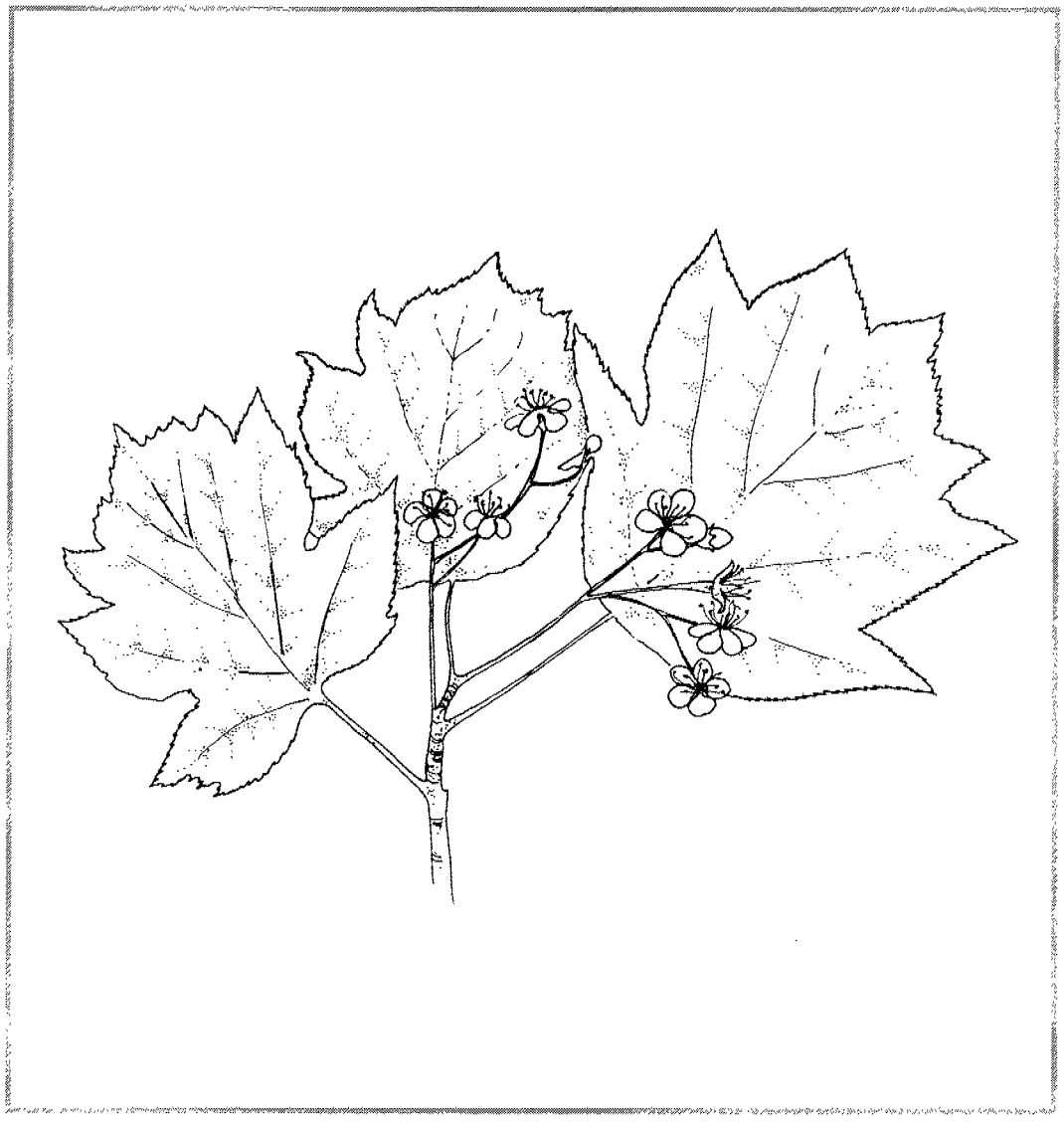
ENGLISH NATURE

A preliminary assessment of woodland conservation in England by Natural Areas

No. 186 - English Nature Research Reports



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A preliminary assessment of woodland conservation in England by Natural Areas

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Summary

1. English Nature has adopted the principle of using a series of 'Natural Areas' to promote nature conservation objectives in England. Natural Areas are used to interpret the distribution of habitats and species in terms of geology, soils and land use. The initial phase of this work on which this report is based identified 92 terrestrial Natural Areas.

2. English Nature is currently working with the Countryside Commission to produce a map which reflects both the ecological and landscape character of England. As part of this process some of the Natural Area boundaries are being refined. Most of these changes are slight and are unlikely to significantly affect our understanding or interpretation of each Natural Area.

3. English Nature's local staff produced a preliminary analysis for each Natural Area of the main features, species and issues. In a parallel exercise, national overviews for particular habitats and species groups are being prepared. This report brings together information about woodland for all Natural Areas using the material gathered by the local teams and results from the Ancient Woodland Inventory. It is an initial account only and needs further refinement and revision.

4. Data are presented by Natural Area on the area of ancient woodland, distribution by size classes, extent of replanting and occurrence in different forms of conservation status or ownership. Selected examples of other data are given, for example species distributions, that might be explored further over the next year. Suggestions or comments on the usefulness of such information or of other data that might be included would be welcomed.

5. A preliminary evaluation of the importance of different Natural Areas for woodland conservation is made. There is no simple way of doing this - which areas count as priority for woodland conservation vary according to the objectives of any particular evaluation exercise.

6. Examples of possible uses of Natural Area divisions in woodland conservation work are presented.

Acknowledgements

The Natural Area concept and initial boundaries were developed by Keith Porter. Subsequent collation of information for each Natural Area involved many local team staff, but particularly Simon Bates, Mel Heath, Nick Sibbett, Simon Webb and Corinna Woodall. Assistance with woodland data came from Dawn Isaac and Jeanette Hall; other habitat/species data came from Roger Key, Tony Mitchell-Jones, Phil Grice and Andy Brown. Various other colleagues provided constructive comment and criticism on the report.

