

Contract No: FST 20-32-023 Woodland Indicators: analysis of field survey

National Woodland Survey 2002

Field Handbook

Amended by K Kirby, S M Smart and H I J Black. Adapted from original text by M W Shaw and R G H Bunce for the 1971 baseline broadleaved woodland survey of GB.

*Centre for Ecology & Hydrology
Merlewood
Grange-over-Sands
Cumbria LA11 6JU May 2002*

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1. Instructions on methods of survey and recording

1.1. General

You will be supplied with the necessary site and plot location maps, recording sheets and soil sampling bags and boxes before leaving Merlewood. A check list of all equipment is given in Appendix V. CEH can lend girth tapes for DBH measurement and sighting poles for slope or tree height measurement if necessary. In any event all survey teams should use the same methods.

Woods will be located using a list of grid references and names for each woodland site, an A4 extract from the relevant 1:50,000 OS map (plus, wherever possible, a copy of the original 2½” map) showing the location of each site and an enlarged copy of the site sketch map showing the locations of each of the 16 plot locations that need to be re-recorded (from either the 1:50, 000 or 2 ½” map – please check carefully as this will affect locating plots). Having located the site the first important thing is obtaining **PERMISSION** to enter and survey the site in question.

1.2. Access and Permission to Survey Sites

It will be the responsibility of the surveyors to obtain permission to survey the woods. The contractors will provide such information as they hold but for some woods there will be no known owner and this will need to be established on the ground. Once you have established ownership, record names and addresses with the survey results on the back of the Site Description sheet. You **MUST** obtain permission to access the land.

Experience from Pilot Woodland Re-survey and the Countryside Survey 2000 fieldwork showed that, in the majority of cases, land-owners could be identified and permissions secured in half a day –even with multiple owners. There were very few cases where land-owners refused permission to survey their land. Most are fascinated by the fact that records existed from 1971 and that these records could be accurately updated.

In order to ease negotiations you will be provided with a letter of introduction explaining the background to the survey. You can also assure any landowner that they will receive a complete copy of the results (1971 and 2002) for their parcel of land. This is also why it is crucial to note down addresses and contact numbers for each site.

1.3. Location of the Sampling Points

A map will be provided that is marked with the 16 random sampling points (numbered 1-16). Locating these points on the ground is an extremely critical part of the survey procedure upon which much else depends. There are two important factors in locating the points:

- i) Accuracy
- ii) Absence of subjective bias (i.e. not exercising choice)

In practice, high accuracy is not possible without resorting to time-consuming methods. However a reasonable degree of accuracy is required if plot and map derived datasets are to be compatible, since certain information about the plots (altitude, slope position, measures of exposure etc.) will be taken from the map. Three maps will be provided: (i) 1:50 for location, (ii) a photocopy of the original 2½” with plot locations and (ii) expanded version of the same.

PLEASE NOTE that the contours on the 2½” map are in 25 foot intervals and the original 1971 instructions to surveyors were that 1/32nd of an inch = 22 yards. If you have a metric map, or wish to work in metres, you will have to convert all distances and slopes accordingly.

There are no permanent markers for each plot as absolute reference points to determine the accuracy of relocation. A degree of re-location error is expected given the lack of permanent markers but our experience in the pilot survey shows that the following re-location procedure performs substantially better than analysis of repeat records from a newly randomised set of locations.

More important is the avoidance of bias. Such considerations as, “this bit is not very typical”, or, “we had a bit like this last time, we will walk on another 10 paces, it looks better there”, must be avoided at all costs. Taking short or long paces in order to avoid a blackthorn thicket or nettle bed is an equally serious crime as is the location of plots in situations judged to be in any sense ‘homogenous’.

PLEASE NOTE THAT THE USE OF GPS TO LOCATE PLOTS IS DISCOURAGED. THIS MAY BRING YOU CLOSER TO THE 1971 **MAPPED** PLOT LOCATION BUT MAY NOT NECESSARILY BRING YOU CLOSER TO WHERE THE PLOT WAS ACTUALLY RECORDED. BECAUSE GPS WAS NOT USED IN 1971 ITS USE IN 2003 COULD INTRODUCE BIAS.

1.4. Relocation approach:

The approach will be to pace out along a compass bearing having derived a distance and angle from the plot location map.

Each enlarged map has one complete side of a 1 km square marked on it. This will allow you to scale between distance on the map and distance on the ground e.g. 1 mm = 10 m on a 1:10,000 map. **Please note**, plot location maps have been enlarged to different extents to increase the clarity of the plot locations so you will need to work out a map-to-ground correspondence separately for each plot location map.

Bear in mind that the sites may have altered significantly over 30 years. Collect soil samples and record the vegetation even if the plot is no longer woodland. Only do not record if it is built-over. We know that at least one site has been bisected by a motorway since 1971. Dramatic changes in land-use may have affected other sites as well. Do not attempt to record plots that now fall into land you have no permission to survey but **DO** make a note of the change in use. In particular, do not record plots on used railway embankments or motorway verges. Be sensible and stay alive!

1.5. Order of Recording the Data

One site description and habitat form must be completed for each site and three sets of data (each with its own recording form) and one soil sample must be collected from each plot.

We recommend you use clutch pencils to fill in all recording forms. They do not need sharpening and since all forms will be printed onto waterproof paper, pencil will be preferable to pen if it is raining. An example of each recording form is given in Appendix IV. The vegetation plot for ground flora should be recorded first so that it is surveyed in a relatively undisturbed state. The remaining recording can then be carried out in the most manageable order.

Recording Forms for each dataset

- (a) **Vegetation plot.** Ground Flora - presence and absence in five successively increasing quadrat sizes up to the full 14.14 x 14.14 m, with % cover/abundance estimates for the largest of these. Major common bryophytes should be recorded but a full list is not expected (see below).
- (b) **Site description and habitats** - mostly presence and absence of attributes.

- (c) **Trees, saplings and shrubs** - trees, DBH (cm) and species from all four quarters of a 14.14 x 14.14 m plot (200 m²), the same data for saplings and shrubs from a pair of diagonally opposite quarters 1 and 3 of the plot.
- (d) **Plot description and habitat data** - mostly presence and absence of attributes, from the same 14.14 x 14.14 m plot.

Samples

- (i) A soil sample dug from each plot to be obtained at the same time as the plot survey.

The methods of setting out the plots and the collecting and recording of the data are now dealt with in detail.

2. Recording of Plot Data

There are four recording forms for the following categories. The Appendix provides further details on individual categories and classifications.

2.1. Vegetation plot: Ground Flora

The first operation when the plot centre has been located, is to lay out the plot. The four corner posts delineate the largest 14.14 x 14.14 m (200 m²) plot. The plot should be located so that the diagonal strings, and hence corners of the plot, are orientated along cardinal compass points. Spaced along each of the distance strings are four coloured markers that give the half-diagonal distances of the four smaller plots (see Figure 2). Starting with the smallest 2 x 2 m plot, the area within is carefully searched recording the presence of all ground flora species - all vascular plants (monocots, dicots, and ferns) - **including tree or shrub seedlings <25 cm in height**. A record of the presence of species in this innermost quadrat are made by inserting a **1** in the column headed Q on the vegetation plot recording sheet and in the row corresponding to the species concerned (see Appendix II). If the species is not listed then pencil in the entry in the blank rows under 'Other species' at the bottom of the sheet. Plants which cannot be immediately identified, or for which a subsequent check, in flora or herbarium, is required, should be placed in a labelled paper bag.

