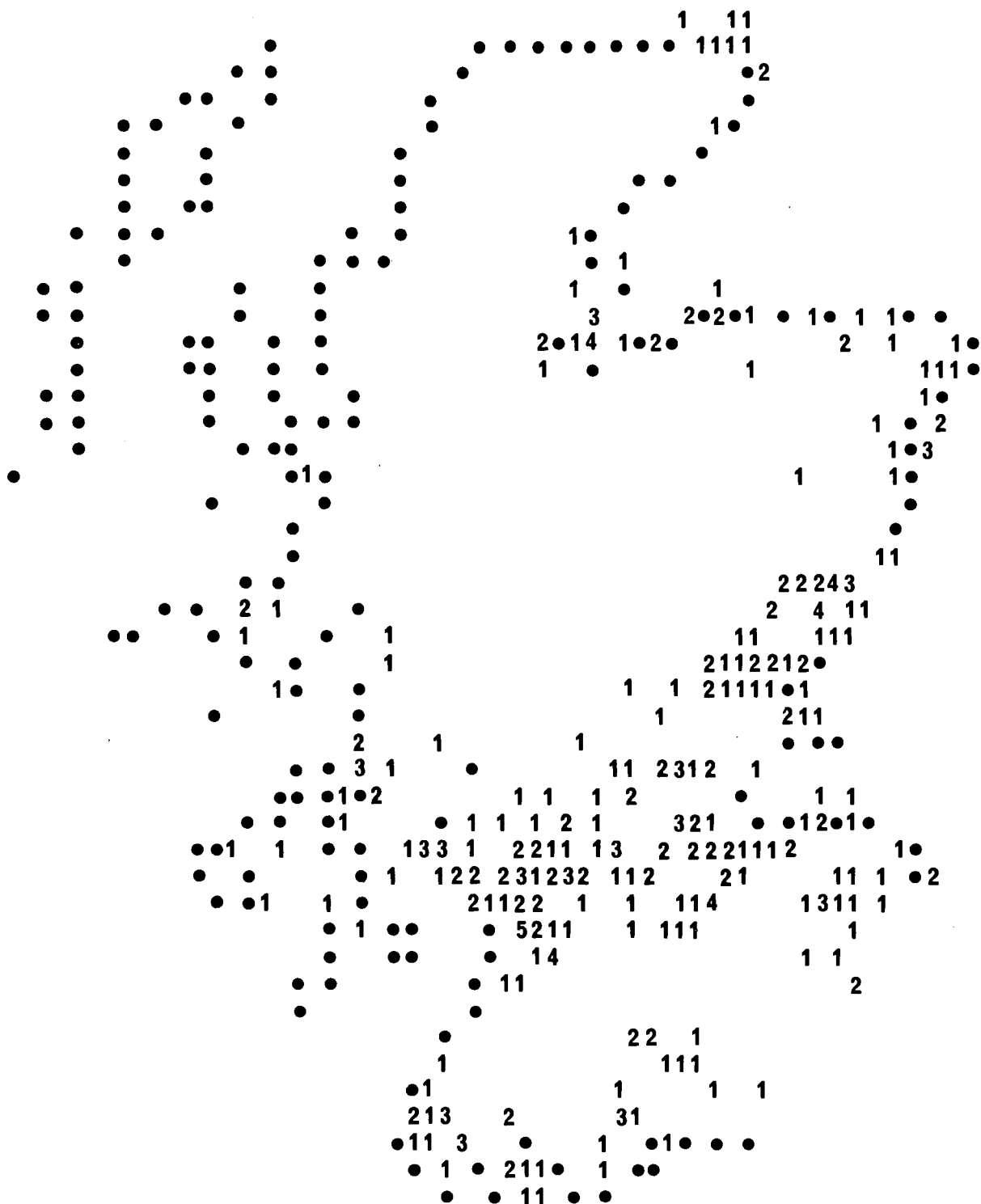


Fig. 6 Copy of a computer produced map of Scotland (coastline shown by dots) showing the distribution of woods in which beech is dominant. Each figure represents the number of woods in a rectangular area of approximately 45 km².

woodland cover of Selkirkshire seems therefore to have decreased by 62% during the last 30 years, a figure comparing with 80% calculated from unadjusted data. This loss can be attributed to (i) the clearance and replacement of birch scrub by conifers and (ii) the underplanting of deciduous trees, which remain locally abundant, with conifers. Because the effects of the latter are neither instantaneous nor dramatic, the gradual conversion from deciduous to coniferous may go unnoticed.