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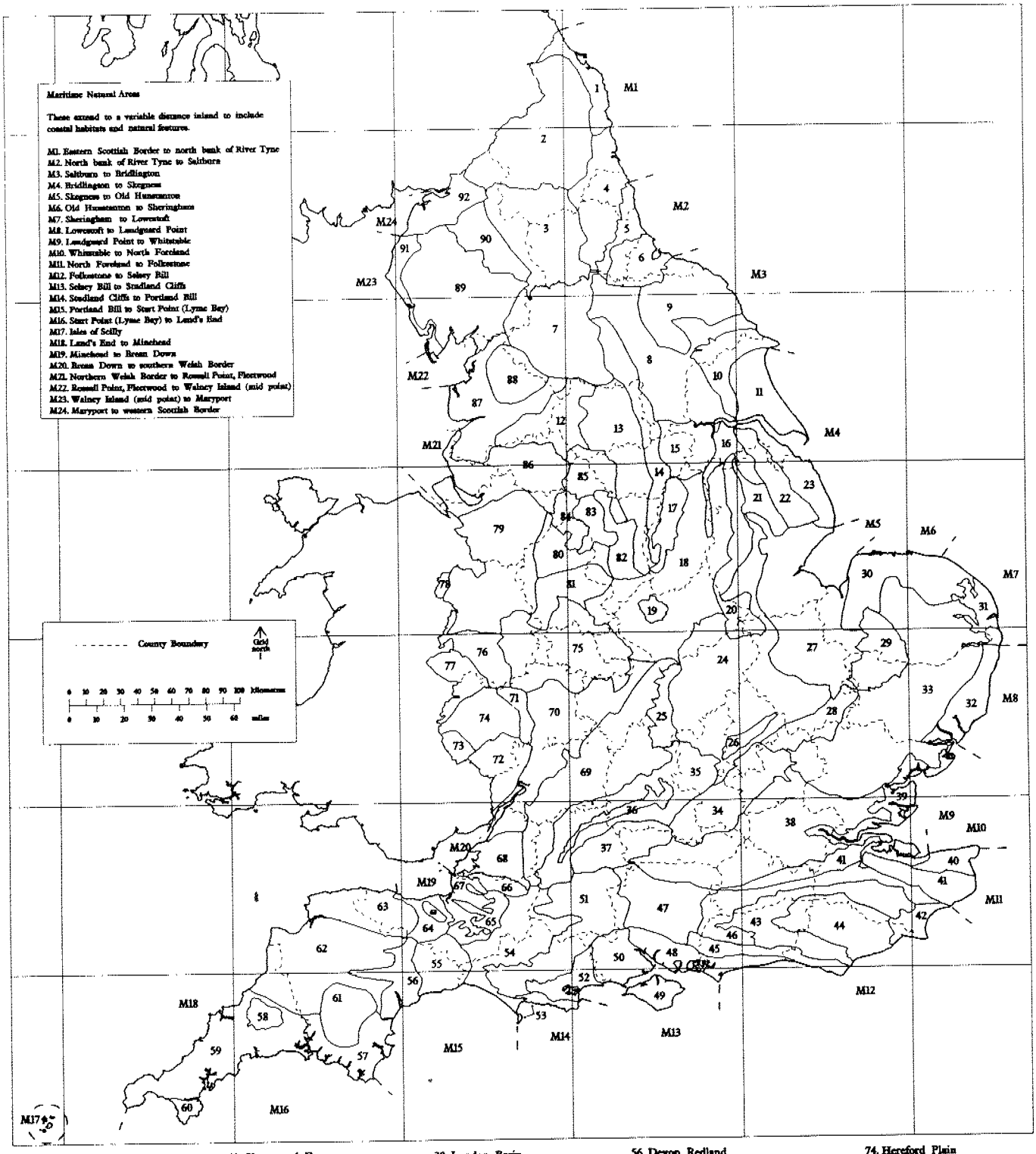

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Based upon the 1975 Ordnance Survey 1:1250000 map with the permission of the Controller of Her Majesty's Stationery Office.
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Revised to June 1994

Part 1 National overview

Introduction

The landscape and wildlife of England vary enormously from one part of the country to another but no single way of expressing this variation is suitable for all conservation purposes. Convenient divisions based on birds or grassland for example might be irrelevant for woodland conservation purposes and *vice versa.*

Much of English Nature's work is and will continue to be based around administrative units such as counties and districts (which do not necessarily remain constant) because they form the basis for the work of other organisations such as Local Authorities or the Forestry Commission. Such administrative boundaries may not however reflect useful ecological or landscape units. For example, the Wye Valley is split between two countries; the Chilterns spread across several counties; the New Forest is all within one county but many of its affinities are more with the woods and heaths of Dorset than with the rest of Hampshire to the north. English Nature (1993, 1994) has set out an alternative approach based around what are termed 'Natural Areas'. These have been defined on the basis of geology, soils and historical land use patterns. The boundaries are intended to surround reasonably coherent units that will form a sound basis for future conservation planning and management. The use of Natural Area boundaries in describing woodland patterns across the country and in helping to develop conservation priorities is explored in this report. Similar overviews have been prepared for birds (Grice *et al* 1994), heathland (Michael 1996), grassland (Jefferson 1996), and Earth heritage (King *et al.* 1996). Work on others is in progress.

We would welcome any comments either on the presentation of data, our interpretation of material or suggestions for what else we might include.

Appendix 1 gives an index to Natural Area numbers and names and a map showing the boundaries used for this report.

Future Natural Area boundaries

English Nature is also working with the Countryside Commission and with the help of English Heritage, to produce jointly a map which reflects the natural and cultural dimensions of the landscape. This map - *The Character of England: landscape, wildlife and natural features* - will be launched on December 4th 1996, together with a revised Natural Areas map. Minor modifications to some of the Natural Area boundaries used in this report will occur. In some parts of the country sub-units within Natural Areas will be recognised in this new map to reflect local variation.

Sources and methods

Ancient Woodland Inventory

A major part of the material in this report comes from the Ancient Woodland Inventory (Spencer

& Kirby 1992). Data on the size and location of ancient woods in England have been collated by Natural Area using the geographic information system MAPINFO. The data can then be presented in a variety of ways, for example as distribution maps of sites within an individual Natural Area, for groups of Natural Areas, or as summary data for the whole country.

Part 2 of the report contains summary maps for all Natural Areas (grouped by the English Nature Team that takes the lead on each area) showing site distribution patterns; an area breakdown according to how much is in semi-natural stands, has been replanted or cleared since *c.*1930; and a size distribution for ancient woodland sites.

Core profiles

The second major source of information has been the 'Core Profiles' (Hewston & Cooke 1996) prepared for each Natural Area by Local Team staff. These give an initial assessment as to whether or not woodland was viewed as an important conservation resource in the local context, details of characteristic communities and species and of some of the issues affecting that habitat or feature (Table 1).

These have been used to develop overviews of what seem to be the key issues affecting woodland, nationally and in different parts of the country. Details on the main National Vegetation Types listed, plus information from the published accounts (Rodwell 1991) and other surveys (Cooke & Kirby 1994) were amalgamated to indicate which Natural Areas seem to have a particular value for given types. A similar approach was taken for selected Peterken Stand Type group (Peterken 1981). These are based on local and national staff's perceptions and may be biassed by particular people's interests or knowledge; they are therefore a starting point for discussion, not the definitive result.

