

Fourth Draft



FIELD HANDBOOK

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1. INTRODUCTION

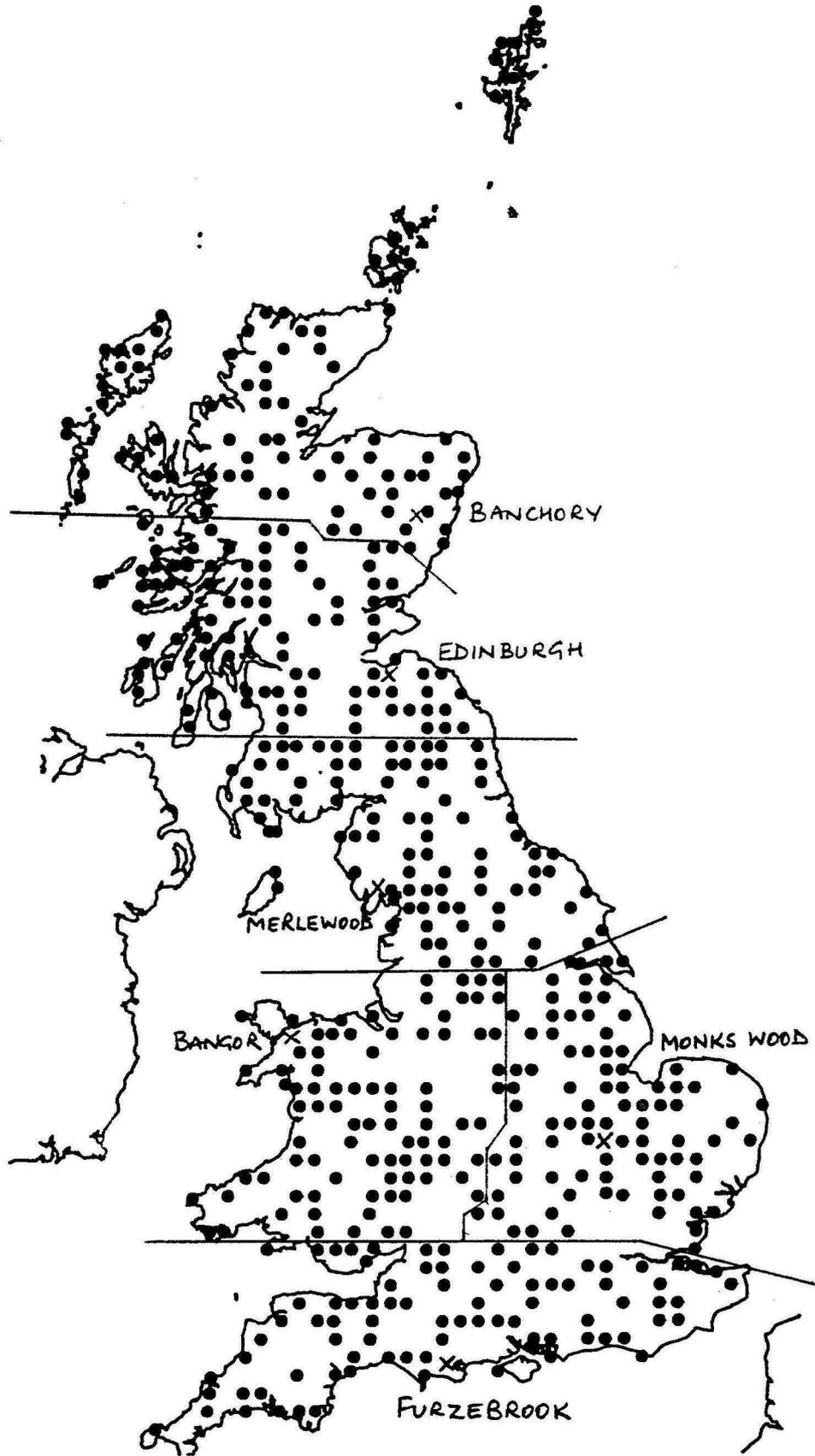
- 1.1 Land use studies may be classed in terms of: data collection and monitoring; land management interactions; land optimisation; and prediction. The first of these is essential in order to update land use databases and to ensure that the outputs from the other activities are both current and relevant.
- 1.2 ITE has carried out two major surveys of GB to sample data from the natural environment; both were based on the application of the ITE Land Classification System. The first was in 1977/8 with an emphasis on recording ecological data, especially vegetation and soils. The second was in 1984 and concentrated on the mapping of land cover and landscape features. A sample unit of 1 x 1 km square has been used. In 1978, eight squares were drawn from each of 32 land classes giving a total of 256 sites; this was increased by 50% in 1984 so that 12 squares were visited in each class (384 sites in total).
- 1.3 Data collected from these two surveys have been used to characterise the land classes, leading to a better understanding of the classification and to its wider use as a stratification for ecological sampling. A comparison of the land cover and landscape data from the two surveys has allowed quantitative assessments of recent changes in the countryside. The survey data have also been used in a series of contract projects, forming a basis for modelling the rural environment.
- 1.4 In 1988, a reduced sample of km squares was visited and further vegetation data were collected. These data, together with those from the previous surveys, have been central to ITE's project for the DOE on "The Ecological Consequences of Land Use Change" (ECOLUC).
- 1.5 Analysis of land cover and landscape data from 1978 and 1984, together with preliminary results from the 1988 survey, suggest that changes are continuing to take place in the countryside. This is confirmed by the results of other studies, notably that completed by Hunting Technical Surveys on behalf of DOE/CC. It is important to provide current datasets for scientific evaluation of ecological systems in the countryside, and to monitor the changes that are taking place to identify current trends and processes. ITE is committed to monitoring changes in the rural environment and 1990 has long been seen as an appropriate date for resurvey.
- 1.6 ITE will conduct a further sample survey in 1990 to collect land cover, landscape and vegetation data from sites visited in previous years. This project will adopt the approach used in previous ITE surveys, but will be enhanced by the inclusion of additional research activities, information capture at a greater level of detail, and increased research collaboration and liaison. The sample number will be increased by 128 additional sites to 512. In particular, the project will contribute to the capture of land use data using satellite imagery and a land cover map of Britain will be constructed. This will be particularly valuable in linking the 'top-down' remote sensing approach with the 'bottom-up' field survey, through the ITE Land Classification System. This two-tier approach will provide additional ground-truth data, allow wider projection of the field survey results, and will enhance the detection of pattern in the landscape.

- 1.7 An important lesson that has been learned from previous ITE surveys is that variation in field recording is a major contributory factor when assessing the statistical accuracy of change data. It is therefore important that every attempt is made to standardise recording between observers and, during the 1990 survey, quality control will be undertaken in several ways to maintain consistency of approach. A thorough knowledge of a clear and informative Field Handbook is a vital prerequisite.
- 1.8 The purpose of this Handbook is to define the set of guidelines to be used during survey. Inevitably circumstances will arise which are not fully covered here; it is important that field recording should be as consistent as possible. An accompanying set of definitions is provided but, again, not every interpretation of a data item can be covered. Where atypical or doubtful categories arise, the surveyor is asked to qualify or comment on his/her choice of recording.
- 1.9 Further information on the background to the Countryside Survey 1990 is available from ITE, Merlewood Research Station, Grange over Sands, Cumbria. LA11 6JU.

2. PLANNING SITE VISITS

- 2.1 The sample squares have been split up into six groups (see Figure 1) and will be surveyed by teams from the six ITE Research Stations. Each team has about 85 squares to survey.
- 2.2 Each square is reckoned to take three days to survey, on average, with the more inaccessible sites often being the easiest to record once reached. The day-to-day working arrangements are in the hands of the Station Coordinators and will be guided by the following principles:
- a. The survey teams are expected to be reasonably flexible in their working arrangements and, similarly, Station Coordinators will be sympathetic to requests for leave of absence for special occasions, when possible.
 - b. Travelling time is expensive both in terms of overall project time and finance - every attempt should be made to avoid returning to a site more often than is necessary, even if this involves some evening work. There will be no overtime payments, in the first instance, but any large accumulations of overtime will be compensated by 'time off in lieu'.
 - c. The costings of the project are based on a reasonable proportion of the squares being surveyed on a daily travel basis (with no overnight subsistence). Surveyors are expected to use day travel whenever it is reasonable to do so.
 - d. There are at least three ways of planning survey arrangements e.g.
 - i. daily travel from Stations for local squares
 - ii. one week away for two or three squares
 - iii. two or three weeks away for a group of squares (with work being undertaken at weekends, by arrangement).

Fig 1. COUNTRYSIDE SURVEY 1990 - SITES



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3. EQUIPMENT

3.1 This survey requires a small amount of equipment even though it is largely a mapping and recording exercise, rather than a measuring one.

Equipment may be divided into three categories:

a) provided by Merlewood

- Recording booklets (FAB's)
- Maps of the site (1:10,000)
- Aerial photographs of the site
- Handouts (explaining project)
- Coloured pens
- Weatherproof clipboards
- Survey poles
- Metal marker plates
- Hammer
- Sampling equipment
- Navigation equipment
- Measuring tape (50 metre)
- Identity card

b) provided by local ITE Station

- Maps to locate sites
- Rucksack (if needed)
- Pencils and rubber
- Reference books (if needed)
- Hand lens
- Camera (if needed)
- Print films
- Bivy bag
- First Aid kit
- Whistle

c) provided by surveyor

- Personal waterproof clothing etc.
- Reference books (if available)
- Rucksack (if available)
- Camera (if available)
- Binoculars (if available)

4. GENERAL FIELD SURVEY PROCEDURE

4.1 How a square is surveyed will depend on a number of factors including the type of land, and the degree of access. However there is a recommended procedure which includes the following points:

- a. On arrival at the square, surveyors should have a quick look round (where access permits), assess likely problems and generally acquaint themselves with the area.
- b. Having assessed the nature of the square, the surveyors should attempt to gain permission for access to the whole square, before commencing survey (see below).