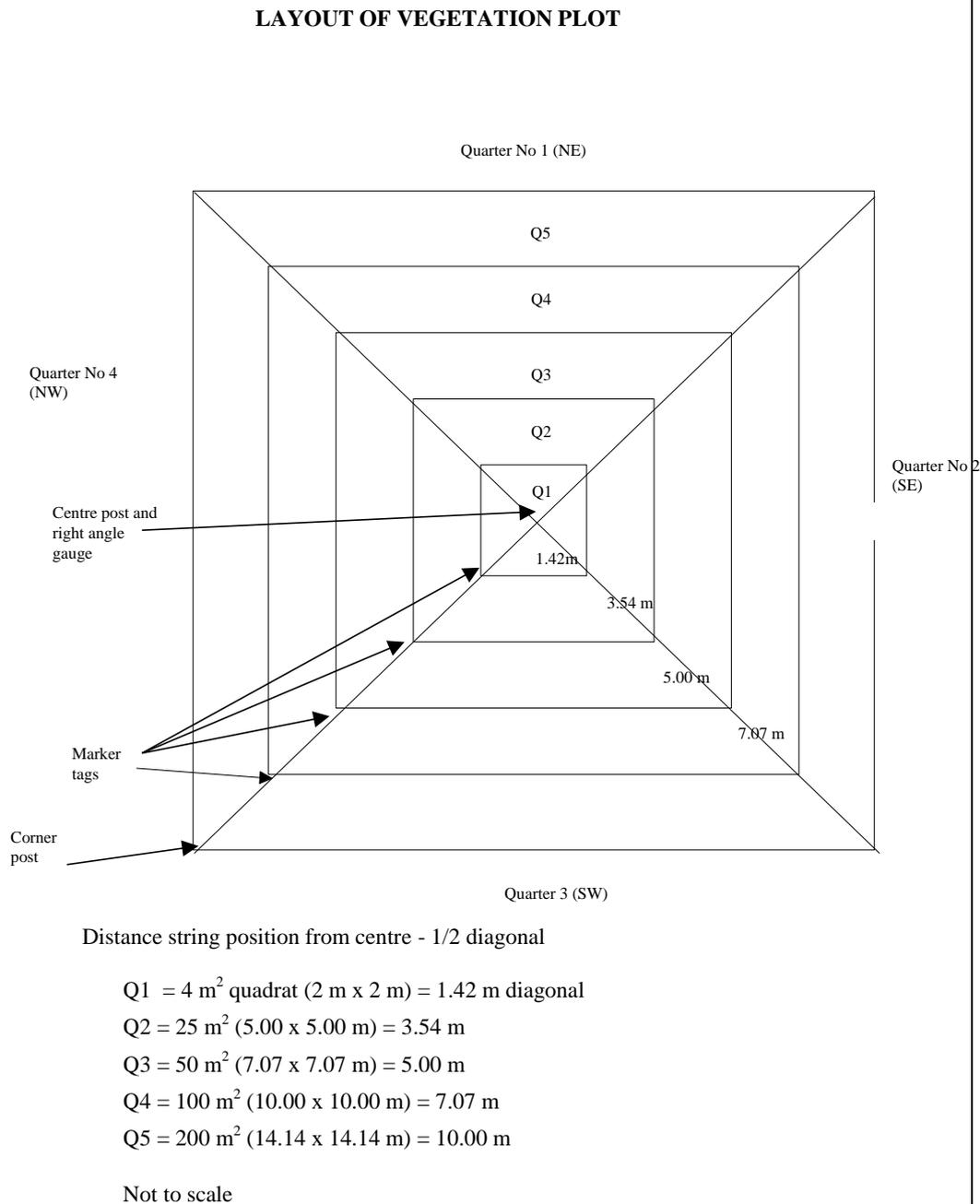
Having recorded all species in a given quadrat size, the new area enclosed by the next successive set of markers is searched for **additional species only**. This procedure is repeated until the full 14.14 x 14.14 m (200 m²) has been recorded. The most convenient method of search for the successive sizes of quadrat is for the two operators to spiral outwards moving in opposite directions so that both cover the whole area. Record successive quadrats by inserting the quadrat number (2 to 5) in the Q column; as for quadrat 1.

Because of identification difficulties, only the common major bryophytes growing on the soil should be recorded (**not on tree bases, logs, rocks or other specialised habitats**). A list of these is given in Appendix I.

Having completed the record of presence of the vascular plants in all five quadrat sizes, an estimate of cover abundance for the full plot (14.14 x 14.14 m) should be made and inserted next to each species in any one of the two columns headed % (see Appendix II). This should include all vascular plants plus tree/shrub seedlings recorded as present, plus the six additional categories (litter, wood, rock, bare ground, water and bryophytes). **Estimates should be given to the nearest 5% only. Species present in appreciable quantity (either in area occupied or number of individuals, if widely scattered), but with less than 5% cover, should be recorded as 1. Those present as only single or few specimens with little cover should be**

recorded as +. The total cover should add up to ca. 100% (making due allowance for the +'s and 1's), or more if the ground flora is markedly layered. Note that tree and shrub canopy cover is not included as the canopy composition and age-class distribution is recorded instead.

Figure 2



2.2. Trees, saplings and shrubs

These are recorded in the 14.14 x 14.14 m plot, the laying out of which has already been described in (a) above. Decisions as to whether individuals are in the plot, or not, are based on rooted base being 50% or more within the plot.

- (i) Trees are defined as stems of >5 cm DBH of any species which is normally capable of attaining a tree like habit. Exceptions include **Hazel**, **Blackthorn**, **Viburnum spp.**, **Juniper** and other shrubs, which rarely produce stems >5 cm diameter anyway. The

species and DBH (cm) of all stems in the whole plot over 5 cm diameter is measured (recording by quarters of the plot). Trees with multiple stems have each stem measured and recorded separately **but these are bracketed together on the recording sheet (see Appendix III)**. Dead trees (standing of course) or dead stems on multi-stemmed trees, are designated by a capital “D” in the top right-hand corner of the cell in which its diameter is recorded.

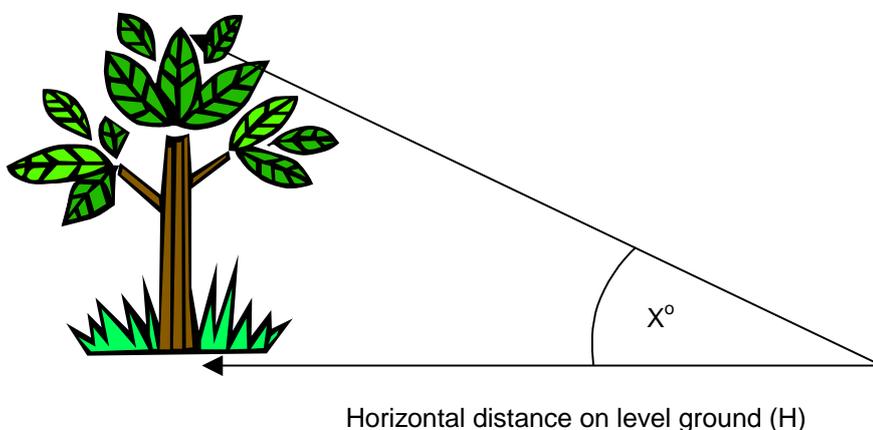
- (ii) Saplings - tree species, with the same definition as (i), but with a height >130 cm (ie over breast height) but <5 cm DBH are recorded only in the diagonally opposite quarters 1 and 3. **Quarter 1 is always the NE quadrant. Quarter 3 is always the SW quadrant (see Figure 2)**. The same measurements as for trees, species and DBH (cm), are recorded for these with the same conventions for multi-stemmed and dead trees or stems.
- (iii) Shrubs - as defined above according to species. Like the saplings these are only recorded in the diagonally opposite quarters 1 and 3; same data, same conventions.

The final job is to measure the height of the largest tree in the plot (the tree with the largest DBH - regardless of species). It is recommended that you use an Abney hand level, clinometer or hygrometer. If provided with a hygrometer – please use this in preference. Failing this you **MUST** calibrate your preferred method against the hygrometer and detail the calibration in the record sheets. Whichever method is used **always ensure that your horizontal distance is taken along the same contour: the slope should be zero between the observer and the base of tree. If this proves impossible then you must record the ground slope so that a correction can be made later.** In the eventuality of the largest tree being in some way atypical (i.e. top broken off) the next largest should be substituted. An example of a completed recording form is given in Appendix III.

(1) Height Measurement with a clinometer

Insert the horizontal distance and angle to the top of the tree next to the relevant individual on the DBH data sheet (see Appendix III). **Note you will have to insert the horizontal distance between observer and tree plus the angle to treetop. The actual height will then be calculated in the spreadsheets you will use for data entry after the survey.**

Use a clinometer to measure the angle between ground and tree top to give X° .



$$\text{Tree height} = (\text{Tan } (X^\circ) \times H) + \text{height from ground to eye level}$$

(2) Height Measurement with a hypsometer

If these are available then instructions will be provided following training on the field course

2.3. Plot description and habitats

These are recorded on the basis of presence within the 14.14 x 14.14 m plot by striking out the appropriate attributes on the form. The object of this form is to obtain frequency data about important attributes that can reasonably be expected to occur a measurable number of times within a single site. A detailed account of methods and definitions of the attributes is given in Appendix IV (the second number in brackets referring to the plot form attributes). **In the case of attributes that have an appreciable defined area, e.g. ponds, glades, etc., only part of the full area needs to be in the plot for it to be recorded as present.** For example if only part of a glade 50 m across occurred actually within the plot it would be recorded as present and attribute 76 struck off. The comments column can be used to record any information that is not included elsewhere and is considered relevant or useful in interpretation.