Our attention has been focussed on ancient woodland, because that is the most important category for nature conservation. However, other woody habitats such as hedgerows, parkland, scrub and recent plantations were identified as significant features in some Natural Areas. Differences between the people producing the profiles mean that these features were not consistently recorded, but this analysis should stimulate consideration of the value of these features in other areas.

The Core Profiles sometimes recorded where woodland or forestry might constitute a problem from a nature conservation point of view, for example grassland threatened by inappropriate tree planting, or heathland or geological features affected by scrub encroachment. Where this was explicit in the Core Profiles we have noted it, because it is particularly relevant to discussions on the potential for woodland expansion in England.

Other information

There is a wide range of other information (see below) that might be accessed and analysed for woodland in Natural Area terms.

Species

The Core Profiles bring together habitat and species information from a local perspective; colleagues are working on similar national overviews. That for birds is the most advanced (Grice

et al 1994) and we looked at how woodland bird interest varies across Natural Areas. Examples of maps for important woodland mammals prepared by Tony Mitchell-Jones have been incorporated, as well as some information for other groups.

Table 1. Information from a core profile

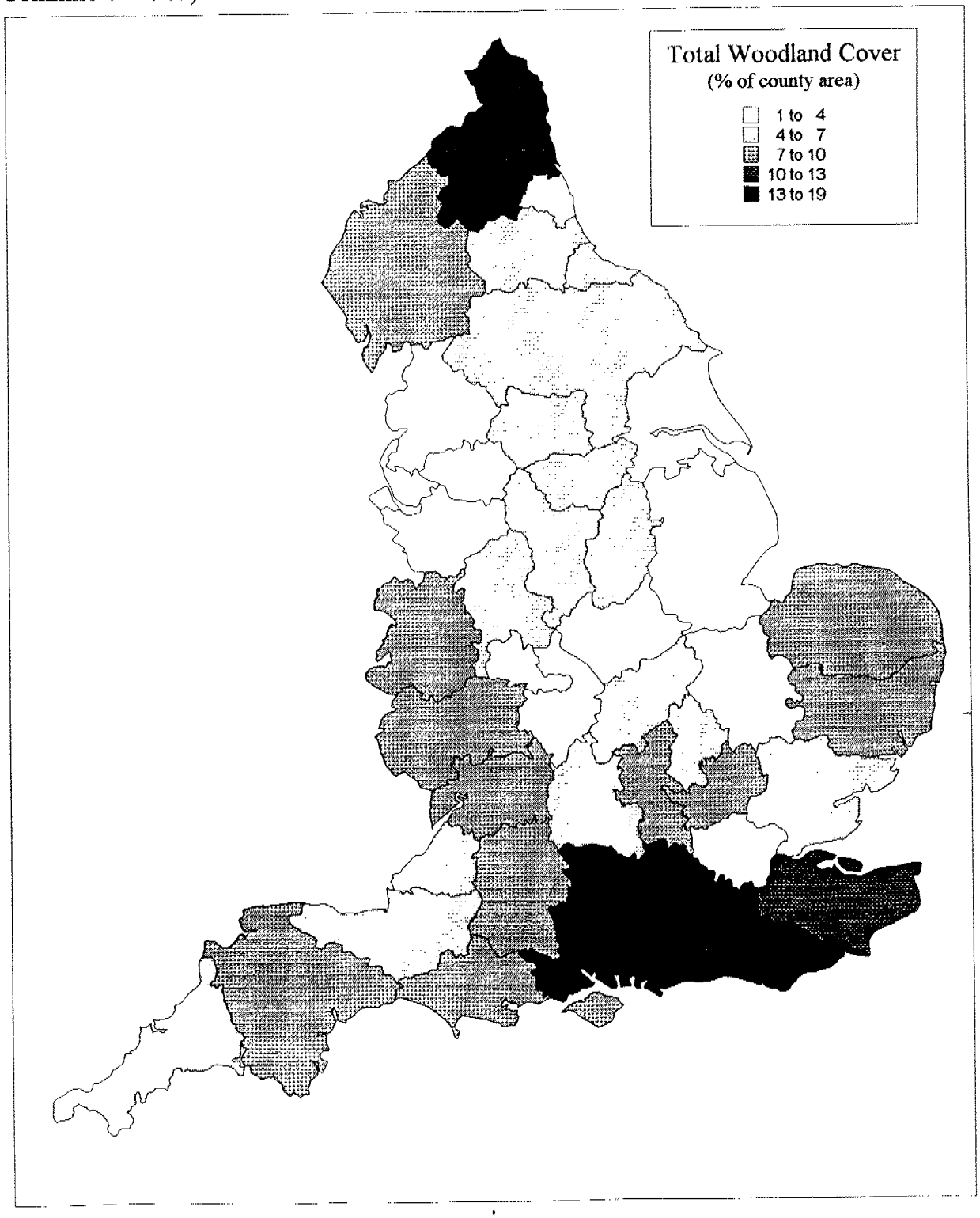
Name of Natural Area	East Anglian Plain	
Key nature conservation feature	Ancient coppice woods	
Feature classification	A111	Woodland: broadleaved, semi-natural
Size of feature	Not known	
Significance	Considerable	
Significant habitats	W8	*Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland
	W10	*Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland
Significant species groups	Bats Woodland birds	
Significant species	*Meles meles* *Pulmonaria obscura* *Melampyrum cristatus*	badger unspotted lungwort crested cow-wheat
Character species	*Meles meles* *Primula elatior* *Carpinus betulus* *Luscinia megarhyncos* *Tilia cordata* *Rubus fruticosus*	badger oxlip hornbeam nightingale small-leaved lime bramble
Declining/extinct species		
Designations	SSSI NNR	
Issues	Lack of coppice management. Lack of markets for coppice management. Too many deer. Too many advisory bodies and uncoordinated advice. Coppice stools getting too old for successful regeneration. Desire of land managers to drain wet rides. Desire for more woodland or hedges linking existing ancient woods. Need to remove conifers from ancient woods. Too much bramble in woods. Drainage of farmland draining the woods. Decline in songbirds. Planting in ancient woods. Lack of regeneration due to owners and rabbits.	

The above information is a preliminary assessment, based largely on qualitative information. It will be refined over the next year.