- c. A suitable route should be chosen which will allow a full and detailed examination of the whole square.
- d. Having completed recording, surveyors should allow time to read through the records they have made, checking for omissions and ensuring full coverage and clear presentation.

5. PERMISSIONS

- 5.1 There are several reasons why permissions to survey should be sought. The most obvious is to gain legal access to all parts of the square. It is also important to ensure the goodwill of the farmer/landowner, not only to avoid an embarrassing confrontation, but to gain useful background information (see Farmer/landowner Information Sheet) and to assist data recording.
- 5.2 By way of an introduction, letters have been sent to all known farmers/landowners saying that the survey is taking place and asking them to expect a visit from ITE surveyors. (Separate letters have also been sent to 'the occupier' of farms which are likely to own land in the new sample sites.) However, they will also expect the teams to call on the day to establish that they are in the area and confirm that the arrangements for survey are satisfactory. About 75% of the sites have been visited before and so the farmers/landowners should be aware of ITE's work.
- 5.3 It is very important that all necessary permissions are confirmed before commencing survey since if a permission is refused when half the square has already been surveyed, then that work will be wasted. (On a comforting note, only one significant refusal was experienced in the 1977/78 survey and only three in 1984).
- 5.4 Experience has shown that some form of permission can nearly always be gained on the day of survey, but Coordinators may prefer to make some sort of prior contact (however this latter approach may lead to delays, letters, phone calls etc.). Copies of a relevant ITE publication, containing a brief explanation of this survey, will be available to all survey teams for distribution as appropriate. Surveyors should carry some form of identity - preferably their ITE identity card.
- 5.5 A list of known names and addresses from previous surveys is available, and surveyors should update and supplement this list on the ownership data sheet. Details of problems, or special requirements, concerning access to land are held by the Coordinators.
- 5.6 There are therefore two types of farmers/landowners: those whose land we have visited before; and those who are new to us in 1990. If permission to access land is refused, the following procedures should be adopted:
 - a) if access is denied to all parts of a square, then all attempts at field recording should be abandoned and reports made to the Station Coordinator as soon as possible (a replacement square will be drawn at random).

- b) if access is denied to any part of the square, then:
 - i. if an 'old' square, then the rest of the square should be surveyed,
 - ii. if a 'new' square, then survey should be abandoned as in a) above, unless the area concerned is easily surveyed from neighbouring land.
- c) if permission is refused for a vegetation plot then a note should be made and the plot repositioned using guidelines shown in Section 6.2
- d) every attempt should be made to contact farmers rather than their staff; where appropriate advice should be taken on who else might be informed of the survey as a matter of courtesy, eg anglers etc

DATA RECORDING (Filling in the FAB)

The Countryside Survey 1990 has three basic elements: mapping, recording quadrats, and sampling. The last of these is covered in Section 7.

6.1 MAPPING

The most geographically comprehensive element of the survey is basically a mapping exercise. Surveyors are asked to annotate a series of enlarged 6" (1:10,000) maps with a variety of information. Wherever possible, this information should be formatted according to the list of options available, but rarely it may be necessary to add other categories to the list.

In order to give as much information as possible about each area of land or landscape feature, combinations of data codes should be used to annotate each category on the map. To enable this form of coding, boxes are provided on each data recording form, which enable a series of numeric codes to be combined and represented by a single alpha character. For instance a particular length of boundary might be coded with a letter "A". In the boxes at the foot of the recording form "A" might be recorded as being a combination of codes 321, 342, 351, 353, 357, 361 where:

321 = Hawthorn hedge;
 342 = <2 m high;
 351 = stockproof;
 353 = gaps filled along <10% length;
 357 = hedge trimmed;
 361 = laying.

The use of an alpha code to represent a series of numeric codes is designed to save space in marking up the map but allow a more informative record to be made.

Always use capital letters for alpha codes. Do not use "X" or "O" as these are easily confused with other symbols. Use "I" not "l". Once all the letters of the alphabet have been used through to "Z", then use double codes: AA, AB, AC - AZ
 BA, BB, BC - BZ etc.

There are two types of code: primary and secondary. All features must be annotated with at least one primary code (which are shown in bold on code lists). In general, the use of more than one primary code should be avoided. However, where more than one primary code has to be used (eg multiple land use) then the code reflecting the dominant use must come first.

It is very important that the codes are used in an order which links the information logically eg a cover code always follows a species code etc

Boundaries on the maps should be clearly marked, whether actual boundaries such as fences, or interpreted ones, between two moorland vegetation types for instance. Boundaries shown on the OS map which no longer exist on the ground should be marked with the code 999 (no longer present). When annotating different boundary types then each length should be clearly defined at each end with a short line drawn perpendicular to the line of the boundary (except where a boundary junction serves to demarcate the end of a unit).

The minimum mappable area is 1/25th ha (400m²). No vegetation (except Bracken) should be mapped as a separate unit unless it comprises this area.

The minimum mappable length is 20 m (1/50th km). These units are shown on the data sheets.

Some features which are not on the agricultural/natural vegetation page of the FAB (and bracken) may be marked using a cross (X). Such features might include isolated trees, a well, or a caravan.

The surveyor in the field is the best person to make decisions about data recording. It is not useful if a decision is deferred in the field and a decision is forced on the data-processor "in the lab". Decisions must be made on the spot and, in exceptional circumstances, may be accompanied by a qualifying note or comment.

Finally, it is important that the whole square is surveyed and that even the smallest field corner, at the edge of a square, is coded.

6.1.1 Aerial photograph interpretation (API)

For some sites (and eventually for all) a restricted aerial photograph interpretation exercise has been undertaken by staff at ITE's Environmental Information Centre (at Monks Wood). The work has been carried out with the following objectives in mind:

- a) to assist in the identification of features which are not generally included on OS maps (such as isolated trees)
- b) to indicate 'boundaries' between different semi-natural vegetation types
- c) to update OS maps, eg for new buildings, roads etc

There has been no attempt to interpret the land cover types or to categorise any feature.

Certain conventions and symbolic representations have been adopted during this work; these need to be learned by surveyors in advance of survey:

- a) on copies of maps to be used for annotation by surveyors, all contour lines, place names and other non-essential information have been removed. (However, each team will also have a copy of the unaltered OS map)
- b) any boundary that has been identified through API is marked onto the map using dashed lines - these are for guidance only and are subordinate to the surveyors judgement on the ground.
- c) any isolated/individual feature is marked as a cross (these are usually trees)
- d) any boundary that has been identified as 'no longer present' is marked with a diamond on the line and arrows mark the extent of the feature.

It is important that this information is used wherever possible, but if it clearly conflicts with evidence on the ground, then it should be ignored and marked accordingly. At the end of the day, the API is for guidance only.

6.1.2 Filling in the FAB

For each square, the data recording forms, together with their 6" maps, have been combined into a booklet which, for historical reasons, is known as a Field Assessment Booklet (FAB). The order of the pages is not significant.

It is extremely important that the FABs are completed as neatly as possible. If information is not clearly interpretable by those undertaking analysis of data in due course, then effort has been wasted.

There are several general points about filling in the FAB's.

- 1. The square series number should be recorded on every page.
- 2. Where possible, a pencil should be used - mistakes can then be erased and waterproofing is enhanced.
- 3. In recording semi-natural vegetation and certain other complex situations, the surveyor is asked to map recognisably different, yet mappable units. As a rule, an area should be mapped separately from another if any descriptive code applies in one case but not in the other. The units are therefore decided by the definitions of the codes which characterise them.
- 4. This may mean that a mosaic is recorded in a comparatively large unit, the proportions of the components being reflected in the primary 'cover codes'. In these situations, the surveyor should use the primary code which most closely fits the majority of the ground cover.

5. Where it is impossible to choose a single primary code, then the dominant one should be recorded first in a list of codes. For example an area of Molinia/Heather moorland might be recorded as 103/175/163/176/106/175/161/180/189 where:

103 = Moorland - grass
175 = 25-50% (ie 25-50% of the mapped area is moorland grass)
163 = Molinia caerulea;
176 = 50-75% (ie 50-75% of the moorland grass is Molinia)

106 = Moorland - shrub heath
175 = 25-50% (ie 25-50% of the mapped area is moorland shrub heath)
161 = Calluna vulgaris;
175 = 25-50% (ie 25-50% of the shrub heath is Calluna)
180 = <30cm (ie the Calluna was <30cm high on average)

189 = Sheep (ie the whole area was grazed by sheep)

- 6. Point information (such as the presence of a hedgerow tree) should be marked with an X, distinguishing them from lines (such as a row of trees) and areas, delimited by a boundary.
- 7. If an area becomes too complex to record using code numbers (especially in built-up areas) then use coloured pens, showing which codes are represented by each colour in the boxes. (See further notes on colour convention under the Buildings, etc. sheet). Remember that colours cannot easily be deleted after error.
- 8. If recent change is obvious then please make use of codes where possible to show this, or else make a note on the sheet concerned.
- 9. Dotted lines after a category are intended to invite further information e.g. what type of quarry/mine or what sort of race track, etc.
- 10. To avoid cluttering the map, arrows showing a link between a code and the feature should be avoided as far as possible. Instead, the code should be written, neatly and unambiguously, immediately adjacent to the feature.
- 11. Note the guidelines for recording information in woodlands (page and immediately adjacent to non-agricultural curtilages (page

There follows a page-by-page guide on how to complete the data sheets, including some definitions or notes on those data categories which are not self-explanatory.

i. Front cover of the FAB

All sections of the cover must be completed.