2.4. Soil sampling

The objective is to obtain a composite soil sample from each plot. Soil samples are to be taken from the centre of each plot or as near as possible (not more than 1 m distant).

Each sample bag must have a self-adhesive label stuck on indicating site and plot (labels provided – ideally done when the bag is dry before starting fieldwork). Wherever possible, bags should also be marked using a permanent marker in the field after the soil sample has been collected – on the bag itself, showing site and plot. Unknown soil samples results in the loss of data – hence double labeling to reduce such error.

Soil samples are to be taken from the top 15 cm of the soil using a trowel. Before taking the sample, check for fresh plant litter (green) on the surface of the soil. Carefully remove this to expose the layer of decomposing plant material below. If in doubt – include in the sample for later removal at CEH. If the area is rocky – remove the largest rocks to expose the soil surface. If there is more rock than soil – move to another area (within 1 m distance).

If difficulties in obtaining sufficient sample are encountered, then supplement from nearest possible point in the plot, (again within 1 m distance) – but ensuring to sample the top 15 cm of soil again. Should this occur, a note to this effect should be appended to the data form. The hole should be filled in and roughly disguised before leaving the plot - this is important.

Record any problems/changes in soil sampling on the plot form.

The sample should be a representative sample of the entire 0 to 15 cm of soil and fill ca. $\frac{3}{4}$ of the bag, wherever possible. Bags are all self-sealing, so when filled, seal to keep air-tight and prevent loss of soil.

All soil sample bags should be kept in the plastic boxes corresponding to each site (marked using the self-adhesive labels) and stored in a cool place until returned to CEH Merlewood.

2.5. Completion of the Plot

Having filled in all data recording forms and collected all necessary samples, the recording of the plots is now complete. At this point it is advisable to:

- (i) check that all forms have been fully entered – make a quick check to see that major items have not been omitted, and that the **site, plot number and date of survey have been correctly entered at the top of each form.**
- (ii) Check all the samples into your rucksack.
- (iii) Check all the equipment into your rucksack.
- (iv) Check the soil sampling area has been filled in.
- (v) Take one last quick look round the plot to see that nothing important has been omitted and no equipment left behind.

The data you are collecting is being collected “forever”. Make sure that it is comprehensive and correct to the best of your ability even at the expense of taking a little extra time.

One additional set of data has to be collected for the site as a whole (i.e. comprising the plots and the ground in-between), namely site description and habitats for the whole site - separate but similar form to that for the plot.

3. Site Description and Habitats

3.1 Recording forms

A detailed description of how this data should be collected and recorded on the form and definitions for all attributes is given in Appendix IV (attribute numbers not in brackets). Coverage is of the whole site, both within and between plots. In order to record section L (Marginal Land Use) and M (Boundary Type) it will almost certainly be necessary to walk round all or part of the boundary. Useful information can also be obtained from the site map. Please make full use of **comments section** to note any features may help in the interpretation of change. Also make sure you record any information gleaned from conversation with the land-owner, although such anecdotal information will not be consistently recorded it can help when interpreting change. Since surveyors are required to draft brief pen sketches of each site, it will be in your interest to complete the plot and site descriptor sheets in the field.

3.1 Completion of the Site

When the whole site has been completed (4 sets of data and 2 sets of samples for 16 plots, plus the site description sheet) all the sheets should be stapled together in plots, checked for completeness and put back into the cardboard site folder ready for data entry.

4. Soil dispatch to Merlewood

When all 16 soil samples from each plot are in the plastic box, you are now ready to dispatch to CEH Merlewood. An address label is supplied to be taped to each box when ready for dispatch. Options for returning samples are: delivery by hand if you are in the area; courier; recorded delivery next day post; collection by CEH (when this is local or near a CEH station). Options for sample return will be finalised in discussion with surveyors at the field course. Each survey team should, ideally ensure that samples are sent so that they arrive at CEH Merlewood within the week they are sampled. Please remember that CEH Merlewood is closed over the weekend so courier/post will not be delivered to CEH Merlewood on a Saturday or Sunday. It is much better to keep the samples until the following week in a cool place than send them on a Friday when they could end up sitting somewhere hot for two days.

APPENDIX

Appendix Ia - List of top 25 most common bryophytes recorded from Pilot woodland sites

BRC code	BRC names	CountOfBryoCode
8201214	<i>Polytrichum sp.</i>	254
820599	<i>Thuidium tamariscinum</i>	173
820507	<i>Pseudoscleropodium purum</i>	152
8101308	<i>Lophocolea sp.</i>	132
8201147	<i>Fissidens sp.</i>	123
820395	<i>Plagiomnium undulatum</i>	111
820382	<i>Mnium hornum</i>	109
820351	<i>Hypnum cupressiforme sens.lat.</i>	105
820463	<i>Pleurozium schreberi</i>	97
820206	<i>Dicranum scoparium</i>	80
820346	<i>Hylocomium splendens</i>	64
820532	<i>Rhytidiadelphus loreus</i>	64
820533	<i>Rhytidiadelphus squarrosus</i>	62
820534	<i>Rhytidiadelphus triquetrus</i>	52
8201243	<i>Sphagnum sp.</i>	38
820203	<i>Dicranum majus</i>	32
8201110	<i>Campylopus sp.</i>	32
820592	<i>Thamnobryum alopecurum</i>	26
820374	<i>Leucobryum glaucum</i>	25
8204	<i>Calliergon cuspidatum</i>	17
810867	<i>Pellia epiphylla</i>	16
820402	<i>Neckera crispa</i>	12
810827	<i>Marchantia polymorpha</i>	9
820335	<i>Hookeria lucens</i>	8
82042	<i>Aulacomnium palustre</i>	8

Appendix Ib - List of common bryophytes in Great Britain

BRC code	BRC names
82040	<i>Atrichum undulatum</i>
82042	<i>Aulacomnium palustre</i>
82081	<i>Brachythecium rutabulum</i>
8201106	<i>Bryum spp.</i>
8204	<i>Calliergon cuspidatum</i>
8201110	<i>Campylopus spp.</i>
810714	<i>Cephalozia bicuspidate</i>
820157	<i>Cirriphyllum piliferum</i>
820184	<i>Dicranella heteromalla</i>
820203	<i>Dicranum majus</i>
820206	<i>Dicranum scoparium</i>
820249	<i>Eurhynchium praelongum</i>
820255	<i>Eurhynchium striatum</i>
8201147	<i>Fissidens spp.</i>
820335	<i>Hookeria lucens</i>
820346	<i>Hylocomium splendens</i>
820351	<i>Hypnum cupressiforme sens.lat.</i>
820357	<i>Isopterygium elegans</i>
820363	<i>Isothecium myurum</i>
810807	<i>Lepidozia reptans</i>
820374	<i>Leucobryum glaucum</i>
810814	<i>Lophocolea heterophylla</i>
8101308	<i>Lophocolea spp.</i>
810827	<i>Marchantia polymorpha</i>
820382	<i>Mnium hornum</i>
820402	<i>Neckera crispa</i>
810867	<i>Pellia epiphylla</i>
200001105	<i>Plagiochila spp.</i>
820383	<i>Plagiomnium rostratum</i>
820395	<i>Plagiomnium undulatum</i>
820463	<i>Pleurozium schreberi</i>
820475	<i>Pohlia nutans</i>
8201214	<i>Polytrichum spp.</i>
820507	<i>Pseudoscleropodium purum</i>
820389	<i>Rhizomnium punctatum</i>
820245	<i>Rhynchostegium confertum</i>
820532	<i>Rhytidiadelphus loreus</i>
820533	<i>Rhytidiadelphus squarrosus</i>
820534	<i>Rhytidiadelphus triquetrus</i>
8201243	<i>Sphagnum spp.</i>
820589	<i>Tetraphis pellucida</i>
820592	<i>Thamnobryum alopecurum</i>
820599	<i>Thuidium tamariscinum</i>
8201052	<i>Ulota crispa sens.lat.</i>
820158	<i>Climacium dendroides</i>
8201121	<i>Cratoneuron spp.</i>
8201138	<i>Drepanocladus spp.</i>
820276	<i>Fontinalis antipyretica</i>
820512	<i>Ptillium crista-castrensis</i>

