

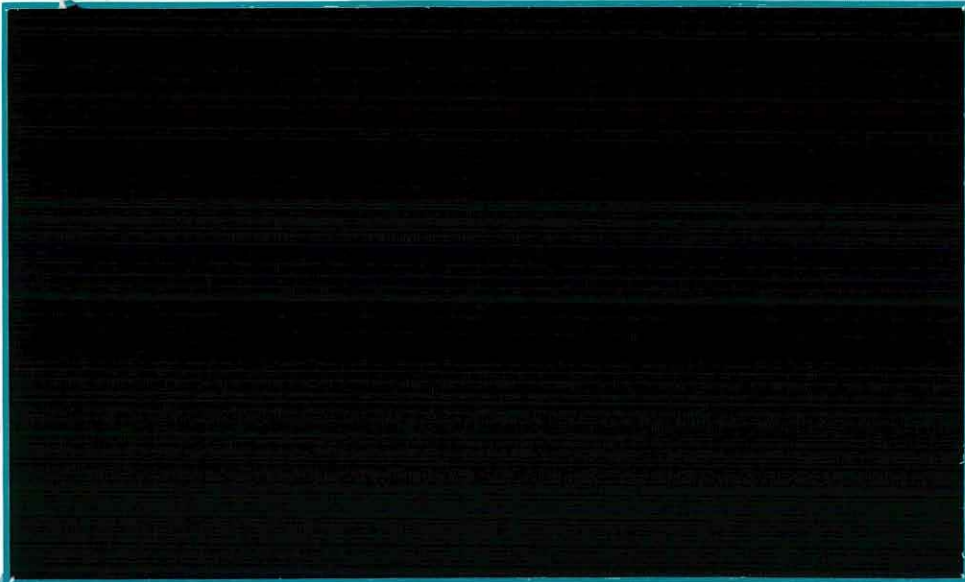
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ITE sites

Monks Wood
(Admin HQ)
Abbots Ripton
HUNTINGDON PE17 2LS
Telephone 01487 773381-8
Fax 01487 773467
Email MONKSWOOD@ITE.AC.UK

Merlewood Research Station
GRANGE-OVER-SANDS
Cumbria LA11 6JU
Telephone 015395 32264
Fax 015395 34705
Email MERLEWOOD@ITE.AC.UK

Edinburgh Research Station
Bush Estate
PENICUIK
Midlothian EH26 0QB
Telephone 0131 445 4343
Fax 0131 445 3943
Email BUSH@ITE.AC.UK

Furzebrook Research Station
WAREHAM
Dorset BH20 5AS
Telephone 01929 551518-9, 551491
Fax 01929 551087
Email FURZEBROOK@ITE.AC.UK

Banchory Research Station
Hill of Brathens
Glassel, BANCHORY
Kincardineshire AB31 4BY
Telephone 01330 823434
Fax 01330 823303
Email BANCHORY@ITE.AC.UK

Bangor Research Unit
University of Wales, Bangor
Deiniol Road
BANGOR, Gwynedd LL57 2UP
Telephone 01248 370045
Fax 01248 355365
Email BANGOR@ITE.AC.UK