NB. Series number - this must be filled in on every page on the FAB.
Location - this should refer to the nearest village/town/geographical feature and the County or Region (in Scotland).

ii. Ownership

As explained previously, permission must be obtained to access all parts of the square. During this exercise, the ownership of all Parts of the square should be established in detail and marked on the map. All the land units (e.g. fields) belonging to owner number 1 should be marked with a "1", those belonging to number 2 with a "2" etc.

The exact address and telephone number of each owner or tenant should be recorded.

While recording ownership information, please use a "T" against the name of tenant farmers, and a "C" against the name of owners of farms which have changed ownership since 1984.

The code numbers to the right of "address" are to be circled according to how interested/cooperative/helpful the owner appears to be, as follows

- 0 = Not available or unable to judge
- 1 = Less than interested/cooperative/helpful
- 2 = Generally interested/cooperative/helpful
- 3 = Very interested/cooperative/helpful.

This will provide useful introductions on further possible surveys but will not be used in any way as part of an analysis etc.

If the owner asks for information on his land to be sent, this should be noted on the ownership page of the FAB.

iii. Farmer/Landowner Information

This is not intended as an official questionnaire and details recorded here will only be used as background information, hence a uniform cover of all farmers is not required. However, many farmers do like to chat about their land and in this event the surveyor is requested to steer the conversation towards the questions posed on this sheet.

The clipboard should not be much in evidence - many farmers feel inhibited by surveyors scribbling down every word they utter, but notes should be made or a summary of the conversation made on leaving the premises.

In each square, surveyors should attempt to engage at least one farmer in such conversation, preferably the one who holds most land within the square. The code from the ownership sheet should be noted and if a second "Interview" takes place, a line drawn across the page to separate the information.

iv. Physiography/Inland Water/Coastal

Inland physiographic features

- 1. Cliff >30m high: a vertical or near-vertical face of rock
- 2. Cliff 5-30m high:

- 3. **Rock outcrop & cliff <5m:** areas of bare rock should be included here together with a % cover category (12-14)
- 4. **Scree:**
- 5. **Surface boulders:** boulders are defined as >50 cms in any direction and should be mapped as an area with a % cover code (12-14)
- 6. **Limestone pavement:**
- 7. **Peat hags:** includes any bare or eroding peat which is not vegetated
- 8. **Current peat workings:** where peat has obviously been extracted in the current or previous season
- 9. **Old peat workings:**
- 10. **Soil erosion:** includes both human and natural erosion in any situation
- 11. **Ground levelling:** includes any formerly raised area that has been reduced to the level of the surrounding terrain (eg for development)

- 12. **100% rock:**
- 13. **>50% rock:**
- 14. **10-50% rock:**
- 15. **100% peat:**
- 16. **>50% peat:**

Coastal features

- 31. **Cliff > 30m high:**
- 32. **Cliff 5-30m high:**
- 33. **Rock outcrop & cliff <5m:** to be used when the rock is outcropping base-rock, as opposed to ...
- 34. **Rocky/Boulder shore:** used when the shore is of shattered rocks or boulders >10cm diam (ie grapefruit-size)
- 35. **Pebble/Gravel shore:**
- 36. **Sandy shore (or dune):**
- 37. **Bare mud:**
- 38. **Sea:** this may seem obvious but is helpful in estuarine and coastal marsh situations - always record.

Inland water features

These features should be recorded and mapped whether they are dry at the time of survey or not.

- 51. **Lake - natural:** any inland water body, of any size, should be mapped using this code.
- 52. **Lake - artificial:** usually distinguished by the presence of a dam or embankment.
- 53. **River:** defined as being more than 2.5m wide; a stream is less than 2.5m. (2.5 m would be a very brave leap).
- 54. **Canalised river:** rivers which have been modified (eg sections straightened, banks smoothed), but which still follow the same basic direction as the natural watercourse.
- 55. **Canal:** constructed where no watercourse existed previously.
- 56. **Stream:** defined as being less than 2.5m wide (see River)
- 57. **Roadside ditch:** linear excavations with the purpose of drainage; should be recorded even if dry at the time of survey.
- 58. **Other ditch:** (see Roadside ditch)
- 59. **Spring:** usually marked on the map but implies evidence of a continual supply of water at ground surface.
- 60. **Well:**

- 61. **Signs of drainage:** includes evidence of tile-drains or mole-drains ie lines of disturbance across a field.
- 62. Not used
- 63. **Gorge:**
- 64. **Levee:** artificial raised banks at the sides of rivers, characteristic of canalised rivers.

Banks - two codes should be used for each length of watercourse, one for each side. Record the Righthand bank first, as seen looking downstream. Measurements refer to distance on ground, not height.

- 65. **Bank <1m:** to describe the bank intimately associated with, or effected by, a watercourse ie river, stream, ditch, canal etc.; the bank would run from the 'normal' water's edge to a boundary, or change in land cover type.
- 66. **Bank <5m:**
- 67. **Bank >5m:**

v. **Agriculture/Natural vegetation etc**

This sheet includes most of the ground cover types in GB except urban and woodland. The first section, cover types, includes categories which may be qualified by the other codes, such as species, use or measurements.

It is important to note that these cover types should not be used in a built-up area. Once a curtilage has been recognised, as defined in Section viii, then all land within the curtilage is to be recorded according to the Section viii categories. Hence an orchard in a residential garden is not to be recorded on this sheet.

Cover types

Cover types - many of these categories need defining in the context of this survey and the definitions given may not be those with which the surveyors are familiar.

Types of grassland are notoriously difficult to distinguish, especially since their current species composition and general appearance is decided by management practices, rather than origin, history or use. Hence the primary codes are limited but there are several general descriptive codes, as well as species codes, by which such areas can be described.

Bracken is to be treated differently to other categories. Even where bracken occurs in smaller areas than a minimum mappable unit, details should be recorded using a cross (X) to mark its location.

- 101. **Lowland agricultural grass:** includes any grass crop or pasture in a generally lowland, or enclosed, situation (ie most grass)
- 102. **Upland grassland:** natural grassland (unimproved) in an upland situation but with a high proportion of palatable grasses and usually on a mineral soil. Typical species include *Festuca ovina*, *Agrostis tenuis*, *Anthoxanthum odoratum*, *Galium saxatile*, often with bracken.
- 103. **Moorland - grass:** coarse upland grass in a moorland setting, usually dominated by species such as *Nardus*, *Molinia*, *Deschampsia flexuosa*, *Juncus squarrosus*. Soils usually have a peaty top.

104. **Moorland - shrub heath:** dominated by dwarf shrub species often growing on peat, invariably dominated by *Calluna* or *Vaccinium*
105. **Calcareous grassland:** found on calcareous soils and with a high proportion of calcicole species of limestone, chalk, dunes and machair. Typical species include *Bellis perennis*, *Lotus corniculatus*, *Linum catharticum*, *Thymus druceii*, *Poterium sanguisorba*, and *Briza media*.
106. **Maritime vegetation:** found on sea cliffs or other coastal situations and usually herb-rich due to salt spray.
107. **Lowland heath:** shrub heath at low altitudes and in lowland England and Wales, usually characterised by dry soils.
108. **Aquatic macrophytes:** major species characteristic of standing water such as *Typha*, *Ranunculus fluitans* and *Phragmites*.
109. **Aquatic marginal veg:** growing at the fringe of open water eg *Valeriana*, *Epilobium hirsutum*, *Filipendula*, *Oenanthe croccata* etc

There are various classifications of bogs, mires etc; the following division is a compromise.

110. **Raised bog:** occurs mainly in lowland situations, often formed in level flood plains of mature rivers; typically convex and gently sloping from the centre to a steep margin and bounded by a watercourse.
111. **Blanket bog:** characteristic of large areas in north-west, upland, high-rainfall parts of Britain. Characterised by *Eriophorum* with or without *Sphagnum*; other species include *Molinia*, *Trichophorum*, *Calluna* and *Erica tetralix*.
112. **Valley bog:** (including basin mires) form in depressions where there is a slow, directional flow of water.
113. **Fen:** lowland peat usually dominated by sedges or rushes often with alder or willow.
114. **Marsh:** Nutrient-rich wetland on predominantly inorganic soil dominated by rushes or sedges.
115. **Flush:** Localised, narrow areas of moving water which tend to have species which are different from surrounding vegetation. Calcareous flushes are characterised by species such as *Prunella vulgaris*, *Plantago lanceolata*, *Linum catharticum* and *Parnassia palustris* and are relatively rare. Non-calcareous flushes are usually dominated by rushes, often with *sphagnum*.
116. **Saltmarsh:** Should only be recorded where the area is vegetated, otherwise bare mud (Physiography section) is appropriate.

117-132 These categories are self-explanatory even though young crops may be difficult to recognise. The following notes may help:

- cereal crops are nearly always drilled in rows with a high proportion of soil visible between the plants.
- wheat plants have broad, glaucous blades with auricles.
- barley has dull green leaves and auricles.
- oat plants have broad soft glaucous leaves with no auricles.