Appendix III TREE, SAPLING AND SHRUB DATA

Site No. 200
24/06/71

Plot No. 1

Recorder: MWS

Date

Q No	Species													Ht (m)
1														
T	Oak	37	34											16
R														
E	Birch	9	7	12										
E														
S														
S	Birch	2	5	2	2									
A														
P														
S														
S	Hazel	2	5	4	3	1	1	2	4	2	1			
H														
R														
B														
2														
T	Oak	16 ^D	24											
R														
E														
E														
S														
3														
T	Oak	15	16 ^D	15										
R														
E														
E														
S														
S	Birch	4	1											
A	Rowan	4	3	4										
P														
S														
S	Hazel	2	5	2	1	1	2	3	2 ^D	3 ^D	1	1	3 ^D	
H														
R														
B														
4														
T	Oak	34												
R														
E														
E														
S														

Appendix IV

INSTRUCTIONS FOR COMPLETING THE PLOT AND SITE DESCRIPTION AND HABITAT FORMS

General

One copy of the Site Description and Habitat Form is completed for each site. The Plot Description and Habitat Form is a somewhat reduced version of the Site Form and one is completed for each plot (i.e. 16 per site). For simplicity in the subsequent handling of the data, the code numbers for the attributes are different on the two forms, the attributes being numbered sequentially on each form without gaps, except for unallocated codes. Since the methods of recording and definitions of attributes remain the same on the two forms it is possible to treat them together by giving both code number series - site code first unbracketed, and plot code second in brackets ().

Checking that all the appropriate attributes for a given plot have been recorded is part of the routine procedure dealt with in the main text. A further check should, however, be made that there are no logical inconsistencies between the plot and site forms; attributes which are present on the plot form **must** be present on the site form (but not necessarily vice versa). If any significant area of the site has not been covered in connection with locating or recording the plots (or for other purposes) it should be briefly visited to check that no attributes have been missed. Particular care should be taken with the site form as the recording of a given attribute is an all or nothing proposition and is therefore critical.

The attribute code numbers are dealt with in order below:

(SE = self-explanatory; and UA = unallocated).

- 1 (1) Site Number - SE
- 2 (2) Plot number - SE, on site form fill in as 1 -16
- 3 (3) Recorder - recorder's initials
- 4 (4) Date - day, month, year. Inclusive dates on site form.
- (5) Slope - (plot only) in _ or %. Depends on the instrument provided - Blume Leiss = _, Haga = %. (See main text for methods).
- (6) Aspect - _ magnetic, SE (See main text for methods).
- A. **Trees - Management**
- 5 Planted hardwoods - must be clear evidence that the trees have been planted, eg visible lines, uniform age and/or, in the case of mixtures, regular alternation of species. Gets more difficult to detect planted origin with age.
- 6 Planted conifers - these can usually be assumed to be planted except in the case of European larch and Scots pine, unless there is strong evidence to the contrary, eg irregular distribution and age. May be natural regeneration of some species.
- 7 Pollards - trees that have had their main branch systems cut off at some time at a height above breast height (4'3" or 130 cm) but have now resprouted. An ancient method of marking boundaries or obtaining firewood and/or browse for stock.
- 8 (7) Coppice stools - trees that have been cut off below breast height and have resprouted. Most multi-stemmed trees are the result of coppicing but not all. Usually the point of cutting can be seen and there are usually

>2 stems. Hazel stools should not be recorded as coppice stools unless there are unmistakable cut stems to be seen; a multi-stemmed growth form is normal for this species. Many woods all over Britain, but particularly in the south, were formerly managed on a coppicing system. Most coppice origin woods have not been cut for 20, 50 or even more years and have grown on so that their former use is less evident (but see attribute 10 (9)).

- 9 (8) Singled coppice - where, in what was formerly coppice, with a preponderance of multi-stemmed trees, selected stools have had the number of shoots reduced to one by cutting the others off. This can be detected by the swollen base of the tree with scars where the other main shoots were removed or by the presence of residual twiggy growth. Becomes less detectable with time.
- 10 (9) Recently cut coppice - where there is evidence that coppicing is still, or has been until very recently, in progress. Recent coppice can be detected from cut shoot stubs on the stools and/or the presence of coppice produce (see also 20) in the wood. Recent - <c 5 years.
- 11 Mature conifers - trees >40 years old or >20 m height.
- 12 (10) Stumps hardwood new - hardwood stumps can usually be distinguished from conifers by the presence of ring-porous wood and/or medullary rays. Often the remnants of bark can be used to identify the hardwood species, eg oak, ash, birch. New stumps can be distinguished from old 13 (11) by the absence of advance rot, luxuriant growths or bryophytes and by the fact that the ring growth is still discernible without cutting or scraping the stump.
- 13 (11) Stumps hardwood old - the inverse of the characters used to identify new stumps in 12 (10) above. Stumps of species like birch rot away completely in a very short time, whilst those of more resistant species like oak persist for many (>50) years, so the old/new scale is necessarily arbitrary.
- 14 (12) Stumps conifer new - conifer stumps can be distinguished from hardwoods by the absence of ring-porous wood or medullary rays. Identifiable bark is often useful, as also is resin exudation, and the smell of resin if reasonably fresh. Apart from Sequoias (not very likely) **NO** conifers produce any coppice shoots from stumps cut near the ground. So if there are any signs of coppice shoots live or dead it is sure to be hardwood. the same rules for new/old hardwood stumps also apply to conifers. Yew coppices quite frequently but is easy to identify.
- 15 (13) Stumps conifer old - fully explained above, SE.
- 16 Stumps overgrown - in the more open woodlands, the older stumps in an advance state of decay will often be completely overgrown by such species as bramble, honeysuckle or bryophytes.
- 17 Brashing/pruning - where the lower branches of the trees have been artificially removed by cutting to improve access and/or timber quality.
- 18 Brash heaps - can result from brashing or pruning, or from the cutting of scrub species, or as the lop and top (the thinner branches) of felled trees. Essentially, therefore, a heap of thin branches which have been left to rot.
- 19 Cord wood - odds and ends of felled trees, almost invariably hardwood, which have been cut to log size (as for putting on the fire) and have been piled into regular stacks (usually about 4'-6' high and 2'-3' wide and any length).

- 20 Coppice sticks - the product from cutting coppice which has been tidily stacked for subsequent use. Can vary from large sizes such as hop poles down to pea sticks.
- 21 Stack timber - the larger parts of the stems of felled trees which have been cut into regular lengths (3' up to 30' or 40') and stacked. Anything from pulp bolts up to the largest sizes in saw timber.
- 22 Felled trees - trees that have been felled but have not been processed any further than having had the branches cut off.
- 23 Chips/sawdust - SE
- 24 Fire sites - SE, often used to get rid of brash 18.
- 25 Paint/blaze marks - used to mark trees for some special purpose; often for felling, retaining or thinning out the surrounding trees in favour of the best trees. Paint marks may consist of dots, rings or even numbers. Blaze marks consist of the bark being cut off in a strip at about breast height. The latter almost invariably means the tree is marked for felling. Also include scribe marks.
- 26 Extraction routes - places where logs have obviously been dragged or strips of trees removed for the same purpose.
- 27 Vehicle tracks - the use of vehicles on **unmade ground** off the main roads or tracks (see also attributes 114-118 (79-82)).
- 28 (14) UA

B. Trees - Regeneration

29-48 (15-34) (as per species listed) - **regeneration is any tree species >25cm height and <5cm DBH and must be of seedling origin.** The only exception (ie non-tree) is hazel which must of course be >25 cm in height but must also be of obvious, recent, seedling origin (**do not** record coppice shoots - upper limit of 5 cm hardly applies here). Coppice shoots are not to be recorded as regeneration and care should be taken to check this point as far as possible. Younger seedlings, <25 cm height, will be recorded by plots as a part of the ground flora. Regeneration over breast height will similarly be recorded in more detail with the saplings.

C. Trees - Dead (= Habitats)

- 49 Live/Dead - trees which, although still alive, have substantial dead parts on them, >50%.
- 50 Standing dead <10 cm diameter - SE.
- 51 Standing dead >10 cm diameter - SE.
- 52 (35) Fallen broken - trees dead, or recently alive, which have fallen and are lying on or near the ground due to the main trunk breaking. Includes trees that have been felled and abandoned. Must be <10 cm diameter at widest point - does not include very small trees.
- 53 (36) Fallen uprooted - as for 52 but uprooted with a mass of soil and roots pulled out of the ground leaving a hole. Must be >10 cm diameter again.
- 54 (37) Log very rotten - a very old version of 52 (35) or 53 (36), the sort you can kick into with your boot (with no broken toes). Must be >10 cm diameter again.
- 55 (38) Fallen branch >10 cm diameter - SE.
- 56 (39) Hollow trees - as indicated by large holes in base or higher up, SE.