**Institute of Terrestrial Ecology
Centre for Ecology and Hydrology
(Natural Environment Research Council)**

**Progress Report to
Department of Environment,
Transport and the Regions
Contract Ref: EPB 1/8/16**

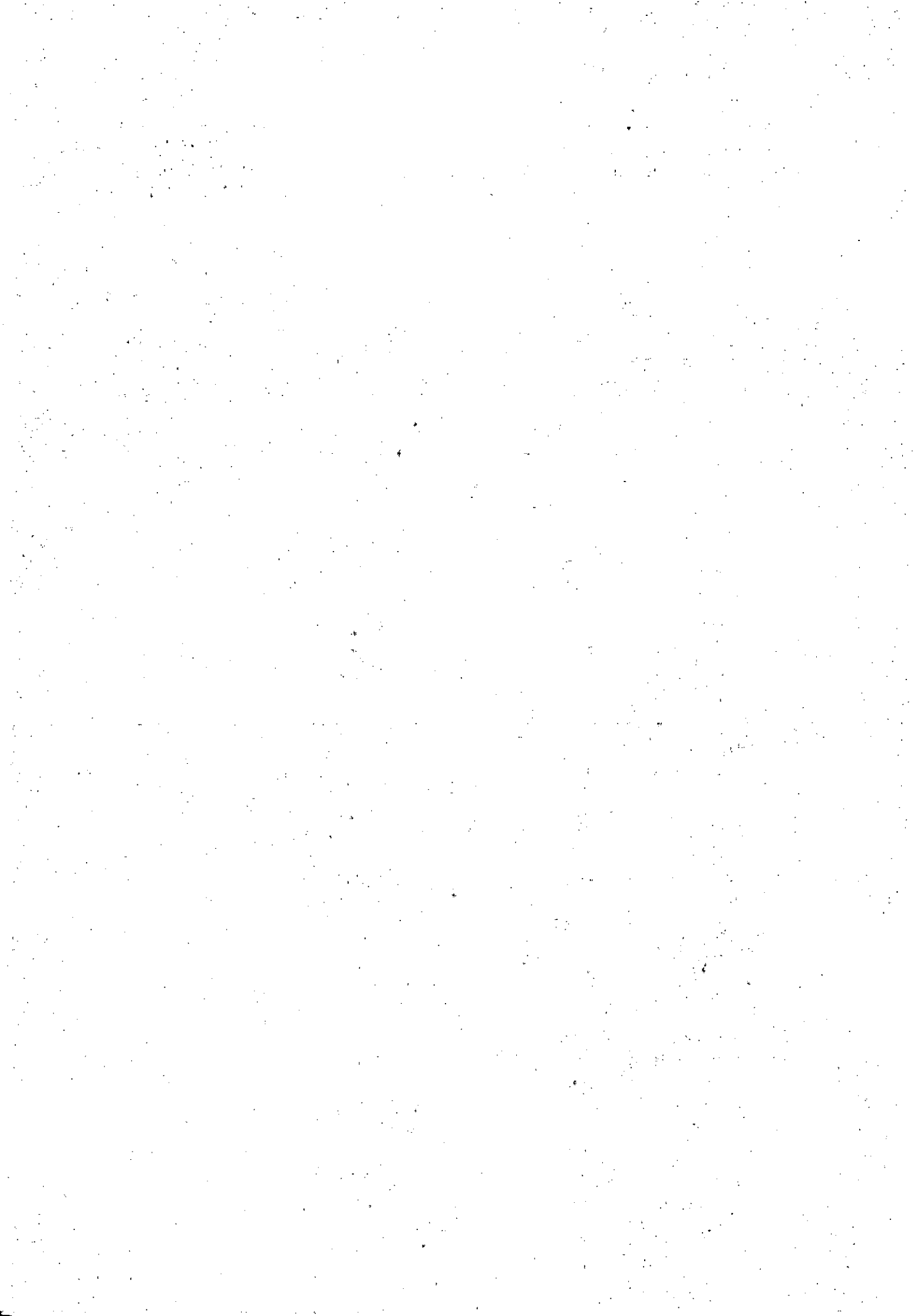
**Pilot study to link
Environmental Change Network
and Countryside Survey
vegetation monitoring**

Interim Report: June 1997

M D Morecroft
T W Parr
W A Scott

Environmental Change Network
Institute of Terrestrial Ecology
Merlewood Research Station
Grange-over-Sands
Cumbria LA11 6JU

October 1997



1. Introduction

This study was commissioned by the Department of the Environment to address the following aims:

1. Compare the botanical monitoring protocols used at ECN sites and in the Countryside Survey 1990 and to assess the representation of UK vegetation at ECN sites.
2. To develop and test an annual vegetation monitoring protocol compatible with Countryside Survey methods and representing the range of vegetation (including disturbed vegetation and linear features) at ECN sites during the summer of 1997.
3. To assess the significance of observer error in detecting annual variation in vegetation.
4. To demonstrate analytical procedures which may be used to compare data from ECN sites and Countryside Survey and assess the impact of weather on year to year variation in vegetation.
5. To make recommendations for modifications to vegetation monitoring procedures to be implemented in Countryside Survey 2000.