Total woodland cover

At present there is no data source for all woodland cover, equivalent to the Ancient Woodland Inventory, that can be displayed on a Natural Areas basis. The Forestry Commission's last census of woodland provides some comparison of broad patterns but the breakdown is to county level only (Figure 1). (The next census is just beginning in England and will be available as digital boundaries, but not for several years).

Figure 1. Total woodland cover as % of land surface area by county. (Based on Forestry Commission 1983).



Another possible source of "all woodland" data is the Countryside Information System (CIS). This includes data from a mixture of sample field survey and satellite image interpretation. Results are available at 1 km square levels which could be amalgamated up to Natural Areas. Our initial attempt at this, based on the field sample data, was not successful for various technical reasons but it is being explored further.

Woodland conservation and Natural Areas

The aim of using Natural Areas is to assist nature conservation as a whole in England: but how can they help with woodland issues in particular?

Woodland data can be analysed, and differences in interpretation found, for almost any set of boundaries drawn on a map of England. Analyses by county, for example, have been widely used. To investigate the usefulness of a Natural Areas approach for the interpretation of woodland data for conservation purposes we considered the following questions:

- Do Natural Areas broadly reflect patterns in the distribution of ancient woodland sites; are there major anomalies in particular parts of the country?

- Are major differences in the distribution of woodland vegetation and structural types reflected in the pattern of Natural Areas?

- How can Natural Areas provide a suitable framework for organising our ideas and approaches on a range of woodland issues?

For each Natural Area we have made a preliminary assessment of its *overall national significance for woodland conservation in England* against a set of criteria - including for example:

- area of ancient and ancient semi-natural woodland;
- percentage land surface covered by ancient woodland;
- whether the Natural Area is notable for particular woodland vegetation communities.

Criteria used in making such an assessment should vary according to particular objectives or mechanisms that are being explored. For example, if the objective is to identify Natural Areas *where opportunities for restoration of replanted ancient woodland are likely to be greatest*, then more weight ought to be given to criteria such as "% cover of replanted ancient woodland" (see Table 8).

Results

How much ancient woodland is there?

The amount of ancient woodland in different Natural Areas can be presented either in terms of total extent or percentage cover (Figures 2 and 3; Table 2). Both types of information are useful. The absolute amount is significant, because any trend affecting woods in a Natural Area with a large amount of woodland has a disproportionate effect on the country as a whole; the percentage cover is also important since a small amount (in absolute terms) may be very significant in a small Natural Area. The degree of planting within ancient woods also varies considerably, being very high in the Forest of Dean, for example, but relatively low in the London Basin.

Figure 2. Amount of ancient woodland (a) All ancient woodland
(b) Ancient semi-natural woodland