- 57 (40) Rot hole - smaller holes <25 cm diameter where branches have fallen off or the tree has been damaged in some way. In general not large or deep enough to indicate the tree is hollow.
- 58 (41) Stump <10 cm diameter - hardwood or conifer of any age and state of decay.
- 59 (42) Stump >10 cm diameter - as for 58 (41) apart from size.
- 60 UA.

D. Trees - Epiphytes and Lianas

- 61 (43) Bryophytes base - <50 cm height SE.
- 62 (44) Bryophytes trunk - >50 cm height, trunk referring to primary structural members(s) of tree.
- 63 (45) Bryophytes branch - no height or diameter limitations, branch referring to secondary (and lesser) structural members of tree.
- 64 (46) Lichen trunk - as 62 (44) above. Refers to foliose lichens only (**not** the less conspicuous granular types). SE.
- 65 (47) Lichen branch - as 63 (45) above. SE.
- 66 (48) Fern - ferns growing anywhere on the tree.
- 67 Mistletoe - SE
- 68 Clematis - must ascend at least into the lower crown of trees to be counted.
- 69 Ivy - as for 68 SE.
- 71 Macrofungi - growing anywhere on tree from base to crown. Includes both mushroom and bracket-shaped types.
- 72 UA.

E. Habitats - Rock

- 73 (51) Stones <5 cm - as with all attributes in this group, must be on the surface of the ground, otherwise SE.
- 74 (52) Rocks 5-50 cm - SE.
- 75 (53) Boulders >50 cm - SE.
- 76 (54) Scree - the essential characteristics of a scree is its actual or potential mobility, thus distinguishing it from a rock pile (attribute 82 (62)). In order to exhibit this mobility a scree consists of a mass of rock fragments resting at or near the maximum angle of repose. The instability of a scree is conferred either by additions from above or active erosion at the base (possibly at high altitudes by the severe climatic regime). The minimum size for recording screes is 25 m². Man-made screes produced by various earth-moving operations also count (see also 133 (87) and 134 (88)).
- 77 (55) Rock outcrop <5 m (height) - should be, as far as it is possible to tell, part of the solid geology. Height refers to vertical height (includes low angle outcrops such as limestone pavement).
- 78 (56) Cliff >5 m - a larger version of 77 (55).
- 79 (57) Rock ledges - horizontal surfaces of any size on rock outcrops or cliffs (77 (55) and 78 (56)). No width limits apply. Will usually be made very obvious by the presence of vegetation on the rock faces.
- 80 (58) Bryophyte covered rock - logically must record one or more of attributes 74 (52), 75 (53), 77 (55), and 78 (56) as well. Otherwise SE.

- 81 (59) Gully - where two rock faces or cliffs face one another. Must be at least 3 m in height and length and not more than 1.5 x their height apart. Logically must also record one or both of attributes 77 (55) and 78 (56) as well.
- 82 (60) Rock pile - as name suggests a pile of rocks, not less than 1 m in height and 2 m in diameter (see also 76 (54)). Logically must also record one or both attributes 74 (52) and 75 (53) as well.
- 83 (61) Exposed gravel or sand - must be at least 1 m² in extent in one piece.
- 84 (62) Exposed mineral soil - must be at least 1 m² in extent in one piece.

F. Habitats - Aquatic

- 85 (63) Small pool <1 m² - must not be running water, otherwise SE.
- 86 (64) Pond 1-20 m² - as for 85 (63) SE.
- 87 (65) Pond/lake >20 m² - as for 85 (63) SE.
- 88 Stream slow <1 m - speed less than 1 mph (very slow walking or 1 m/2 secs).
- 89 Stream fast <1 m - speed over 1 mph.
- 90 River slow 1-5 m speed as 88, SE.
- 91 River fast 1-5 m - speed as 89, SE.
- 92 River slow >5 m - speed as 88, SE.
- (66) Stream/river slow (plot only) - as above but no size limits.
- (67) Stream/river fast (plot only) - as below but no size limits.
- 93 River fast >5 m - speed as 89, SE.
- 94 Bottom rock - SE.
- 95 Bottom gravel - SE.
- 96 Bottom sand - SE.
- 97 Bottom mud - if water turbid, may have to poke with a stick (if turbid most likely mud anyway).
- 98 Bottom peat - SE.
- 99 (68) Aquatic vegetation - must be true water plants, not terrestrial plants submerged by an abnormally high water level.
- 100 (69) Spring - water emerging from ground, SE.
- 101 (70) Marsh/bog - water exuded under feet.
- 102 (71) Ditch/drain dry - may be wet at other times of year, SE.
- 103 (72) Ditch/drain wet - SE.
- 104 (73 & 74) - UA.

G. Habitats - Open

- 105 Glade 5-12 m grass - in order to qualify must be an area of 5-12 m in two dimensions at right angles not covered by tree canopy (ie. Trees >130 cm) and with grass as the main vegetation type. A gap 8 x 4 m would not count but one 11 x 5 m would.
- 106 Glade >12 m grass - same rules as 105 above, SE.
- 107 Glade 5-12 m mixed - as for 1-5 but vegetation mixed, eg. Grass, herbs, brambles or even woody species <130 cm.
- 108 Glade >12 m mixed - as 107 above, SE.
- 109 Glade 5-12 m boggy - as for 105 but ground exuding water under foot. Vegetation can be any of the boggy types, eg. Rushes, *Sphagnum*, even grasses such as *Molinia*. Is distinguished from attributes 105-108 by wetness.

- 110 Glade >12 m boggy - as for 109, SE.
 (75) Glade 5-12 m (plot only) - as above but any vegetation type.
 (76) Glade >12 m (plot only) - as above but any vegetation type.
 111 (77) Rocky knoll <12 m (width) - consists of an area raised above the surrounding ground consisting largely of rocks with relatively little covering of soil.
 112 (78) Rocky knoll >12 m - as 111 (77), SE.
 113 Field - a field is a definite management division, an area of ground being currently or having been in the past managed as a field. Normally there will be well marked boundaries with the wood - wall or fence, but these may be in poor repair. In order to count as being in the wood it must be at least partly within the survey boundary and enclosed on at least three sides by the wood.
 114 (79) Path 1-5 m - not normally used by wheeled vehicles. Vegetated apart from a narrow trodden area.
 115 (80) Ride >5 m - same as for 114 (79) but largely vegetated.
 116 (81) Track non-prepared - quite extensively used by wheeled vehicles and therefore deeply rutted, vegetation being significantly affected by this use (>25% destroyed). Has not been the subject of large scale earth-moving operations nor has any metal (stones) been added to the surface.
 117 (82) Track metalled - as for 116 (81) but earth-moving and/or addition of stone to surface used in construction.
 118 Road tarmac - must be within the site boundary SE.
 119 & 120 UA.

H. Habitats - Human

- 121 House occupied - SE.
 122 House unoccupied - SE.
 123 Farm occupied - a farm is a complex of buildings for both human habitation and agricultural use (e.g. Farmhouse, barn, cowshed, pigsty, etc.). Do not fill in 121 as well unless there is a quite separate occupied house. Similarly 125.
 124 Farm unoccupied - as for 123. Same rules apply to 122 and 125.
 125 Agricultural building - must be separate from farm SE.
 126 Other building - SE.
 127 Ruined building - SE.
 128 Sheep pen/enclosure - SE.
 129 (83) Wall dry - dry stone walling, no use of mortar or earth packing.
 130 (84) Wall mortared - wall held together with lime mortar, cement or earth. Also includes brick walls.
 131 (85) Wall ruined - formerly 129 or 130, but fallen down. If the walls in a wood are part fallen and part standing must be at least 50 m fallen to count.
 132 (86) Embankment - must be man-made either by the removal or addition of earth.
 133 (87) Soil excavation - rather similar to 132, but more contemporary in nature, with exposed soil surfaces either because excavation is still in progress or subsequent erosion of the surfaces has not yet ceased (see also 84 (62) and possibly 83 (61)).
 134 (88) Quarry/mine - historical or contemporary, SE.

- 135 (89) Rubbish domestic - SE.
 136 (90) Rubbish other - SE.