5. Discussion

Remembering that it is by no means a typical county, it would be foolish to extrapolate from Selkirkshire to obtain 'corrected' estimates of woodland decreases for the remainder of Scotland. In addition to having the smallest area of deciduous woodland, it has lost a greater proportion than any other county except Kincardine. Furthermore it is expected that differences in woodland configurations may affect the outcome of compari-

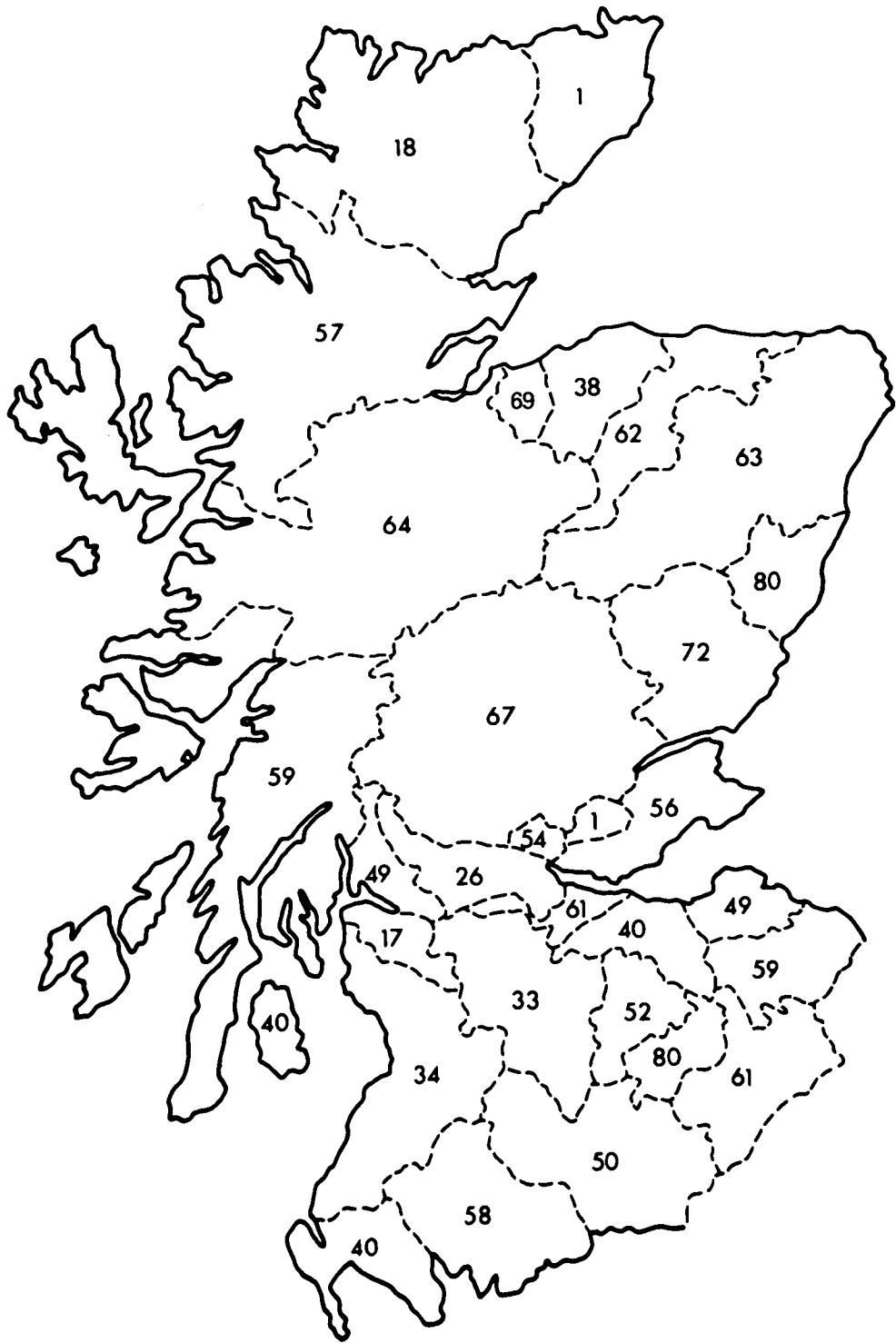


Fig. 7 Map of Scottish counties showing the estimated decreases (%) in woodland cover when ignoring methodological differences between the Forestry Commission's 1947/49 census of woodlands and ITE's survey made during 1976 and 1978 (see text for interpretation).

sons between the FC and ITE surveys. Nonetheless, the 1976/78 inventory indicates that the deciduous woodland resource in Scotland has been significantly decreased during the last 3 decades. There is no reason to be complacent if the already small area of deciduous woodland, less than 1% of the area of Scotland, is to be sustained.