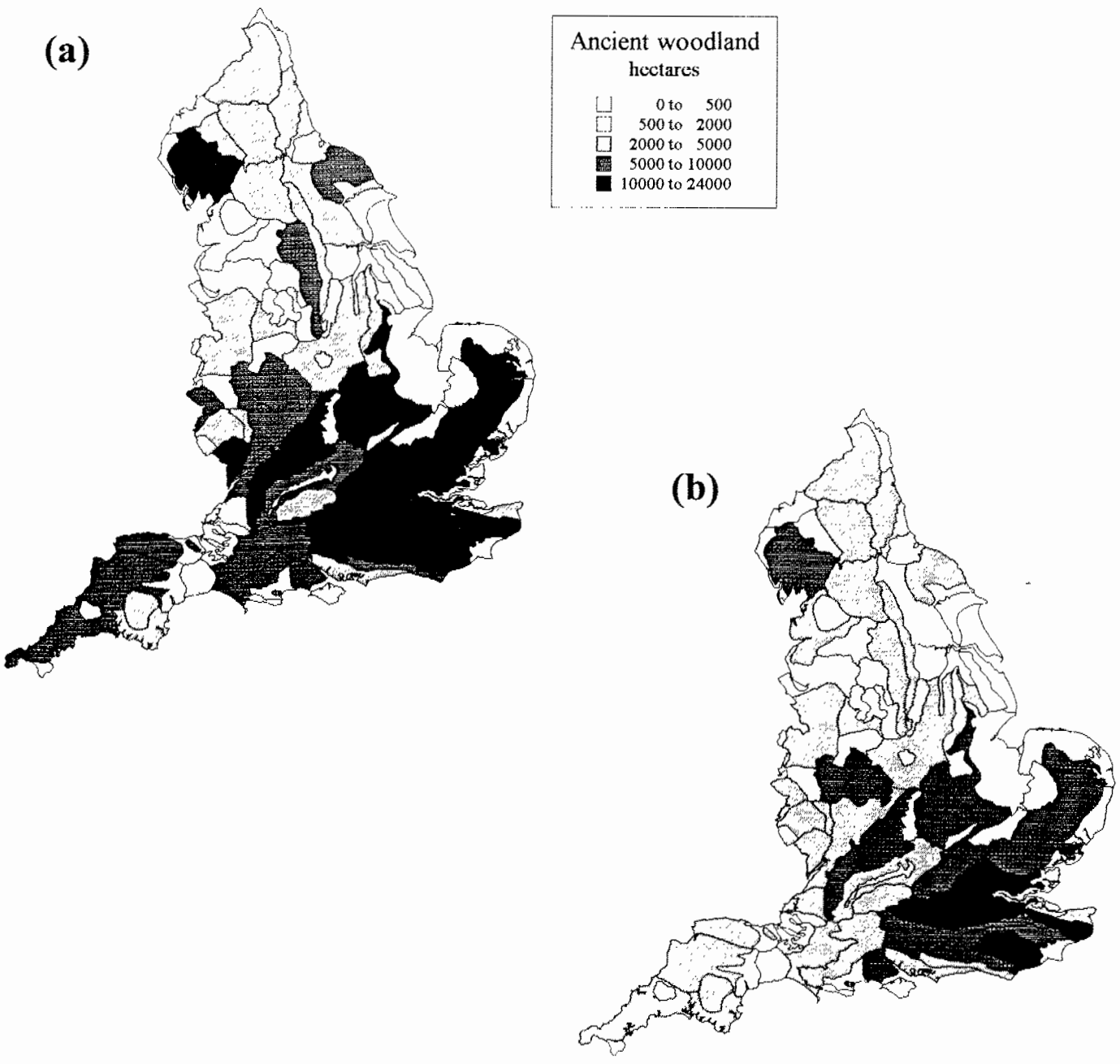


Figure 3. Percentage of each Natural Area covered by ancient woodland

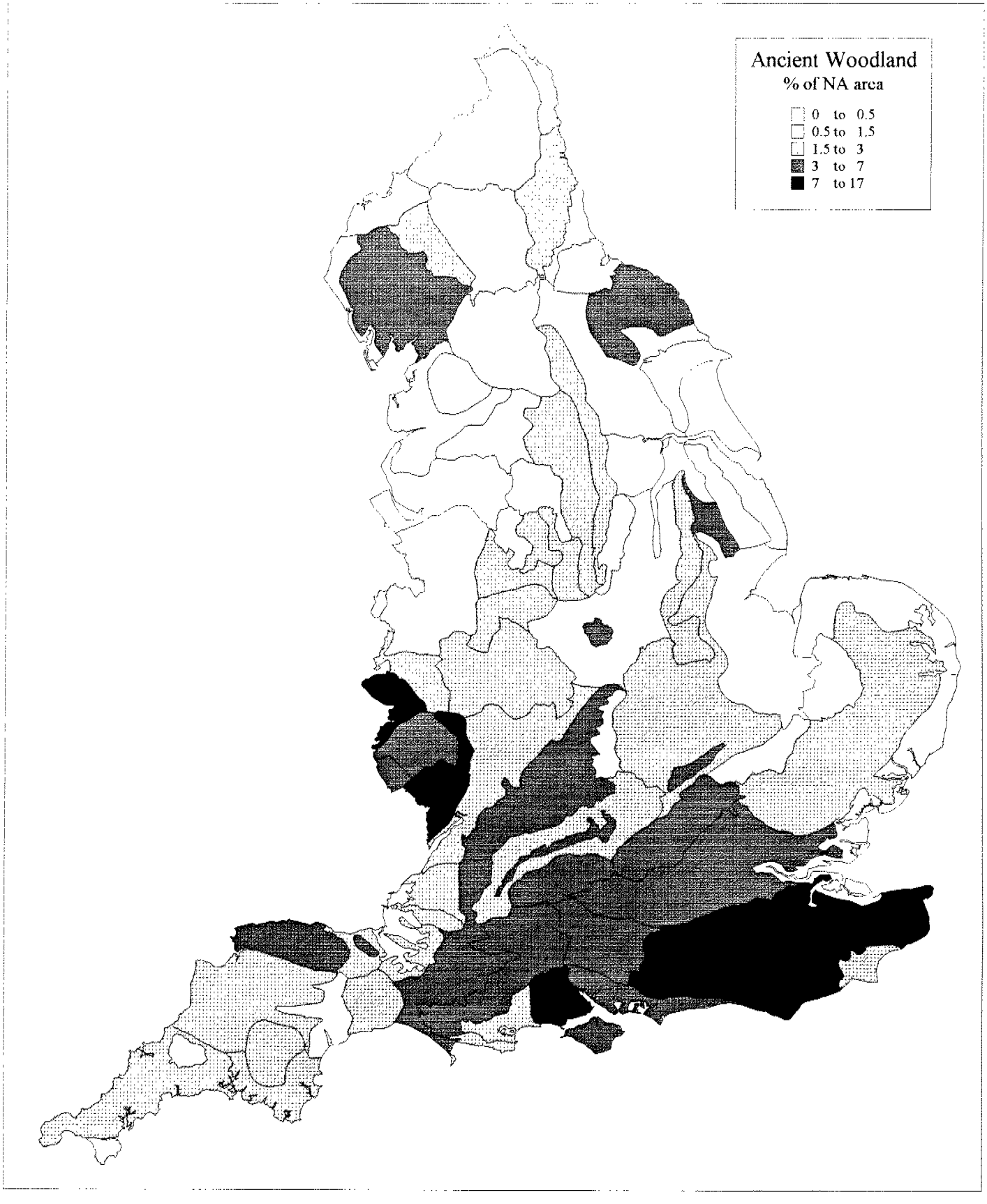


Table 2. The 10 Natural Areas with the highest and lowest amounts of ancient woodland

Natural area number and name	Area (ha) Ancient	Area (ha) Ancient semi-natural	% total that is semi-natural	% land cover that is ancient
(a) HIGHEST amount of ancient woodland				
44. High Weald	23620	15461	59	14.5
38. London Basin	15516	11541	66	3.4
72. Dean Plateau and Wye Valley	14278	4143	28	16.0
41. North Downs	14134	10184	62	9.4
43. Low Weald	13799	8990	58	7.1
46. Greensand	12971	8415	59	8.9
24. Middle England	12802	5927	43	2.3
34. Chilterns	12560	7583	58	6.9
89. Cumbria Fells and Dales	11745	8050	65	3.6
69. Greater Cotswolds	10738	7032	63	3.0
(b) LOWEST amount of ancient woodland				
16. Coversands	307	52	16	0.5
29. Breckland	282	188	59	0.3
15. Humberhead Levels	251	115	31	0.3
22. Lincolnshire Wolds	230	121	50	0.3
58. Bodmin Moor	216	144	64	0.8
67. Somerset Levels and Moors	146	141	95	0.2
60. The Lizard	118	45	38	0.7
78. Oswestry Uplands	110	72	65	1.2
11. Plain of Holderness	83	68	72	0.1
31. Broadland	24	17	65	0
Total England	340598	198622	58.3	2.6

The known concentrations in the south-east, the Wye Valley, the Lake District and along the Chilterns or the Cotswolds are highlighted when examined by Natural Area. Other Areas also emerge as important simply because they are large, for example the Thames Basin and Middle England. Areas with a particularly low cover of ancient woodland again, not surprisingly include the Breckland and former wetlands such as the Somerset Levels.

In the Core Profiles six terrestrial Natural Areas did not have tree cover of any sort listed as a feature of local significance: Vales of Yorkshire; Eden Valley; Humberhead Levels; Thames Marshes; Solway Basin; Romney Marsh. The last four fall into the 'former wetland/bog' zone (if you go back far enough) so the lack of ancient woodland interest is understandable. (A few ancient woods "spill over" into the Romney Marsh area so it is not as low as might be expected.) The other two are open farmed landscapes. Nevertheless woodland does occur and at least parts of them should receive a higher rating. In some other Natural Areas the woodland interest may not be associated with ancient sites - for example the broadleaved woodland in the Broads is important but nearly all recent, while Scots pine belts are important in Breckland.

Ancient woodland size distribution varies across the country: some areas are characterised by long thin woods on hillsides; others by extensive blocks; others by lots of small scattered woods. Large ancient woods (> 100 hectares) are, however, a scarce resource; and ancient semi-natural woodland over 100 hectares even scarcer (Figure 4). The East Anglian Plain, for example, which has quite large amounts of ancient woodland contains only one such large wood.