This interim report deals with Aim 1 and presents plans for the vegetation monitoring to be carried out in the Summer of 1997.

2. Comparison of botanical monitoring protocols in ECN and Countryside Survey 1990

Vegetation recording in both ECN and CS90 is based around the principal of recording plant species in quadrats which can be relocated, allowing change to be detected. Both also make provision for a quantitative assessment for each species, ECN by recording *frequency* within the quadrat and CS90 by estimating *cover* of a species. Under both schemes it is possible to recognise species which are increasing or decreasing across Britain and so to use annual monitoring at ECN sites to interpret the results of Countryside Surveys.

Table 1. Comparison of ECN and Countryside survey vegetation monitoring.

ECN	Countryside Survey 1990
<p>Location of sites through UK</p>	
<ul style="list-style-type: none"> • 11 terrestrial sites. Areas range from 190 ha to 6500 ha. Selected to allow coverage of different areas of the UK and to ensure stable management and a history of research. 	<ul style="list-style-type: none"> • 507 squares 1 km x 1 km (100 ha). A stratified random sample of Great Britain based on land classification.
<p>Vegetation mapping</p>	
<ul style="list-style-type: none"> • 'Baseline' vegetation survey using system of 2 x 2m quadrats (with additional 10 x 10 m plot for tree species centred on the 2 x 2) on a grid provides spatial information on site vegetation. Classified according to National Vegetation Classification. 	<ul style="list-style-type: none"> • Land cover and major landscape features mapped within squares. Classified according to CS1990 field recording codes.
<p>Recording interval</p>	
<ul style="list-style-type: none"> • 3 or 9 year intervals (+ one off baseline). Pilot study on annual vegetation recording c.f. this report. 	<ul style="list-style-type: none"> • Undetermined. 1978, 1990 and 1998.
<p>Scope of recording</p>	
<ul style="list-style-type: none"> • Vascular plant species rooted in quadrats, Bryophytes and lichens, except those growing on rocks or trees. (identification to species level in 'fine grain' and 'baseline' plots, but not 'coarse grain'). • Arable areas excluded. 	<ul style="list-style-type: none"> • All vascular plants rooted in plots. (separation to species level is not required with specified difficult groups). Only specified common bryophytes and lichens are recorded. • Recording of quadrats in arable areas included, but limits of plot estimated and not marked out.
<p>Permanent marking</p>	
<ul style="list-style-type: none"> • Permanent marking required at corners of plots. 	<ul style="list-style-type: none"> • One permanent marker per plot if possible.
<p>Standard Quadrats</p>	
<ul style="list-style-type: none"> • 'Coarse grain'. Up to 50 quadrats of 2 x 2 m selected randomly from grid positions used in baseline survey. Occurrence of species in 25 regularly arranged sub-quadrats of 0.4 x 0.4 m² recorded to give frequency. 	<ul style="list-style-type: none"> • 5 square quadrats of 200m² (14.14 x 14.14 m) per 1 km square, pre-positioned at random. Species list and cover estimates made.
<p>Every 9 years</p>	
<ul style="list-style-type: none"> • 'Fine grain'. Subjectively placed quadrats of 10 x 10 m in each NVC type; at least 2 per vegetation type. Occurrence of species in 10 randomly located sub-quadrats recorded to give frequency. Every 3 years. 	<ul style="list-style-type: none"> • 5 quadrats 4 m² per 1 km square, subjectively placed in land cover types where there is not already a 200 m² or 10 m² quadrat. Where there are >5 unrepresented land cover types they are chosen randomly; where there are <5, the 5 are distributed according to area covered.
<p>Boundary (linear) plots</p>	
<ul style="list-style-type: none"> • OPTIONAL additional measurement only: A series of 0.4 x 0.4 m quadrats are located along a line running perpendicular to the boundary. Number of quadrats and length of line adjusted to suit situation. Where the line crosses a hedge row, woody species are record 5 m. either side of the line 	<ul style="list-style-type: none"> • 10 m x 1m plots along the edge of (i) boundaries closest to 200 m² quadrats in enclosed land (ii) up to 2 hedgerows (iii) up to 5 streamsides (iv) up to 5 roadsides. Extra 10 x 1m quadrats are established adjacent, in parallel in water for the stream sides and on verges wider than 2m. Cover estimates made.
<p>Tree monitoring</p>	
<ul style="list-style-type: none"> • Where 'coarse grain' plots fall within woodland, a 10 x 10 m plot centred on the 2 x 2m plot is established. Tree species in the 10 x 10 are recorded and up to 10 trees are marked and diameter at breast height (every 3 years) and height (every 9 years) measured. Seedlings are recorded in 10 sub-quadrats of 0.4 x 0.4 m randomly distributed throughout the 10 x 10m. quadrat. • Forest Health may be recorded on ECN sites using the UN-ECE method. 	<ul style="list-style-type: none"> • No comparable measurement
<p>Pasture and cereal productivity monitoring.</p>	
<ul style="list-style-type: none"> • Additional protocols are available and implemented by small number of sites 	<ul style="list-style-type: none"> • No comparable measurement.