117. **Wheat:**
 118. **Barley:**
 119. **Oats:**
 120. **Sugar beet:**
 121. **Turnips/Svedes/Roots:**

- 122. Kale:
- 123. Potatoes:
- 124. Field Beans:
- 125. Peas:
- 126. Maize:
- 127. Rye:
- 128. Oilseed rape:
- 129. Other crop
- 130. Flowers:
- 131. Commercial horticulture:
- 132. Orchard:
- 133. Unmanaged grass: this is grassland that has no obvious use (agricultural, amenity etc) but which cannot be called an abandoned land use. (Wide roadside verges, only cut once/twice per year, may be coded as unmanaged grass - or tall herb vegetation, as appropriate).
- 134. Tall herb vegetation: semi-natural vegetation, often in wet or disturbed positions; dominated by tall herbs but with grasses present.

- 136. Ley: a short-term grassland, re-seeded less than five years previously. Characterised by evidence of ploughing, bare soil between grass plants, scarcity of broadleaf species and is often dominated by a single grass species eg Lolium. This code should only be used if there is absolutely no doubt about these factors (eg from landowner information or recent sowing). Any field with more than 10% Lolium multiflorum (a short-lived ley species) would be included here.
- 137. Unimproved grass: pasture in an enclosed situation which contains many palatable grasses but which has not been agriculturally improved by the use of fertilisers or other agricultural inputs. A comparatively rare category, containing species such as Conopodium majus, Plantago lanceolata, Lotus corniculatus etc. Would include most 'hay meadows'.
- 138. Forbs >10%:
- 139. Forbs >25%:
- 140. Forbs >50%:
- 141. Neglected: agricultural land for which there is no obvious intended change of use, but where the former use has been temporarily neglected (for up to 3 years). Fallow land (which has been unused as part of an agricultural rotation) should be recorded here. Set aside land should also be recorded here (but only if identified without doubt)
- 142. Abandoned: agricultural land which has been neglected for more than 3 years and in which long-lived perennials and shrubby species are becoming established.
- 143. Ploughed: the crop harvested before ploughing should be identified (from fragments that remain) and this code used as an extra description.
- 144. Burnt (moorland): land which has been burned deliberately as a management practice e.g. for grouse (muirburn).
- 145. Mown: to be used for any grassland type that has been mown such that the 'normal' vegetative structure of grasses is not present and therefore hinders species identification.

Species (if >25% cover)

The following major agricultural grasses and semi-natural ground cover species (which are listed according to a gradient from rich to poor land) are recorded if they cover 25% or more of a mapped unit, irrespective of the number of canopies present (ie total cover can reach more than 100%). For any species which is not listed here and which reaches 25% cover, one of the blank code numbers should be used:

- | | |
|---|--------------------------------------|
| 146. <i>Lolium multiflorum</i> | 158. <i>Juncus effusus</i> |
| 147. <i>Lolium perenne</i> | 159. <i>Deschampsia flexuosa</i> |
| 148. <i>Trifolium repens</i> | 160. <i>Nardus stricta</i> |
| 149. <i>Dactylis glomerata</i> | 161. <i>Calluna vulgaris</i> |
| 150. <i>Anthoxanthum odoratum</i> | 162. <i>Vaccinium myrtillus</i> |
| 151. <i>Phleum pratense</i> | 163. <i>Molinia caerulea</i> |
| 152. <i>Cynosurus cristatus</i> | 164. <i>Eriophorum angustifolium</i> |
| 153. <i>Holcus lanatus</i> | 165. <i>Eriophorum vaginatum</i> |
| 154. <i>Agrostis tenuis</i> | 166. <i>Tricophorum cespitosum</i> |
| 155. <i>Festuca ovina</i> | 167. <i>Sphagnum spp</i> |
| 156. <i>Pteridium aquilinum</i> - dense | 168. <i>Juncus squarrosus</i> |
| 157. <i>Pteridium aquilinum</i> - scattered | |

Cover

175-178 These cover % codes should be used with the species codes 146-168 and, where a mosaic of vegetation categories exists, with land cover types. No more than three cover codes may be used to describe any area.

- 175. 25-50%:
- 176. 50-75%:
- 177. 75-95%:
- 178. 95-100%:

Heights (Calluna & Pteridium)

179-184 These height class codes should only be used with Bracken and Heather and should reflect the average height of the stand at the time of survey.

- 179. <10cms:
- 180. <30cms:
- 181. <50cms:
- 182. <1m:
- 183. <1.5m:
- 184. >1.5m:

Uses etc

These codes should be used to qualify the cover types where known. Stock type can be told from recent dung as well as presence of animals.

- 185. **Beef:** should include 'sucklers' (0-6 mths) and 'rearers' (6 mths onwards)
- 186. **Dairy:** N.B. mixed herds of beef cattle and dairy cattle should be coded 176/177
- 187. **Breeders:** only to be used if it is confirmed that the primary purpose of the herd is for breeding.

- 188. **Dual purpose:** applies to the few remaining cattle breeds which are bred for beef and milk production e.g. Simmentals, South Devons, some Shorthorns and some Fresians.
- 189. **Sheep:**
- 190. **Goats (with no.):** the numbers of goats and horses in fields should be recorded where possible, including those animals in a field, only part of which is in the square. Numbers should follow the code (in parentheses).
- 191. **Horses (with no.):**
- 192. **Pigs:**
- 193. **Silage:** Silage fields can be distinguished from hay fields only after cutting (silage-cut stems are fresh, bright green: hay fields usually produce dried grass remnants), or by asking the farmer.
- 194. **Hay:** should only be used if there is firm evidence eg wisps of dry grass after harvesting
- 195. **Deer:** only to be used if there is firm evidence including presence of animals or dung, artificial feeds, estate information
- 196. **Grouse:** as for deer
- 197. **No apparent use:** should be used if the primary use of the land cannot be identified.

vi. Forestry/Woodland/Trees

The codes from the woodland sheet should be used to describe each 'woodland unit' (ranging from a single sapling to a forestry plantation) and every combination of codes must contain at least one primary code. Features from other pages of the FAB should not be recorded within woodland, unless they are above a minimum mappable unit in size (ie exceeding 1/25th ha), and excepting bracken.

Trees/scrub should be recorded in any situation except inside the curtilages of buildings or as individuals or lines immediately adjacent to non-agricultural curtilages.

Trees should be recorded from all recreation land such as golf courses and playing fields (except in urban situations). It is important that the double use of land is recorded eg individual trees growing in farmland, or sheep grazing in an abandoned orchard.

Tree species (with apical dominance leading to the formation of recognised trunks) of all sizes should be recorded, as should shrubby species (comprising scrub).

Cover types - all occurrences of trees should be allocated to one of the primary codes and qualified by secondary codes - if any one area of trees includes distinct variation in age or species composition, then the unit should be sub-divided into blocks and coded separately.

The following key should allow any feature to be placed in one of the primary code definitions:

- | | |
|---|-----------------|
| 1. Exclusively shrubby species? | YES .. 2 |
| | NO .. 5 |
| 2. Less than 6 individuals? | YES .. Code 207 |
| | NO .. 3 |
| 3. At least 20m line of single specimen width? | YES .. Code 209 |
| | NO .. 4 |
| 4. Canopy covers less than 25% of area? | YES .. Code 208 |
| | NO .. Code 210 |
| 5. Less than 6 individuals? | YES .. Code 201 |
| | NO .. 6 |
| 6. Less than 0.25 ha with canopy >25% area? ... | YES .. Code 205 |
| | NO .. 7 |
| 7. Linear feature (ratio 1:5 and < 50m width)? | YES .. 8 |
| | NO .. 9 |
| 8. Single tree width? | YES .. Code 203 |
| | NO .. Code 204 |
| 9. Canopy cover less than 25%? | YES .. Code 202 |
| | NO .. Code 206 |

201. **Individual trees:** should be marked with a cross. Groups of less than 6 trees should be recorded as individuals as should lines of trees of less than 20 m in length. A coppice stool is recorded as a single tree.
202. **Scattered trees:** do not make a wood or clump (see definitions) because their crowns are not contributing 25% cover of the mapped unit.
203. **Line of trees:** must be single tree width and be at least 20 m long with crown contact. They should be marked with a line.
204. **Belt of trees:** 2 or more trees wide with a width to length ratio of at least 1:5, parallel-sided and with a maximum width of 50m.
205. **Clump of trees:** a small woodland or group of trees (6 or more) and of less than 0.25 ha.
206. **Woodland/Forest:** an area of trees of more than 0.25 ha (but see Belt) and a crown cover of more than 25%.
207. **Individual scrub:** consists exclusively of shrubby species often with tree regeneration and brambles. Individual trees of more than twice the average height of the scrub should be separately marked as individuals or scattered.
208. **Scattered scrub:** scattered as for trees.
209. **Line of scrub:** line as for trees.
210. **Patch of scrub:** an area of continuous scrub (canopy >25%) of any size.
215. **Closed canopy:** canopies touching or overlapping
216. **Canopies not touching:** to be used for linear features, if the gap between two canopies does not exceed the average canopy width of the two individuals on either side.

- 217. **Hedgerow:** trees in a hedgerow which are twice the average height of the hedge, or where the hedge has been trimmed to favour the growth of a young tree. They should be marked with an X.
- 218. **Parkland:** a series of isolated mature trees over usually grazed grassland, often associated with large country houses or recreational areas.

Species (if >25%) - should be recorded with one of the cover types if they constitute more than 25% of the canopy. It is not necessary to qualify "unspecified conifer" or "unspecified broadleaf" with a species name. The mixed category codes should be used in the same way ie when >25%.