Figure 4a. Distribution of large ancient woodlands (over 100 hectares)

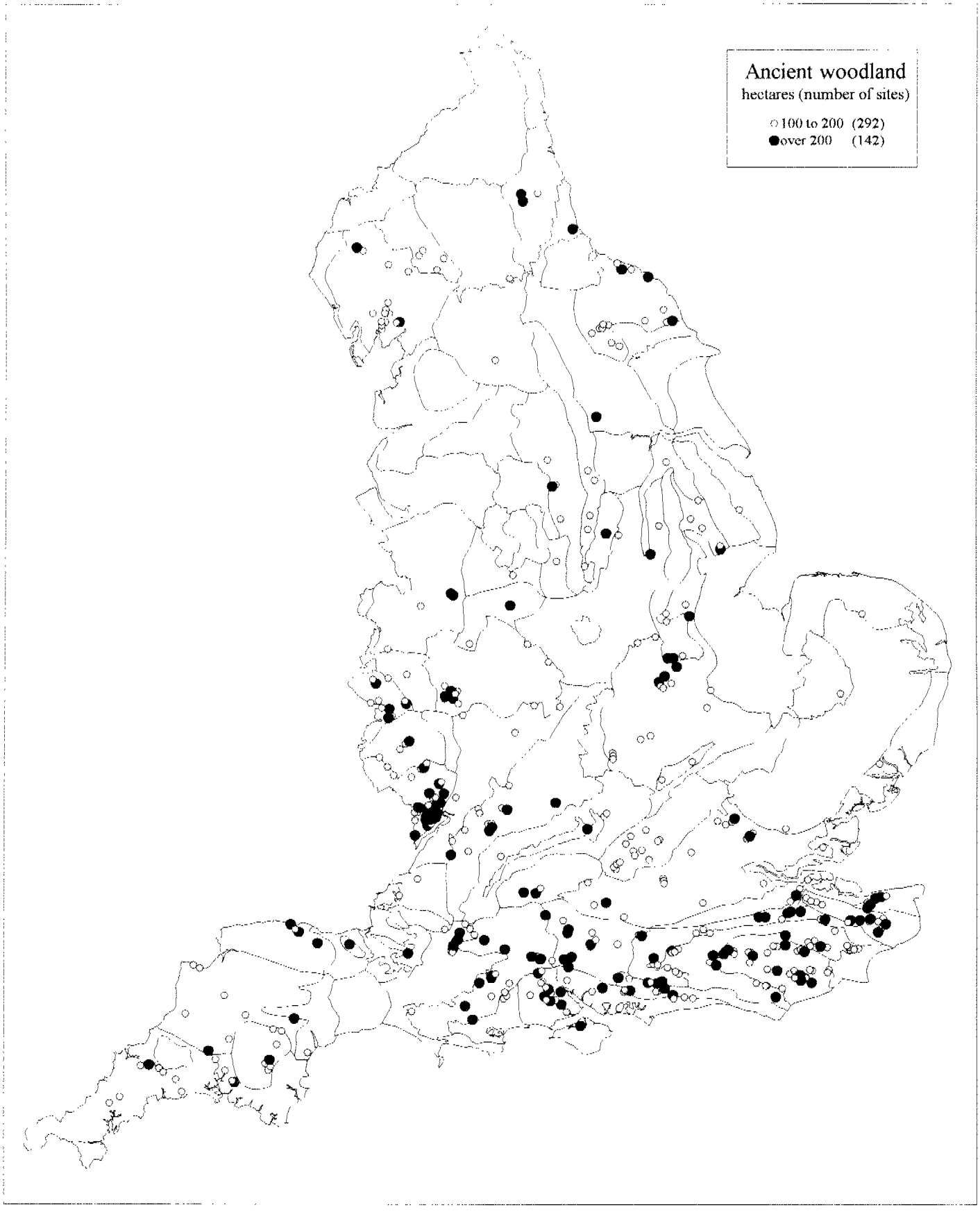
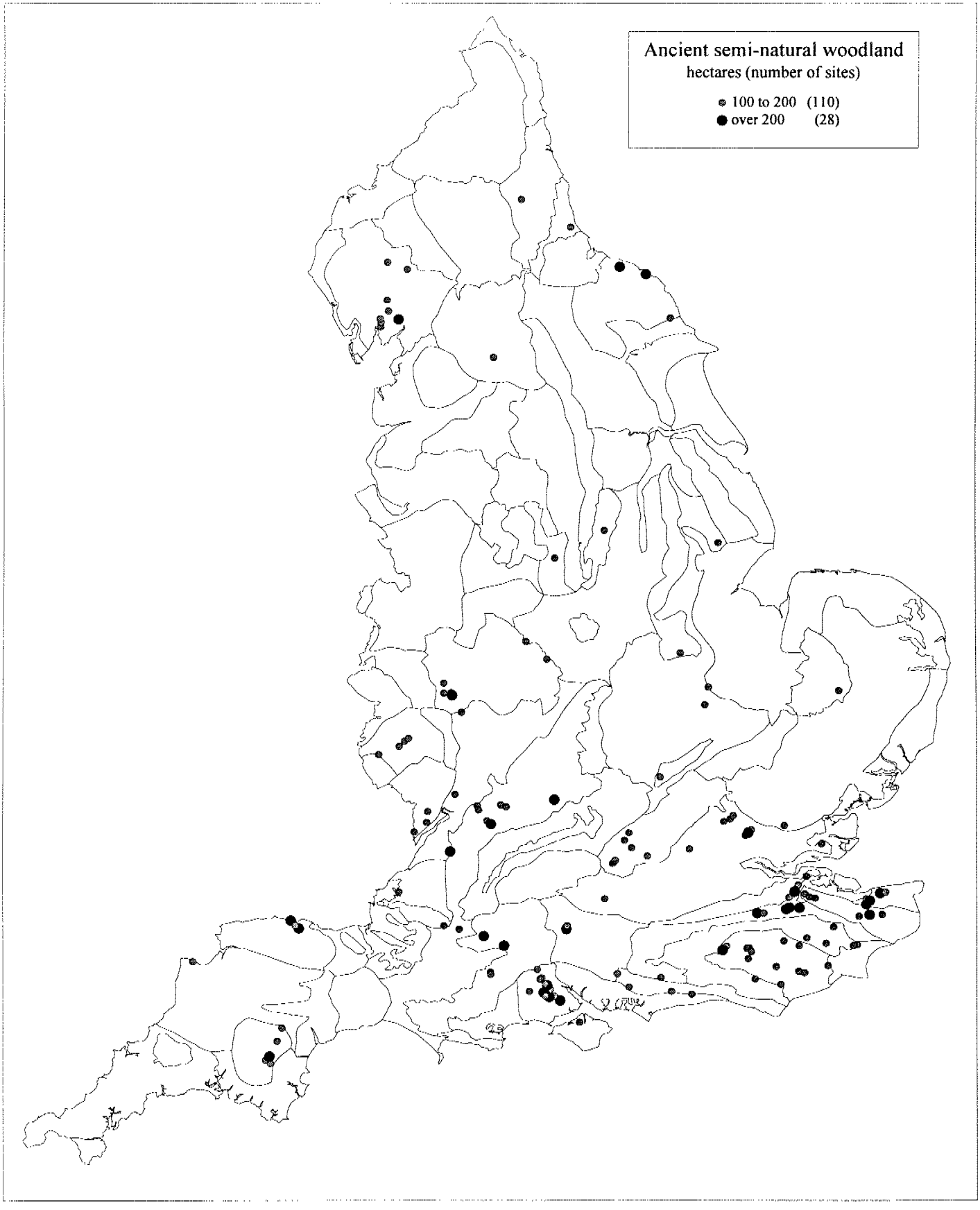