I. Habitats - Vegetation

- 137 Alder grove - must be at least 400 m² in one piece to count.
 138 Hazel grove - as for 137, SE.
 139 Willow grove - as for 137, SE.
 140 Conifer grove - must have typical "grove" characteristics, ie. Dense branches near the ground, plenty of cover. Will therefore usually be restricted to young conifers. Otherwise as for 137, SE. See also 11.
 141 (91) Blackthorn thicket - must be at least 100 m² in one piece.
 142 (92) Hawthorn thicket - as for 141 (91) SE.
 143 (93) Rhododendron thicket - as for 141 (91) SE.
 144 (94) Bramble clump - must be at least 25 m² in one piece to count.
 145 (95) Nettle clump - as for 144 (94) SE.
 146 (96) Rose clump - as for 144 (94) SE.
 147 (97) Willow-herb clump - as for 144 (94) SE.
 148 (98) Umbellifer clump - as for 144 (94) SE.
 149 (99) Bracken dense - must be at least 100 m² in one piece to count.
 150 (100) Moss bank - must be at least 5 m² in one piece to count.
 151 (101) Fern bank - as for 150 (100) SE.
 152 (102) Grassy bank - must be at least 25 m² in one piece to count.
 153 (103) Leaf drift - must be at least 10 m² in one piece to count and >5 cm in depth.
 154 Isolated scrub - must be at least 100 m² in one piece to count, and at least 30 m from the nearest woodland.
 155 Isolated trees - must not be more than 3 trees together and at least 30 m from the nearest woodland to count.
 156 (104) Herbaceous vegetation >1 m - species other than those already recorded in 144-149 (94-99) inclusive. Same minimum size.
 157 (105) Macrofungi soil - SE.
 158 (106) Macrofungi wood - on dead wood (see also 71 (50) on standing live or dead trees).
 159 & 160 UA.

J. Animals

Evidence from a number of different sources can be used to record the presence of these animals; sight, signs or sound. In the plots it will usually depend mainly on signs. A few suggestions are given below.

- 161 (107) Sheep - dropping, hoof marks, wool on brambles, tree bark and fences, bleating.
 162 (108) Cattle - droppings, hoof marks.
 163 (109) Horse/pony - care is required here because only horses living and/or feeding in the wood at some time should be recorded. Horses ridden through the wood should not be recorded. Droppings, hoof marks (may be unshod).
 164 (110) Pig - droppings, hoof marks, digging, noises.

- 165 Goat - no suggestions (not very likely anyway).
 166 (111) Red deer - droppings, fraying >1 m, hoof marks, scrapes.
 167 (112) Other deer - droppings, fraying <1 m, hoof marks, scrapes.
 168 (113) Rabbit - droppings (usually concentrated on small hummocks), holes and incipient holes, fur.
 169 Hare - not easy, apart from sight, larger than rabbit, black tips to ears, runs differently.
 170 (114) Badger - setts (large holes with remains of bedding materials outside, no smell), footprints, hairs on fence, latrines (groups of holes with dropping in them), feeding excavations and scrapings.
 172 (116) Mole - mole hills.
 173 Red squirrel - apart from dreys, not really distinguishable from those of grey squirrel, must rely on sight.
 174 Grey squirrel - as for 173, SE.
 (117) Squirrel (plot only) - red or grey together, SE.
 175 (118) Anthill - refers to larger species, with hill >25 cm.
 176 (119) Corpse/bones - SE but can also be used to detect the presence of the deceased, e.g. Rabbit bones record rabbit, etc.
 (120) Spent cartridges - SE.

K. Birds

- 177 Rook - heavy beak, baggy trousers, usually in flocks.
 178 Crow - like rook apart from above characteristics, usually seen singly or in pairs.
 179 Jackdaw - smaller than rook or crow, greyish skull cap.
 180 Magpie - easy.
 181 Jay - easy, characteristic call as well.
 182 Raven - larger than crow or rook, characteristic call.
 183 Pigeon - easy, can also use grey feathers, egg shells, and nests to detect.
 184 Owl - easy, call and pellets.
 185 Buzzard - heavy birds, broad wings, soaring, characteristic mewing call.
 186 Kestrel - more delicate, frequently hovering.
 187 Other birds of prey - if in doubt about identity, record this.
 188 Blackbird - easy, also alarm call.
 189 Thrush - easy.
 190 Heron - easy
 191 Wildfowl - easy.
 192 Robin - easy.
 193 Wren - easy, also alarm call.
 194 Finches - includes house sparrow, chaffinch, green finch, etc. Heavy finch-like beaks.
 195 Tits - includes blue, great, coal, marsh, willow and long-tailed tits.
 196 Woodpecker - green and others, nests, also drumming on trees.
 197 Pheasant - easy, also call of cock pheasant.
 198 Other game - SE.
 199 Spent cartridges - SE.
 200 UA.

L. Marginal Land Use (<400 m distant)

For some of these, e.g. Road, railway, river, etc. it will be possible to obtain correct records from the map. The map can also be used to pinpoint parts of the marginal land for which it will be necessary to check the use on the ground. It will be necessary to walk much of the boundary anyway to fill in section M. A good deal of navigation to determine the plot positions can make use of the boundary, thus economising in walking time.

201	Woodland hardwood - >75% hardwood < 25% conifers.
202	Woodland mixed - hardwood 25 -75%, conifer 25-75%.
203	Woodland conifer - >75% conifer <25% hardwood.
204	Scrub-woody species overall height <5m. (Woodland 201-203 >5m).
205	Orchard - SE.
206	Arable - SE.
207	Permanent pasture - SE.
208	Rough grazing - may merge a bit with 207 and 209, but not critical.
209	Heath/moorland - SE.
210	Marsh/fen/bog - SE.
211	River - SE.
212	Lake - SE.
213	Road - SE.
214	Railway - SE.
215	Housing - more than five houses in a reasonable group.
216	Industrial - SE.
217	Quarry/mine - SE.
218	Tipping - rubbish dumps or industrial waste.
219	Waste - land which is under no immediately obvious usage.
220	UA.

M. Boundary Type

221-236 All fairly self-explanatory. Must be at least 10 m in length in one piece of any type for it to be recorded. Attributes 234 and 235, hedge thin and thick, distinguished as <2 m and >2 m respectively. Note distinction between 228 bank and 229 ditch separately and 230 bank and ditch together. A bank must be >1 m high. Merging direct – no obvious boundary; grading into open area between woods and adjacent area.

N. Subjective Overall Impression of Site

236-241	Quite straightforward, simply one's subjective impression of the site.
242	Approximately time taken to survey - SE.

Comments

Anything (but anything) that was noted about any aspect of the site and which was not formally recorded on the form may be included here. Obviously it will not be possible to use this information in a formal, analytical sense, but it may constitute an extremely valuable aid to interpretation or in designing the collection of information for future surveys.

Appendix IV (continued)

PLOT DESCRIPTION AND HABITATS

1 Site No. <i>200</i>	2 Plot No. <i>1</i>	3 Recorder <i>MWS</i>	4 Date <i>24/06/71</i>
5 Slope 12° or %	6 Aspect 120° Mag.		
A TREES - MANAGEMENT			
7 Cop. stool	8 Singled cop.	9 Rec. cut. cop.	10 Stump hard.new
11 Stump hard.old	12 Stump con.new	13 Stump con.old	14
B TREES - REGENERATION			
15 Alder	16 Ash	17 Aspen	18 Beech
19 Birch	20 Hawthorn	21 Hazel	22 Holly
23 Hornbeam	24 Lime	25 Oak	26 Rowan
27 Rhododendron	28 Sweet chestnut	29 Sycamore	20 Wych elm
31 Other hrwd.	32 Scots pine	33 Yew	34 Other con.
C TREES - DEAD (- HABITATS)			
35 Fallen brkn	36 Fallen uprtd.	37 Leg.v.rotten	38 Fall. bnh.>10cm
39 Hollow tree	40 Rot hole	41 Stump<10cm	42 Stump>10cm
D TREES - EPIPHYTES AND LIANES			
43 Bryo.base	44 Bryo.trunk	45 Bryo.branch	46 Lichen trunk
47 Lichen branch	48 Fern	49 Ivy	50 Macrofungi
E HABITATS - ROCK			
51 Stone.<5em	52 Rocks 5-50em	52 Boulders >50em	54 Scree
55 Rock outep.>5m	56 Cliff >5m	57 Rock ledges	58 Bryo.covd.rock
59 Gully	60 Rock piles	61 Exp.grav/sand	62 Exp.min.soil
F HABITATS - AQUATIC			
63 Sml.pool <1m ²	64 Pond 1-20 m ²	65 Pon/lake>20 m ²	66 Strm/riv.slow
67 Strm/riv. fast	68 Aquatic veg.	69 Spring	70 Marsh/bog
71 Dtch/drain dry	72 Dtch/drain wet	73	74
G HABITATS - OPEN			
75 Gld.5-12m	76 Gld.>12m	77 Rky.knoll<12m	78 Rky.knoll>12m
79 Path <5m	80 Ride >5m	81 Track non prop	82 Track metalled
H HABITATS - HUMAN			
83 Wall dry	84 Wall mortared	85 Wall ruined	86 Embankment
87 Soil excav.	88 Quarry/mine	89 Rubbish dom.	90 Rubbish other
I HABITATS - VEGETATION			
91 Blkthorn.thkt.	92 Hawthron thkt.	93 Rhodo.thkt.	94 Bramble clump
95 Nettle clump	96 Rose clump	97 W.herb clump	98 Umbel.clump
99 Bracken dense	100 Moss bank	101 Fern bank	102 Grass bank
103 Leaf drift	104 Herb veg.>1m	105 Macfungi.soil	106 Macfungi.wood
J ANIMALS (mainly signs)			
107 Sheep	108 Cattle	109 Horse/pony	110 Pig
111 Red deer	112 Other deer	113 Rabbit	114 Badger
115 Fox	116 Mole	117 Squirrel	118 Anthill
119 Copse/bones	120 Spent ctrdgs.	121	122