- 221. Fir - Douglas
- 222. Larch
- 223. Pine - Corsican
- 224. Pine - Lodgepole
- 225. Pine - Scots
- 226. Spruce - Norway
- 227. Spruce - Sitka
- 228. Unspecified conifer

- 231. Alder
- 232. Ash
- 233. Beech
- 234. Birch
- 235. Bramble
- 236. Elder
- 237. Elm
- 238. Field maple
- 239. Gorse
- 240. Hawthorn
- 241. Hornbeam
- 242. Lime
- 243. Oak
- 244. Poplar
- 245. Rowan
- 246. Sweet Chestnut
- 247. Sycamore
- 248. Willow

- 250. Mixed broadleaves
- 251. Mixed conifers
- 252. Unspecified broadleaf

Proportions - these are for use with the tree species codes and should refer to the percentage cover of the dominant canopy layer. No more than three codes should be used to describe any one feature.

- 256. 25-50%
- 257. 50-75%
- 258. 75-95%
- 259. 95-100%

Age - should be used in conjunction with any of the cover-type codes.

To help with age category recognition the following table may be of use. These figures are a guideline and individuals will vary according

to vigour, climate and other environmental factors, particularly fast-growing species of exotic origin. Further information is available in "Trees of Britain and Europe" by Mitchell.

Age (yrs.)	Diam. at breast height
5	3-4 cm
20	18-20 cm
100	70-75 cm

- 261. 1-4 yrs
- 262. 5-20 yrs
- 263. > 20 yrs
- 264. > 100 yrs

Use - To be used for an area of trees (ie not individuals). It can be extremely difficult to decide the use and many woodlands, especially broadleaved, appear to have no particular use. These should be left uncoded in terms of use.

- 266. **Timber production:** all(?) coniferous forest and highly managed broadleaved woodland is likely to be included here.
- 267. **Landscape:** usually covering trees planted to improve the amenity of a site (usually visual amenity), or to fringe and 'hide' commercial plantations.
- 268. **Sporting/Game:** to be used if there is clear evidence that the wood is used to rear pheasants or other game birds.
- 269. **Public recreation:** where there is active encouragement for the public to use the area for recreation eg car parks, forest walks, arboreta etc.
- 270. **Nature conservation:** only to be used if there is clear evidence that the feature is being managed for nature conservation purposes.
- 271. **Shelter:** includes signs of wintering livestock as well as windbreaks etc.

Condition (to be used with woodland/forest >0.25 ha only)

- 275. **Managed:** to be used if there are clear signs of management activity for the primary use of the woodland area, eg, for timber production: weeding, thinning, brashing/snedding; for amenity: planting; for nature conservation: planting, scrub clearance etc
- 276. **Unmanaged - thriving:** no signs of active management but healthy trees, varied age structure and regeneration present.
- 277. **Unmanaged - improvable:** no signs of active management with healthy trees but no structure and grazing preventing natural regeneration
- 278. **Declining:** trees not healthy, often old, and with no structure and no regeneration; no longer woodland if existing trees removed.

Descriptions/Features

- 281. **Felling/Stumps:**
- 282. **Natural regeneration:** to be used only where tree species <1.3m high, which have grown naturally from seed (or suckers) are outside the canopy of a dominant woodland feature.

- 283. **Underplanting:** where semi-natural woodland has been under-planted with standard exotics or native species.
- 284. **Planted:** Planted may be used with any of the cover types where it is obvious that planting has taken place, rather than self-seeding.
- 285. **Ploughed land:** to be used where land has been ploughed (or scarified) in advance of forestry planting.
- 286. **Staked trees:** to be used for isolated trees only and not where 288 applies.
- 287. **Tree protectors:** light-weight plastic tubes (about 1 m high) which provide protection as well as a favourable micro-climate for planted trees.
- 288. **Fenced (single trees):**
- 289. **Windblow:** can be used to qualify an area of forest or a single individual which has clearly been blown over, or had the top blown out, by wind.
- 290. **Dead standing tree(s):** recorded either singly or as a description for an area of woodland.
- 291. **Regrowth - cut stump:** applies to isolated regenerating trees
- 292. **Grazing (stock):** to be used if there is any evidence of agricultural stock using the feature for grazing, intentionally or otherwise.
- 293. **Ride/Firebreak:**
- 294. **Bracken dense:** any bracken in a woodland area must be recorded as for codes 156 and 157.
- 295. **Bracken scattered:**

vii. Boundaries

All boundaries should be recorded **unless** they form part of a curtilage or they are within the canopy of a woodland (except that boundaries of woodlands must be recorded). It is important that the boundary between urban and rural is marked, but it need not be coded if a curtilage is involved.

It is the total boundary feature which is to be coded, using a combination of primary codes if appropriate (eg fence with hedge). In these cases, the most complete (stockproof) element of the boundary should be coded first.

Walls

- 301. **Dry-stone:**
- 302. **Mortared:** includes dry-stone walls which have been capped with mortared stone.
- 303. **Other:** ... (include a description)

Fences

- 311. **Wood only:**
- 312. **Iron only:**
- 313. **Wire on posts:**
- 314. **Other:** ... (include a description)

Hedges

It can be difficult to distinguish between 'mature' hedges and lines of trees. A hedge is defined as woody vegetation that has been subject to a regime of cutting in order to maintain a linear shape. When hedge management is abandoned, and the natural shape of the tree is regained, then the feature can no longer be described as a hedge.

- 321. >50% Hawthorn: only to be used if Hawthorn constitutes more than half of the length of hedge under consideration.
- 322. >50% Other: (specify)
- 323. Mixed hedge: should be used for any length of hedge where no single species dominates.

Other

- 331. Stone bank:
- 332. Earth bank: N.B. stone and earth banks are common and should be coded as 331/332
- 333. Grass strip: to be used where a grass strip separates two fields with no vertical boundary.

Descriptions

- 341. >2m high: if different heights apply on either side of the boundary, then the height should apply to the side on which stock are kept; otherwise, the lowest height category should be used.
- 342. <2m high:
- 343. <1m high:
- 351. Stockproof: where possible, this should apply to the stock that would normally use the surrounding fields; if in doubt, assume sheep
- 352. Not stockproof:
- 353. Filled gaps <10%: should be used to show that the boundary has had gaps which have been filled in an attempt to make it stockproof. The %'s refer to the gaps as a % of the boundary unit being coded.
- 354. Filled gaps >10%:
- 355. Signs of replacement: (of one boundary type by another)
- 356. Signs of removal:

Codes 357 - 360 represent a transition from a well managed, trimmed hedge, to a relict line of shrubs.

- 357. Trimmed: signs of management within the previous 12 months and a neat, cropped appearance.
- 358. Uncut: has had recent management but has been 'let go' over one or more seasons.
- 359. Derelict: still obviously a hedge but all attempts at management having been abolished.
- 360. Line of relict hedge: usually a line of shrubs showing where a hedge has once been (see definition of hedge; can be used in addition to codes on the forestry page)
- 361. Laying (recent): to be used if it appears likely that the hedge has been layed in the last five years.
- 362. Flailing: to be used if flailed in the last year; recognisable by smashed and shattered ends to cut branches.

- 363. **Regrowth from stumps:** this applies to hedges that have been cut to ground level but have sprouted again, often at intervals along the old boundary.
- 364. **Bracken present:** to be used if any bracken is present in the boundary.

viii. Buildings/Structures/Communications

This sheet covers features associated with built structures and routes of communication. Note that features which are immediately adjacent to a non-agricultural curtilage (except roads) need not be recorded on other FAB pages. Similarly no information from other FAB pages need to be recorded within a curtilage (except trees - see 402 below)

Colour Coding - if using colours because code numbering is too complex then please use the following choice of colours wherever possible:

- Grey = Residential Building
- Yellow = Agricultural curtilage (+ green dots with trees >10% cover)
- Green-solid = other curtilage without trees
- Green-dots = other curtilage with trees
- Orange = Commercial Buildings
- Dark Blue = Public Service Buildings
- Purple = Religious Buildings
- Pink = Road (tarmac)
- Red = New development

Other buildings and grounds should be number-coded, most being large enough to accommodate a written code.

Cover types

Built-cover types - these categories should cover the majority of "urban" land and built features in the countryside but special codes may be needed on rare occasions. Where possible they should be qualified by use and description codes.

A curtilage is an area of ground that is associated with a building and which has a use linked with that building eg gardens, 'grounds', forecourts etc. Apart from the presence of trees (cf code 402), it is not necessary to record any features within curtilages. If in doubt about whether a feature is a curtilage, then only treat it as such in an urban situation (eg land around a rural resevoir is not curtilage).

- 401. **Building:** usually present on the map - the exceptions will be new buildings which must be coded or coloured with code 441.

Gardens/Grounds apply to curtilages associated with residential or other buildings. Gardens/Grounds may be mapped and coded in groups if they are all alike.

- 402. **Garden/grounds with trees:** Gardens/Grounds with trees includes those curtilages or mapped group of curtilages, which have a cover of 10% or more.
- 403. **Garden/grounds without trees:**
- 404. **Public open space:** includes Parks, Ornamental Gardens and Accessible Common Land, especially near large conurbations.

405. **Amenity grass >1ha:** non-agricultural grass which is clearly being used for amenity purposes (not recreation); to be recorded in units of 1ha or more eg parks, large lawns etc (but see 404). Should be used on golf courses.
406. **Allotments:**
407. **Car park:**
408. **Glasshouse:** refers to commercial, large-scale enterprises, not greenhouses at the bottom of gardens.
409. **Garden Centre/Nursery:**
410. **Embankment:** to be used for any constructed embankment in any situation eg motorway, resevoir etc.
411. **Other land**: for use in exceptional circumstances; try and use other primary codes first. Always qualify.

Use - these categories should be used to describe the cover type.