Figure 4b. Distribution of large blocks ancient semi-natural woodland (over 100 hectares)



Woodland fragmentation

The size, shape and distribution of woods can affect the ability of woodland species (plants and animals) to move between and within them. Woodland fragmentation (ie the breaking up of woodland blocks as a result of changes in land use) and the consequent isolation of woodland species were specifically highlighted as issues in a number of core profiles (see Table 3 and map below). It is likely, however, that conservation problems associated with woodland fragmentation are much more widespread. Various measures of habitat fragmentation have been considered in Kirby and Thomas (1994) and Baalman and Kirby (1994) and illustrate the differences that exist between Natural Areas (Table 4).

Table 3. Natural Areas where woodland fragmentation was identified specifically as an issue in the core profiles

4 Northumbria Coal Measures
7 Yorkshire Dales
9 North York Moors
13 Coal Measures
16 Coversands
17 Sherwood Forest
18 Trent Valley and Levels
19 Charnwood Forest
20 Lincolnshire Limestone
21 Lincolnshire Clay Vales
23 Lincolnshire Marsh and Coast
26 Bedfordshire Greensand
34 Chilterns
52 Dorset Heaths
53 Isles of Portland and Purbeck
54 Wessex Vales
56 Devon Redland
58 Bodmin Moor
64 Vale of Taunton
70 Severn Valley
75 Midlands Plateau
76 Shropshire Hills
88 Bowland Fells
89 Cumbria Fells and Dales

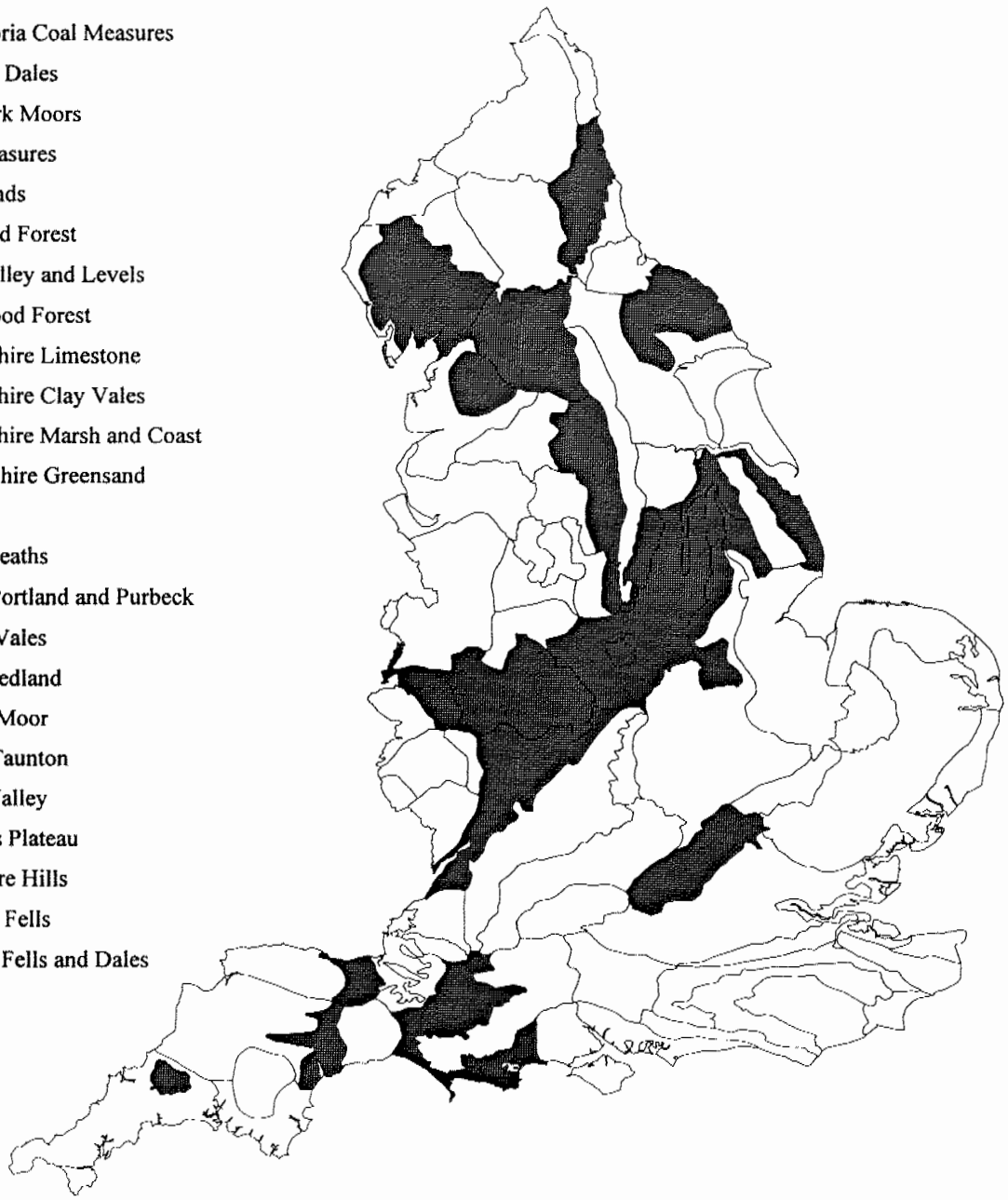
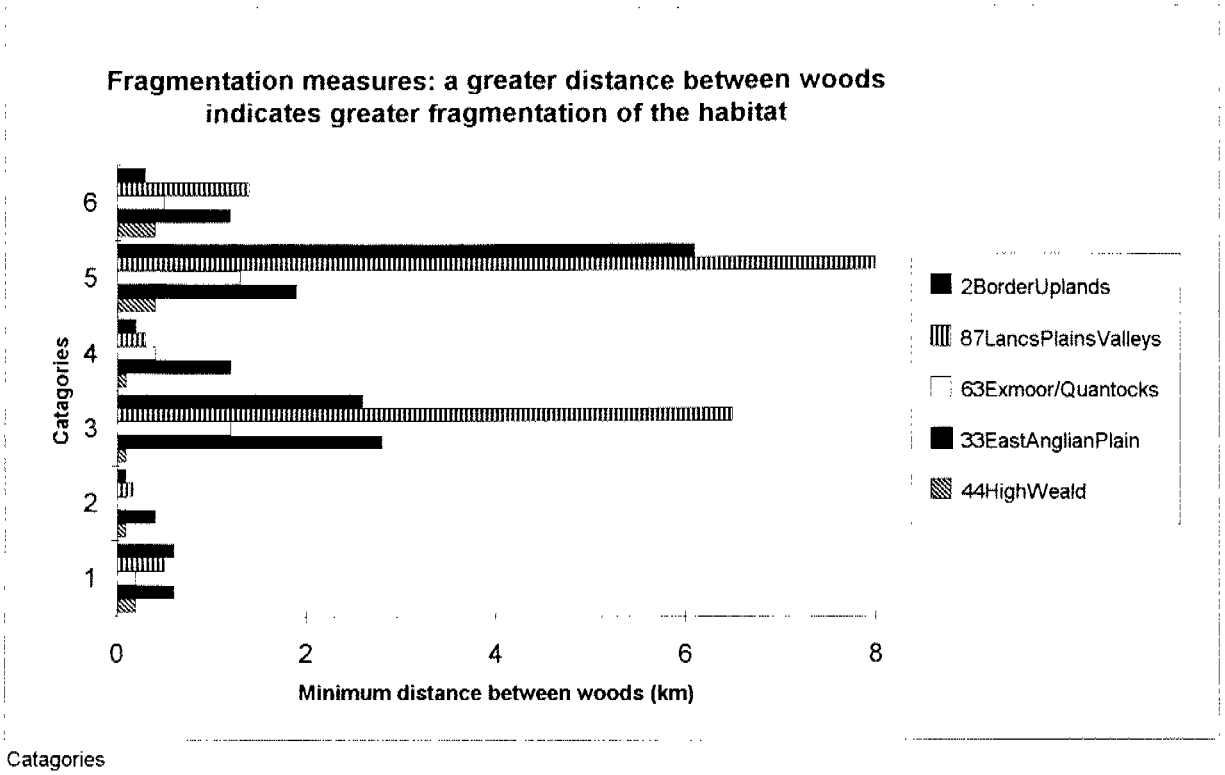