COMMENTS

APPENDIX IV (continued)

SITE DESCRIPTION AND HABITATS

1 Site No. 200	2 Plot No. 1-16	3 Recorder MWS	4 Date 24/06/71
A TREES - MANAGEMENT			
5 Pnted.hard	6 Pnted.con.	7 Pollards	8 Cop.stool
9 Singled.cop.	10 Rec.cut cop.	11 Mature.con.	12 Stump.hard.new
13 Stump.hard.old	14 Stump.con.new	15 Stump.con.old	16 Stump.ovgwn.
17 Brush/pruning	18 Brush.heaps	19 Cord wood	20 Cop.sticks
21 Stack timber	22 Felled trees	23 Chips/sawdust	24 Fire sites
25 Pnt/blaze mks.	26 Extrn. routes	27 Vehicle tracks	28
B TREES - REGENERATION			
29 Alder	30 Ash	31 Aspen	32 Beech
33 Birch	34 Hawthorn	35 Hazel	36 Holly
37 Hornbeam	38 Lime	39 Oak	40 Rowan
41 Rhododendron	42 Sweet Chestnut	43 Sycamore	44 Wych Elm
45 Other bard	46 Scots pine	47 Yew	48 Other.con.
C TREES - DEAD (- HABITATS)			
49 Live/dead	50 Stnd.dead <10cm	51 Stnd.dead >10cm	52 Fallen brkn
53 Fallen uprtd.	54 Log.v rotten	55 Fall.bnb.>10cm	56 Hollow trees
57 Rot holes	58 Stump <10cm	59 Stump >10cm	60
D TREES - EPIPHYTES AND LIANES			
61 Bryo.base	62 Bryo.trunk	63 Bryo.branch	64 Lichen trunk
65 Lichen branch	66 Fern	67 Mistletoe	68 Clematis
69 Ivy	70 Honeysuckle	71 Macrofungi	72
E HABITATS - ROCK			
73 Stones	74 Rocks 5-50cm	75 Boulders >50cm	76 Scree
77 Rock outop.<5m	78 Cliff >5m	79 Rock ledge	80 Bryo.covd.rock
81 Gully	82 Rock piles	83 Exp.grav/sand	84 Exp.min.soil
F HABITATS - AQUATIC			
85 Sml.pool <1m ²	86 Pond 1-20m ²	87 Pond/lake >20m ²	88 Strm.slow <1m
89 Strm.fast <1m	90 Riv.slow 1-5m	91 Riv.fast 1-5m	92 Riv.slow >5m
93 Riv.fast >5m	94 Bottom rock	95 Bottom gravel	96 Bottom sand
97 Bottom mud	98 Bottom peat	99 Aquatic veg.	100 Spring
101 Marsh/bog	102 Dtch/drain dry	103 Dtch/drain wet	104
G HABITATS - OPEN			
105 Gld.5-12m grs	106 Gld.>12m grs	107 Gld.3-12m mx.d.	108 Gld.>12. mx.d.
109 Gld.5-12m bgy	110 Gld.>12m bgy	111 Rky.knoll <12m	112 Rky.knoll
113 Field	>12m 114 Path 1-5m	115 Ride >5m	116 Track non-prep.
117 Track metalled	118 Road tarmac	119	120
H HABITATS - HUMAN			
121 House occ.	122 House unocc.	123 Farm occ.	124 Farm unocc.
125 Agri.bldg.	126 Other bldg.	127 Ruined bldg.	128 Sheep pen/enc.
129 Wall dry	130 Wall mortared	131 Wall ruined	132 Embankment
133 Soil excav.	134 Quarry/mine	135 Rubbish dom.	136 Rubbish other
I HABITATS - VEGETATION			
137 Alder grove	138 Hazel grove	139 Willow grove	140 Con.grove
141 Blkthorn.thkt	142 Hawthorn thkt.	143 Rhodo.thkt.	144 Bramble clump
145 Nettle clump	146 Rose clump	147 W.herb clump	148 Umbel.clump
149 Braecken dense	150 Moss bank	151 Fern bank	152 Grass bank
153 Leaf drift	154 Isolated scrub	155 Isolated trees	156 Herb veg.>1m
157 Macrofungi soil	158 Macrofungi wood	159	160

J ANIMALS (Sight, sign or sound)

161 Sheep	162 Cattle	163 Horse/pony	164 Pig
165 Goat	166 Red deer	167 Other deer	168 Rabbit
169 Hare	170 Badger	171 Fox	172 Mole
173 Red squirrel	174 Grey squirrel	175 Anthill	176 Corpse/bones

K BIRDS (Sight, sign or sound)

177 Rook	178 Crow	179 Jackdaw	180 Magpie
181 Jay	182 Raven	183 Pigeon	184 Owl
185 Buzzard	186 Kestrel	187 Other BOP	188 Blackbird
189 Thrush	190 Heron	191 Wildfowl	192 Robin
193 Wren	194 Finches	195 Tits	196 Woodpecker
197 Pheasant	198 Other game	199 Spent ctrdge.	200

L MARGINAL LAND USE (<400 m distant)

201 Woodland hrwd.	202 Woodland mixd.	203 Woodland con.	204 Scrub
205 Orchard	206 Arable	207 Permnt pasture	208 Rough grazing
209 Heath/moorland	210 Marsh/fen/bog	211 River	212 Lake
213 Road	214 Railway	215 Housing	216 Industrial
217 Quarry/mine	218 Tipping	219 Waste	220

M BOUNDARY TYPE

221 Fence good	222 Fence holes	223 Fence derelict	224 Wall good
225 Wall gaps	226 Wall derelict	227 Post and rail	228 Bank
229 Ditch	230 Bank and ditch	231 Water	232 Road
233 Railway	234 Hedge thin	235 Hedge thick	236 Merging direct

N SUBJECTIVE OVERALL IMPRESSION OF SITE

237 Cracking	238 Pleasant	239 OK	240 Nasty
241 Nightmare	242 Approx.time taken to survey = hours		

COMMENTS

APPENDIX V LIST OF FIELD EQUIPMENT

This is a list of equipment needed to carry out the tasks outlined in the field handbook. CEH and English Nature will be providing some of this – as detailed. Individual Personal Protective Equipment and Health & Safety requirements are the responsibility of individuals and their employers.