421. **Residential:** covers all domestic living area.
422. **Commercial:** includes all buildings devoted to selling things, including shops, garages, hotels, pubs, commercial offices etc.
423. **Industrial:** those used for the manufacture of goods and include workshops, warehouses and associated buildings such as stores.
424. **Public Service & facilities:** Public Services and facilities are those buildings which are associated with services available to the public, such as Police Stations, Hospitals, Libraries and facilities associated with electricity, gas and telephone.
425. **Institutional:** includes all buildings belonging to forms of public or private institutions, such as old peoples homes, local government and central government buildings, MOD buildings, Crown land, Remand homes, Prisons and even Research Stations.
426. **Educational/Cultural:** includes schools, establishments of further education, museums, theatres and cinemas.
427. **Religious:** confined to places of worship including Churches, Mosques and Synagogues, and their curtilages eg graveyards, cemeteries etc.
428. **Agricultural:**
429. **Sporting/Recreational:**
430. **Waste - domestic:**
431. **Waste - industrial:** and to include agricultural
432. **Quarry/Mine:**
433. **Gravel pit:**

Description

441. **New:** those developments which are not shown on the OS Map. Boundaries of associated Gardens or Grounds should also be drawn.
442. **Vacant:** building land which is temporarily out of use; often has sign posted and is adjacent to building land.
443. **Derelict:** buildings or land that have been abandoned or neglected such that they are beyond ordinary repair.

Communications

451. **Railway track/land:**
452. **Road (tarmac):** includes any road, whether private or not, which is totally tarmac across its width.

453-445 Verges should be marked separately for each side of the road so that two numeric codes should be used to describe the verges for the length of road concerned (even if they are the same). Record the

'northmost' verge first. If road runs north-south, then record 'eastmost' first. If there is no verge (eg tarmac up to a wall) then do not use a code at all. Verges should be mapped adjacent to constructed tracks, as well as tarmac roads.

453. Verge <1m:

454. Verge <5m:

455. Verge >5m:

456. **Constructed track:** includes any track which has been manufactured using stone or hard material.

457. **Unconstructed track:** those tracks which are not defined as above ie no construction has been involved along their length.

458. **Footpath (exclusive):** a path which uses land area for the purposes of a footpath only - often walled or fenced.

459. **Footpath (other):** those which are shared with some other land use, such as a path across a grazed field.

Surface: (these codes should be used as qualifiers for any Right of Way, ie footpath, bridleway, byways, and 'roads used as public paths')

460. **satisfactory throughout:**

461. **parts in poor condition:**

462. **impassable/difficult:**

Barriers: (some can be shown as primary codes; others as descriptions of Rights of Way as above)

463. **difficult stile/gate:**

464. **difficult bridge:**

465. **difficult fence/wall:**

466. **ploughed/crops:**

467. **natural vegetation:**

468. **muddy/flooded:**

469. **fallen trees/rock:**

470. **bull(s):**

471. **other**

ix. Recreation

Designated

These are generally areas deliberately set aside for recreational purposes; examples other than those given, may be entered using new codes.

501. **School playing fields:**

502. **Other playing fields:**

503. **Golf course:**

504. **Race track**

505. **Tennis courts:**

506. **Boating area:**

507. **Static caravan(s):**

508. **Touring caravan park:**

509. **Camp site:**

510. **Launch site**

511. **Other designated area ...**

Non-designated

Information or signs - where land normally given to some other use, has been used for recreation, often on a very ad hoc basis.

- 521. **Horsiculture:** any signs of horses used for recreational purposes eg jumps, schooling rings etc
- 522. **Angling:** any signs of angling eg notices, platforms etc.
- 523. **Boat - inland water:** any evidence that a boat is used on a piece of water, eg boathouse, moorings etc.
- 524. **Other**

x. Universal codes

- 888. New to map:
- 999. No longer on map:

6.2 VEGETATION RECORDING

6.2.1 General

In 1977/8, as part of the first ITE national sample survey, detailed information on plant species was collected from quadrats and from linear plots adjacent to some features (hedges, roads and streams). In 1988, a sub-sample of the original sites were re-recorded and changes noted. As a result of this work, the quadrats are to be resurveyed again in 1990 as part of a monitoring programme looking at changes in the quality of land cover types, as well as overall changes taking place.

As well as recording vegetation data from plots visited earlier, new plots are to be established which will give more information on specific elements of rural vegetation; these are concerned particularly with linear features and semi-natural habitat types.

Although the earlier plots will have to be relocated using mapped information only, all plots visited in 1990 will be permanently marked using metal plates; other information (including measurements, sketch maps, and aerial photographs) will assist in future plot location. These permanent markers will allow more accurate identification of plots in future surveys.

6.2.2 Method of recording vegetation

The survey requires recording from different sizes of vegetation plot and fuller descriptions of each are given below. However, the basic recording procedure is the same for all types of plot and a standardised recording sheet has been devised (Figure 2). It has the following sections:

- a) Header - information on the broad environmental and management attributes of the plot should be recorded, according to the parameters listed. Land use may be marked as N/A.
- b) Listed species - the main part of the form is taken up with a list of 200 common species of plants (herbs, grasses, bryophytes). Where any of these is present, then the species name should be

struck off and, when appropriate, the number of nested quadrat recorded. On completion of recording, the estimated cover % should be written against each species, using 5% cover categories.

- c) Unlisted species - a space remains at the foot of the form in which should be recorded the names, nested quadrat number, and cover %, for any other species which are not listed.

(It has been found that the species list from most plots is made up very largely from the species already listed on the recording form with perhaps 10% having to be added.)

In all cases a sketch should be included on the back of the recording sheet which shows the position of the plot and all relevant measurements and angles, as described below. All vascular plants should be recorded, together with a restricted list of bryophytes and lichens. The list of aggregates and restricted list is given in Tables 1 and 2. Species which cannot be easily identified should be collected and pressed for later identification. Mosses/lichens growing on rocks/trees should be ignored.

Estimates of cover should then be made within 5% categories. It is necessary to constantly check between partners that there is not a tendency to over or under estimate. Cover may be over 100% if several layers are present e.g. Pteridium over Agrostis. Species with less than 5% cover are not given cover values.

Cover of tree species, if rooted in the plot, should be recorded in the normal way; there is no need to record any difference between seedlings and adult trees. Tree species which are overhanging the plot should have cover recorded in the second % cover column.

"Bare ground" includes leaf litter and rock.

6.2.3 Plot types

The following types of plots are to be recorded in each square:

Quadrats

- X i. 5 x 200 m² quadrats - pre-positioned at random
 Y ii. 5 x 4 m² quadrats - to be placed in semi-natural vegetation types

Linear plots

- B iii. up to 5 linear boundary plots, in enclosed land only
 H iv. up to 2 linear hedgerow plots
 S/W v. up to 5 linear steamside plots
 R/V vi. up to 5 linear roadside plots

Of the 512 squares that will be surveyed in 1990, 128 will be 'new' and a further 128 will not have had vegetation plots recorded in them before. In these 256 squares, linear plots will not have been marked on maps; the surveyor will need to apply rules (given below) to identify the location of these features within the square.

i. **LARGE QUADRATS (X1 - X5)**

Location/Relocation

These large quadrats (200m² - "Wally plots") will be marked on the maps in advance, and should be located as accurately as possible. About half of them will have been recorded in 1977/8 and precise relocation is essential.

There will be instances where the land use has changed so that a vegetation quadrat is no longer appropriate eg a field has been developed into a housing estate. If the new land use is characterised by a vegetation in which a quadrat can be placed (eg golf-course) then the original position should be relocated and a quadrat should be recorded. Where the new land use clearly precludes the recording of vegetation, a new quadrat position should be selected as follows:

Locate a boundary between the developed area of land and the nearest acceptable land cover type; locate a position on that boundary which is nearest to the original plot; take 20 (twenty) paces in the opposite direction to the original plot; record full details of the changes involved.