Table 4. Fragmentation measures for ancient woodland in selected Natural Areas

a. Minimum distances between one wood or a randomly selected point and the nearest wood based on three ancient woods, three recent ones and three points in each of three 10 kilometre squares per natural area (from Kirby & Thomas 1994).



Catagories

1 = ancient wood to ancient wood
2 = ancient wood to any wood
3 = recent wood to ancient wood
4 = recent wood to any wood
5 = random point to ancient wood
6 = random point to any wood

The implications for the colonization of new woods in the Lancashire Plain are very different to those in the High Weald if the location of the new wood is effectively at random to existing woodland cover (ie equivalent to the point data). In the Weald a species found in ancient woods might need to travel only 0.4 km from ancient source to new woodland, whereas in the Lancashire Plain it would be 8.0 km. However, if the species were also in recent woods the colonization distance might be reduced to 1.4 km. A further consideration not obtainable from these data, but obvious from maps and on the ground, is that the minimum distance between woods is often very much less in one direction than another because particularly in the upland woods are often arranged along linear features such as slopes or river valleys.

Table 4. b. 'Wildlife friendliness' of different landscapes for woodland species based on woodland in five 5x1 km strips per Natural Area (from Baalman & Kirby 1995).

Natural area	Ancient semi-natural woodland	Ancient woodland	All woodland
2. Border Uplands	0.00	0.00	109±78
9. North York Moors	15±14	31±14	186±5
18. Trent Valley & Levels	0.00	0.00	11±6
27. Fenland	0.00	0.00	1±1
28. East Anglian Southern Chalk	3±3	3±3	15±4
32. Suffolk Coast and Heaths	14±14	14±14	51±18
44. High Weald	34±15	50±20	88±27
47. Hampshire Chalk	23±11	37±13	56±13
51. South Wessex Downs	12±8	31±20	59±26
59. Cornish Killas and Granite	4±2	10±8	27±12
69. Greater Cotswolds	17±8	20±10	48±20
74. Hereford Plain	2±1	8±4	15±5
79. Mosses and Meres	0.00	0.00	17±11
87. Lancashire Plain and Valleys	2±1	2±1	18±8

The three columns illustrate differences in the relative permeability of the landscape for species with different degrees of dependence on woodland in general and on ancient or ancient semi-natural woodland in particular. For a species dependent on ancient semi-natural woods there is little to choose between the Border Uplands, Trent Valley or Fenland. For a woodland generalist Fenland would be similarly hostile but the Trent Valley is rather more attractive and the Border Uplands have considerable potential. North York Moors and Suffolk Coast have similar amounts of ancient semi-natural woodland, but the opportunities for a species that can use any ancient woodland look rather better in the North York Moors.

Distribution of woodland types by Natural Area

National Vegetation Classification (NVC) types

The published NVC volume (Rodwell 1991) gives the distribution of different woodland communities on a 10 km square basis, but these maps must be viewed as indicative only. They show where samples of the type had been recorded up until 1986, but gaps may reflect a lack of records, not of the type. An atlas of woodland NVC types incorporating post-1986 records is in preparation, but the data have not yet been incorporated for England. A provisional estimate of the significance of different NVC types in different Areas was therefore made using very crude measures (see Appendix 2 and Part 2: Area descriptions). It is open to challenge in every cell because there is a strong element of individual bias (including that of KJK). There is a tendency for upland woods and areas to contain a greater number of NVC communities than lowland ones and this is reflected, for example, in the numbers listed by the local team and in the overall diversity index (Figure 5). However, the band of high values through the West Midlands and in the North Pennines may be partly artifacts.

Certain Natural Areas stand out in terms of their high NVC diversity or the importance of particular types (see Table 5, and Figures 5 a and b).