Site location and permissions

1:50,000 extract with individual sites marked (CEH)
Copies of original 2½” maps with individual sites, where available (CEH)
Copies (where relevant) of sketch map showing plot locations (1 to 16); 1:50,000 and/or 2 ½” – remember to check which you have to get correct scale for distances/contours (CEH)
Copy of letter to landowner explaining background to the project and seeking permission (English Nature); word file to be sent to surveyors for editing for each site as necessary

Plot location and recording

1 x machete (experience during the pilot suggests this item will be very useful for accessing plot locations)
1 set of plot marking equipment (comprising centre pole, 4 x corner poles + distance strings) (CEH)
1 x sighting pole (CEH)
1 x magnetic compass
1 x clinometer (English Nature/OFI, please treat with great care as you will have to replace if lost!)
1 x DBH girth tape (CEH)
1 x 30 m tape

PER SITE

16 x Vegetation (ground flora) recording forms (CEH)
16 x Tree, sapling and shrub recording forms (CEH)
16 x Plot description sheets per site (CEH)
1 x Site description sheet per site (CEH)

Soil sampling equipment

1 x ‘Japanese Bog Digger’ (ask Bob!) – or a small draw hoe or V-shaped hoe
1 x trowel
1 x ruler
16 x self-sealing bags per site (CEH)
16 x pre-printed adhesive labels for each soil sample bag (CEH)
1 x permanent marker pen (use in addition to the adhesive label)

General Equipment

Clutch pencils - plus spares - plus leads
Rubber
Plastic boxes with lids (CEH)
Field keys
Hand lens
Weather writers
Cardboard boxes for return of soil samples (courier to be arranged with English Nature).

APPENDIX VI SOIL ANALYSIS: LABORATORY PROTOCOLS

Soil was sampled from the selected sites (approximately 2 kg) then placed in plastic bags and returned to CEH Merlewood.

The samples were placed in the cold room until analyses could be started.

Soil samples were sieved, removing all stones and vegetation (2 mm stainless steel mesh).

Fresh (wet) pHs were done and then soil samples were oven dried at 25°C for approx. 1 week.

After one week the samples were re-sieved if necessary and then out into labelled pots.

Air-dry pHs and loss on ignitions were the carried out.

pH Method

1. Calibrate the pH meter using buffer solutions of pH 4 and pH 7.
2. Add 10cm³ of the sample to a 50 ml beaker.
3. Add ~ 10ml of spectrum water (ultra pure) obtained from the Environmental Chemistry reservoir.
4. Mix thoroughly with a glass rod / spatula to a paste
5. Top up with spectrum water to the 50ml mark and stir.
6. Leave to stand for 20 minutes.
7. Stir.
8. Insert pH electrode.
9. Leave for a further five minutes.
10. Take pH reading and record result.
11. After each sample has been read, rinse electrode with pure water and touch-dry.

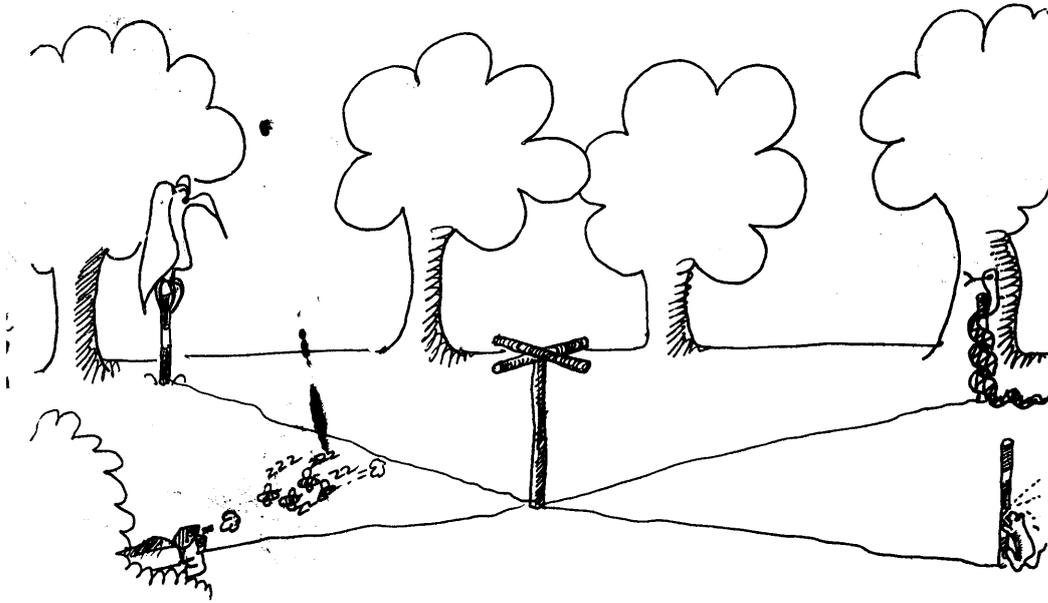
Determination of air-dry moistures - loss of ignitions (LOIs)

1. Dry small crucible in small oven at 105°C.
2. Cool in dessicator
3. Weigh crucible and approx. 1g air-dry sieved sample (= W₁ g)
4. Dry 3 hours at 105°C
5. Cool and weigh as before (= W₂ g)
6. Place in muffle (ashing) at 550°C for 2 hours (allow ½ hour to reach 550°C)
7. Cool in dessicator and re-weigh (= W₃ g)
8. **Calculation**

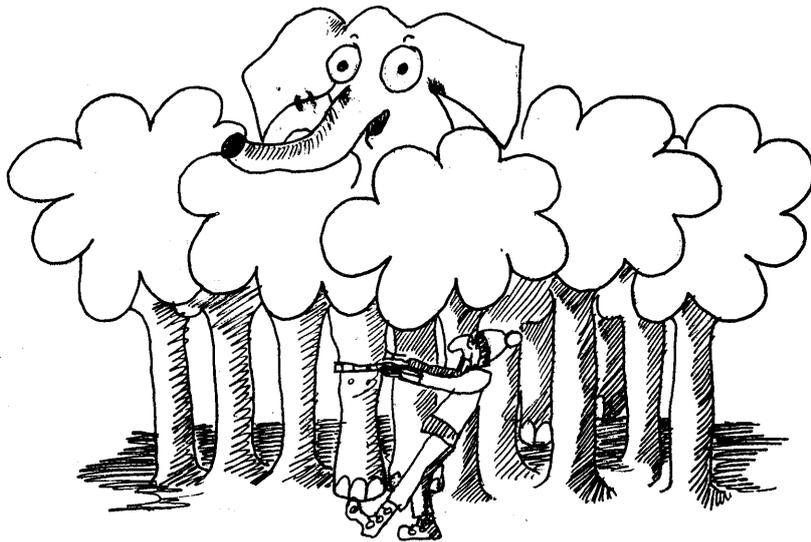
Let (W₂-W₁) oven dried = (W₃-W₁) muffle dried

$$\text{Then \% dry matter} = \frac{(W_3 - W_1)}{(W_2 - W_1)} \times 100$$

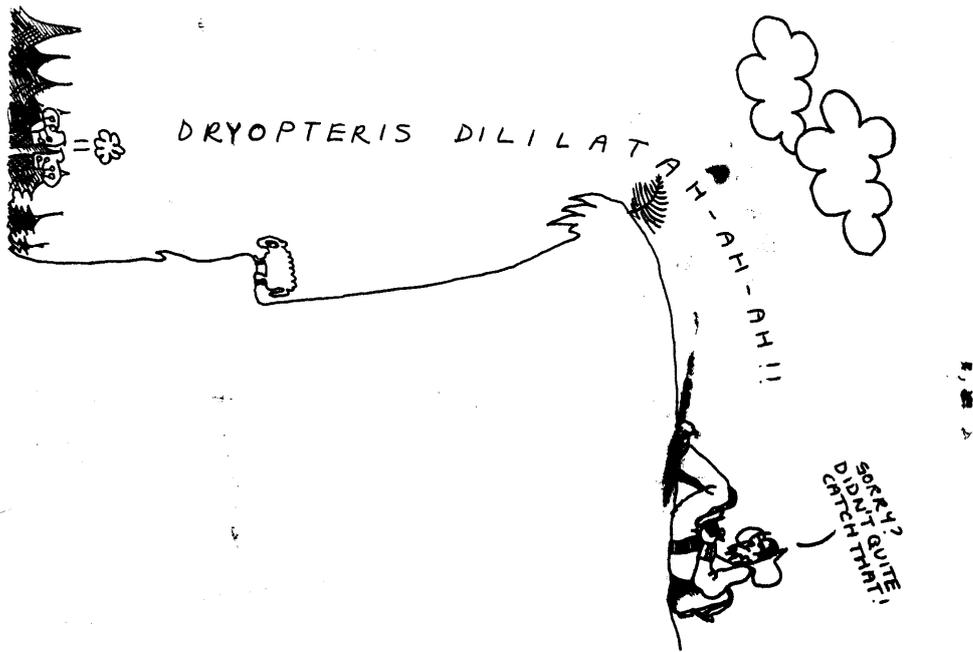
Setting out a plot



Measuring tree d.b.h.'s



Recording ground flora



Taking a soil sample