Laying out and recording

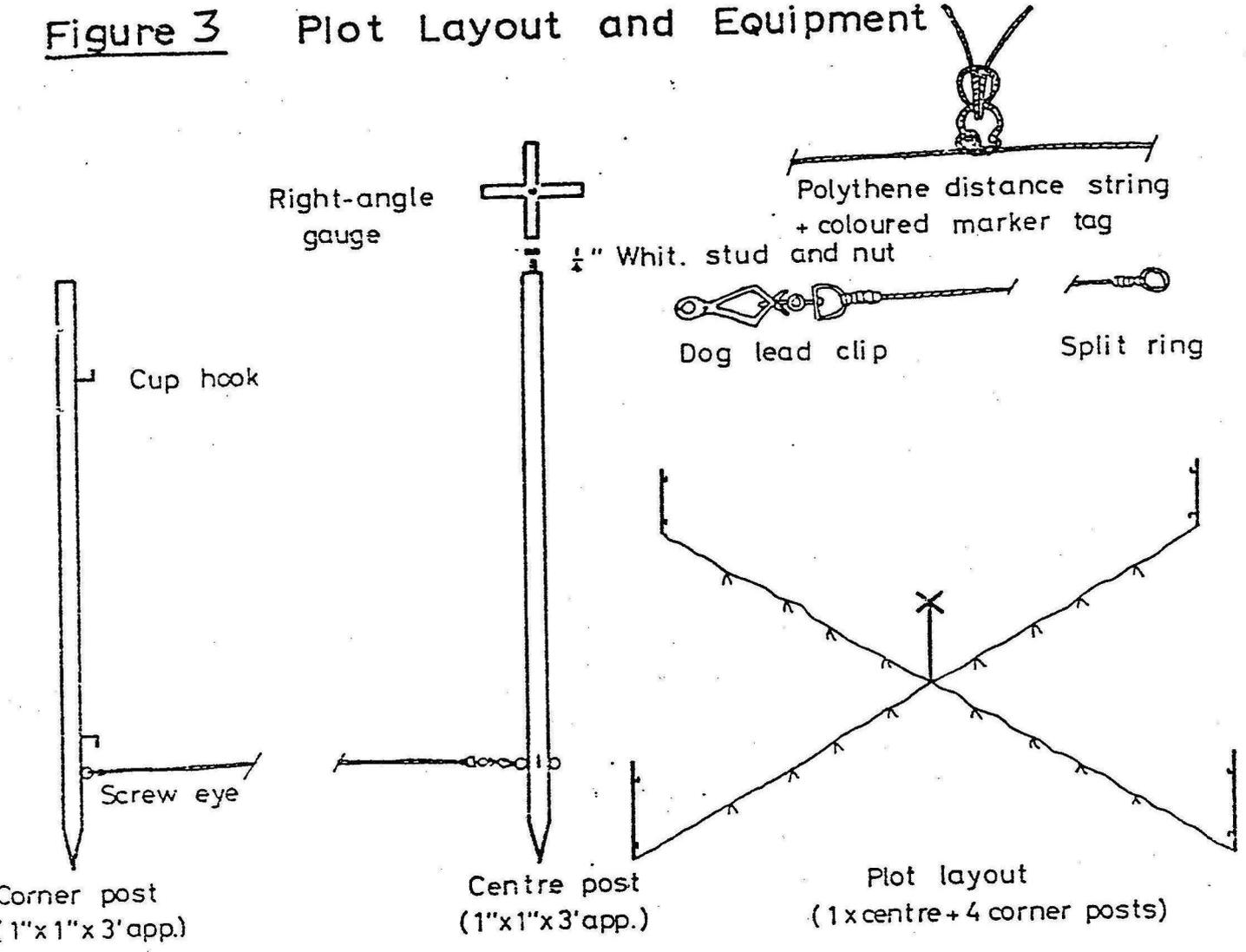
The vegetation plot is 200 m² and is set up by using the survey poles provided with the strings forming the diagonal of the square (Figure 3) The diagonals should be orientated carefully at right angles and the quadrat should be orientated with the strings on the North/South, East/West axes. The different plot size markings shown in Figure 3 are marked by different coloured strings on the appropriate position off the diagonal.

Details of the quadrat should be entered at the top of the recording form according to the prompts given. Any additional comments, not covered elsewhere, should be entered in the space provided.

Using the recording form provided, all species are recorded from the inner nested (4m²) quadrat first, either by striking out the species names on the "top 200" list or by adding species names at the bottom of the recording form. A "1" should then be recorded in the column headed "Q" to show that the species was recorded in the first quadrat. The cover, in 5% bands, should then be shown in the second column (marked "%").

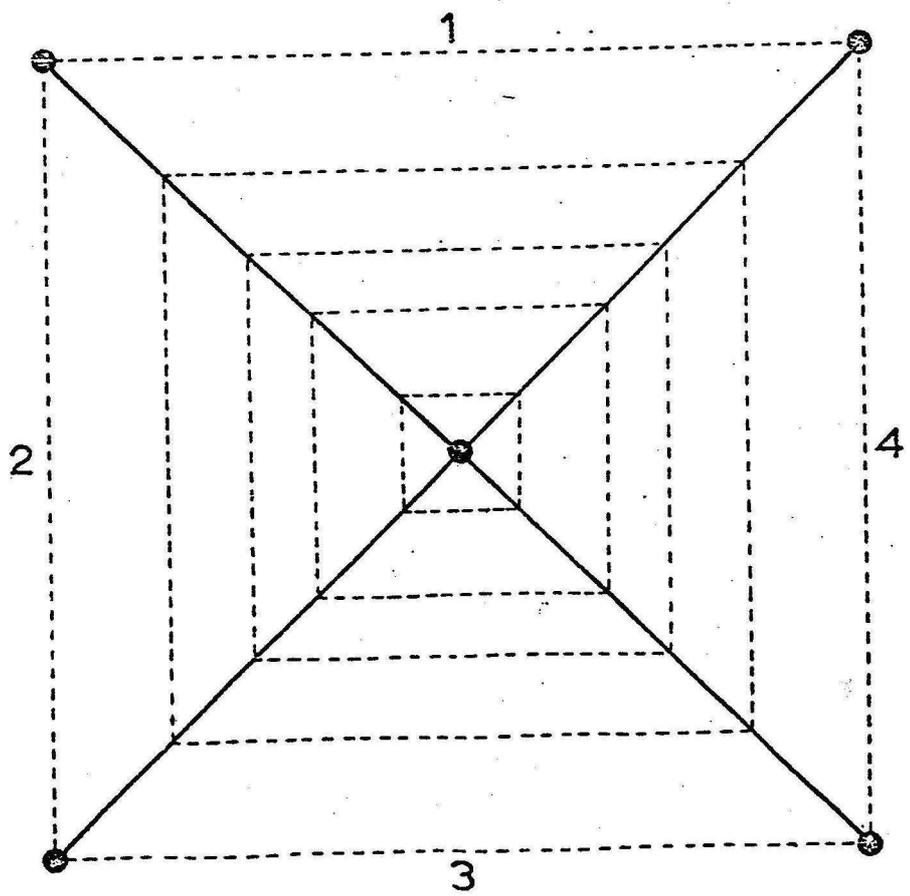
When the inner quadrat has been completed, the second nested quadrat should be examined and any additional species should be recorded using a "2" in the "Q" column. No cover estimate is made at this stage. The procedure continues until all sizes of quadrats have been recorded. Only after a final check for any missed recordings is a final overall cover estimate made for all species with a cover of 5% or more in the whole 200m² quadrat.

Figure 3 Plot Layout and Equipment



Sides

- 2.00m
- 5.00m
- 7.07m
- 10.00m
- 14.14m



Half-diagonals

- 1.42m
- 3.54m
- 5.00m
- 7.07m
- 10.00m

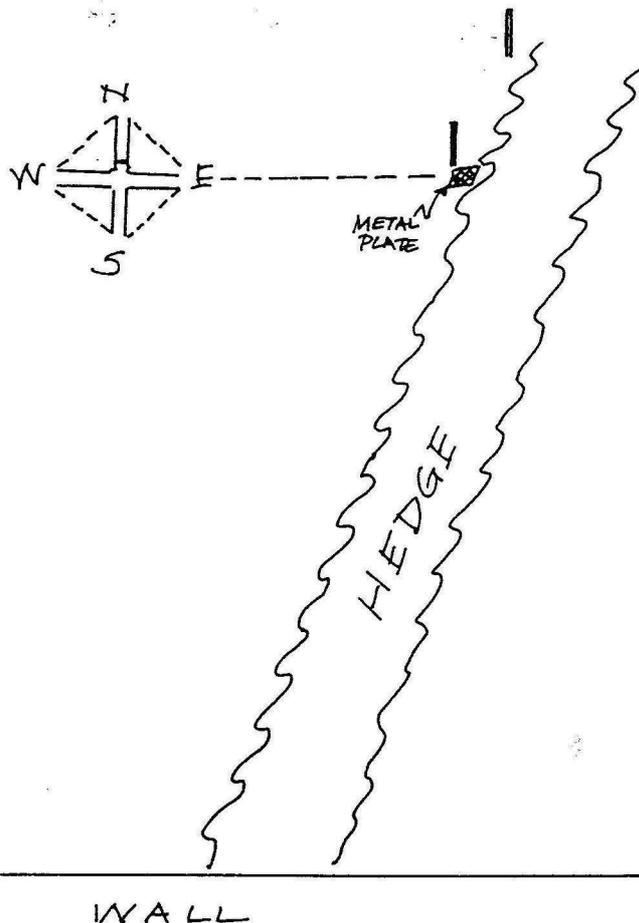
If the plot falls in a field with a growing crop (whether harvested or not) then the plot should be moved to the edge of the field nearest to the original position. The new plot should be taken as being a 14m square (estimated, not measured), starting 3 metres into the crop (to avoid any edge effect). Access should be made using drill lines where possible and causing minimum disturbance to the crop (or where the crop may be on a future visit). The species list should be compiled from what can be seen in the crop - accuracy is difficult to achieve but samples must be taken from arable crops however possible.

Permanent marking

Wherever possible, the quadrat should be marked with a metal plate immediately adjacent to the south corner of the quadrat. This should be possible in most unenclosed land and in woodlands. The plate should not be within the quadrat itself; it should be driven into the ground at an angle of 45 degrees until the top edge is just below ground level (aligned to give maximum likelihood of easy relocation with a metal detector). Wooden stakes may be suitable in woodlands and moorland situations where metal plates would be difficult to re-locate.