3. Coverage of vegetation types by ECN

A new classification of British vegetation, the Countryside Vegetation System (CVS), has recently been completed by the Land Use Section at ITE Merlewood using results from Countryside Surveys. There are 100 vegetation classes which can be aggregated into 8 main types. A preliminary analysis (Table 2) shows that a sample of ECN fine grain plots used for a Quality Assurance exercise in 1996 included a good representation of all of the CVS aggregate classes, except arable. This is to be expected as ECN monitoring excludes arable land from vegetation monitoring at present. Tall grasslands are also slightly under- represented, possibly because the ECN plots did not include boundary vegetation or set - aside, where such types may predominate. At the level of the individual vegetation classes the preliminary analysis showed that ECN QA plots cover 39 of the 100 classes.

Table 2. Classification of ECN QA plots according to CVS aggregated vegetation classes (results of preliminary analysis).

Aggregate Vegetation Class	number of plots	number of sites
1. Crops/weeds	0	0
2. Tall grassland/herbs	5	4
3. Fertile Grassland	16	4
4. Infertile Grassland	18	7
5. Lowland wooded	30	6
6. Upland wooded	9	5
7. Moorland/grass mosaic	18	4
8. Heath/bog	11	4

4. Field Survey Programme

In our original proposal we suggested that a repeat of the 1996 QA exercise on a sub-set of ECN 'fine grain' plots (107 out of a possible 240) in the summer of 1997, would be the best basis for a prototype annual vegetation monitoring scheme, given the finances and time available. The analysis of the coverage of vegetation types confirms this. The advantages can be summarised as follows:

1. Results can be compared with Countryside Survey data, as detailed in section 2. above.
2. We already have comparable data for 1996 and at some sites earlier years also.
3. The quality control issues for this methodology e.g. observer bias have been well researched.
4. The coverage of British vegetation types is good.

All ECN terrestrial sites (except the most recent one to join - Snowdon) will be visited by contract surveyors during July and August, at times as close as possible to last years survey

(Table 3, Fig. 1). Quality Assurance will be by repeat recording of selected plots by another surveyor. The surveyors to be used are:

Lowland sites: Dr. P. Wilson & Ms. M. Reid, Wessex Environmental Associates.

Upland sites: Mr. Gordon Common, Macaulay Land Use Research Institute.

Both contractors have carried out vegetation monitoring at ECN sites previously.

Table 3. ECN sites to be surveyed in 1997.

Site	Target survey date (week beginning)	surveyors
Alice Holt	21 July	Wessex Env. Associates
Drayton	28 July	Wessex Env. Associates
Glensaugh	21 July	MLURI
Hillsborough	11 August	Wessex Env. Associates
Moorhouse / Upper Teesdale	28 July	MLURI
North Wyke	14 July	Wessex Env. Associates
Porton	7 July	Wessex Env. Associates
Rothamsted	4 August	Wessex Env. Associates
Sourhope	14 July	MLURI
Wytham	30 June	Wessex Env. Associates

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Time Spent:	Not Specified		
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Description

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