Elsewhere, in cultivated land or wet habitats, quadrats should be marked by inserting a plate at the nearest field boundary, along a cardinal bearing line (Figure 4). The distance of the boundary from the quadrat should be measured from the centre of the quadrat to the centre of the boundary. In semi-enclosed areas where plate burial is inappropriate and where boundaries are more than 100 metres away, there should be an attempt to mark the plot by reference to an obvious local feature, such as a boulder or tree where the plate should be buried (N.B. see Boundary Plots for definitions of field boundary)

Figure 4 - locating a Boundary plot



In all cases, the position of the quadrat, and marker plate(s) should be sketched on the reverse of the recording sheet, and annotated with distances (measured with a tape) and, if measurements are not possible, compass bearings. All distances should be measured from the centre of the plot to easily recognisable, and permanent, features in the surrounding landscape. A print photograph should be taken (see Photography).

ii. **SMALL QUADRATS (Y1 - Y5)**

Location/Relocation

Five small quadrats (2m x 2m) should be placed in natural or semi-natural land cover types in each square. They will be placed by the surveyor according to the following guidelines:

1. The five quadrats should be placed in five different land cover types, where these are available, additional to those types that have already been represented by the five large quadrats.
2. The plot locations should be determined after all land cover mapping has been completed. During the mapping phase, the presence of small areas of natural or semi-natural vegetation which are below the size of a minimum mappable unit should be noted (and mapped, if helpful). Land cover categories which are additional to the mapping codes might include:

Strandline vegetation
Dune slack
Dune grassland
Dune scrub
Machair
Inland saltmarsh
Inundation grassland
Ultrabasic vegetation
Calcareous flush
Acid/neutral flush
Bryophyte dominated springs
Montane heath
Rock ledges

3. If the total number of different semi-natural and natural land cover types exceeds five, then random numbers should be used to draw five types for sampling (remembering not to sample those already represented within the large quadrats). Where there is more than one area of a type, then the largest area should be chosen.
4. If there are fewer than five additional land cover types available in which to place the plots, then the placing of quadrats will be proportional to the size of land cover types available (ie the larger land cover types receive more quadrats). This can be done by dividing the areas of each type into "mappable areas" and comparing sizes. Positions of plots within each area can also be achieved by the use of a grid and random numbers.

5. In all cases, a complete record of suitable habitats should be recorded, together with the frequency of each. The five plot numbers should be indicated on the same list, as shown in the following example:

Chalk grassland	① ^{x-plot} 2 3 4 ⑤ ^{y5 (random)} 6
Fen	1 ② y1
Marsh	1 2 3
Decid. woodland	1 ② y2
Conif. woodland	① y3
Saltmarsh	① y4

Laying out and recording

The quadrat should be placed in the 'centre of gravity' of the habitat - this is a large element of judgement involved but efforts should be made to avoid bias in positioning of the plot. If the centre of gravity is not representative of the habitat type (eg rock boulder in middle of flush), then re-randomise the plot location.

If the plot is put into a linear feature within which a 2x2 m plot will not fit then the area should be made up to 4m² by extending the length - this should be clearly depicted with measurements in the sketch on the back of the recording sheet.

The survey poles should be used to mark out the corners of the quadrat by reference to the first set of marker strings (equivalent to the inner nested quadrat of the large quadrats). As with large quadrats, the poles should be orientated along north/south, east/west axes. However, in a linear feature, this may not be possible and the main axis of the plot should be measured and recorded.

The species present in the square should be recorded in the same way as for the inner nested quadrat of the large quadrats and a cover estimate made.

Permanent marking

In many cases it will be possible to place the plate immediately adjacent to the survey pole at the south point of the quadrat, but just outside (6") the quadrat boundary. If the plate has to be placed elsewhere, around the perimeter of the quadrat, then this should be clearly shown on the associated sketch.

If it is not possible to place the plate adjacent to the quadrat, then it should be placed at the nearest possible location and distances and angles measured to show the precise location.

iii. BOUNDARY PLOTS (B1 - B5)

General rules for linear (10 x 1m) plots:

1. No two linear plots of the same type should be placed within 10m of each other on the same linear feature.
2. No two linear plots of different types should overlap.
3. The 1 metre width should be measured across the surface of the terrain so that, on a bank, the true horizontal width, as viewed from above, would be less than 1 metre.

Location/Relocation

In enclosed land only, a boundary linear plot is to be recorded at the boundary marker of each of the 5 x 200m² quadrats (see Figure 4).

In this context, a boundary is taken to be any physical feature that has a length and which is an interface between the land cover of the 200m² plot and any other land cover type. This might include a hedge, wall, fence, ditch, embankment etc. It will not include land cover which is associated with the management practice of the field eg headlands.

In general the Boundary plot will take precedence over other types of linear plot. If two plots would otherwise end up in the same location, then the Boundary plot would be laid out and the other linear feature moved to the nearest permissible length of boundary which was at least 10m away. The exception is where a linear plot has previously been located in the same position as a Boundary plot would fall. In this case the Boundary plot would be moved to the next nearest length of boundary on a different cardinal bearing.

The marker plate for the 200m² plot should have been positioned at the boundary nearest to the plot and should be lying on one of the cardinal points of the compass, as measured from the centre of the plot.

Laying out and recording

The linear plot should be laid out with the marker plate on the right side of the plot when you are facing it from the field. In most cases the feature recorded will be vertical, ie. a hedge, wall or fence - in these cases the plot should be 1m from the centre of the feature. In some cases where there is no vertical feature, but a grass strip, the plate should be buried 1m in from the edge of the field (crop), and the linear plot should be recorded in the 1m adjacent to the edge.

Where the boundary is composed of several different elements eg hedge with ditch, then the laying out procedure should be decided by reference to the dominant vertical feature eg hedges/walls/fences are dominant to ditches which are dominant to grass strips. Once the dominant feature has been identified and the plot laid out accordingly, then recording takes place in the 1m strip, irrespective of whether it includes part of another linear feature. (N.B. different rules apply in the case of H, S/W, R/V plots - see below)

Boundary plots which are adjacent to large ditches or dykes should be located at the water's edge, and not at the top of the bank. Where a field is immediately adjacent to a curtilage, then the boundary plot should run from the curtilage into the field.

All species within the plot are recorded using standard recording forms and cover estimates made.

Permanent marking

The plot is already marked by the plate for the adjacent 200m². Note that the plot lies to the left of the marker when viewed from the field.

iv. HEDGEROW PLOTS (H1 - H2)

Location/Relocation

In the case of squares recorded in 1978, the original positions will be marked on the map - they should be relocated as closely as possible. If there is no longer a hedgerow at the position marked, then this should be indicated on the map and the plot should be moved to the nearest hedgerow - this new plot should be renamed (H3, H4) and marked on the map.

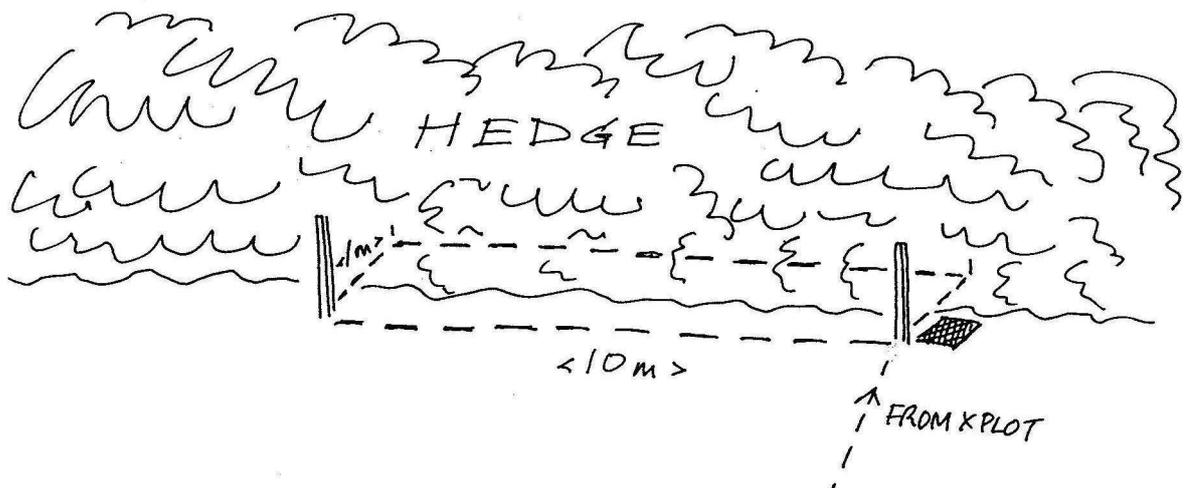
If one or both hedges are not marked on the map but hedges exist in the square, they should be added using the methodology developed in 1978 (see para 6.2.4). However 2 plots should not be nearer than 10m to each other, so if there is not more than 20m of hedge in the square, only one plot should be recorded.

In the case of squares which were not recorded in 1978, the position of these 2 plots should be located using the methodology developed in 1978, (see para 6.2.4). The plot should be on the side of the linear feature closest to the quadrat.

Laying out and recording

The position of the plots should be temporarily marked with a survey pole at each end, one metre out from the centre of the hedge (see Figure 5). A measuring tape can be used to mark the outer edge of the plot.

Figure 5 - laying out a hedgerow plot



If there is not a clear metre between the centre of the hedge and another linear feature, eg ditch, then the hedge should be relocated at the nearest permissible location.

All species should be recorded on the standard recording sheet and cover estimates made.

Permanent marking

Each plot should be permanently marked with a metal plate at the right hand end of the plot when you are facing it from the field - the location of the plate should be indicated on a sketch with distances from a marked feature, eg. gate.

v. **STREAMSIDE PLOTS (S1 - S2; W1 - W3)**

Streamside plots 10x1m (S1, S2)

Location/Relocation

In the case of squares recorded in 1978, the original positions will be marked on the map - they should be relocated as closely as possible. If the stream or ditch is dry then it should still be recorded, but noted on the recording sheet.

If one or both stream plots are not marked but streams, rivers or ditches exist in the square, they should be added using the methodology developed in 1978 (para 6.2.4). However 2 plots should not be nearer than 10m to each other, so if there is not more than 20m of stream/ditch/river in the square, only one plot should be recorded.

In the case of squares which were not recorded in 1978, the position of these 2 plots should be located using the methodology developed in 1978, (see para 6.2.4). The plot should be on the side of the linear feature closest to the quadrat.

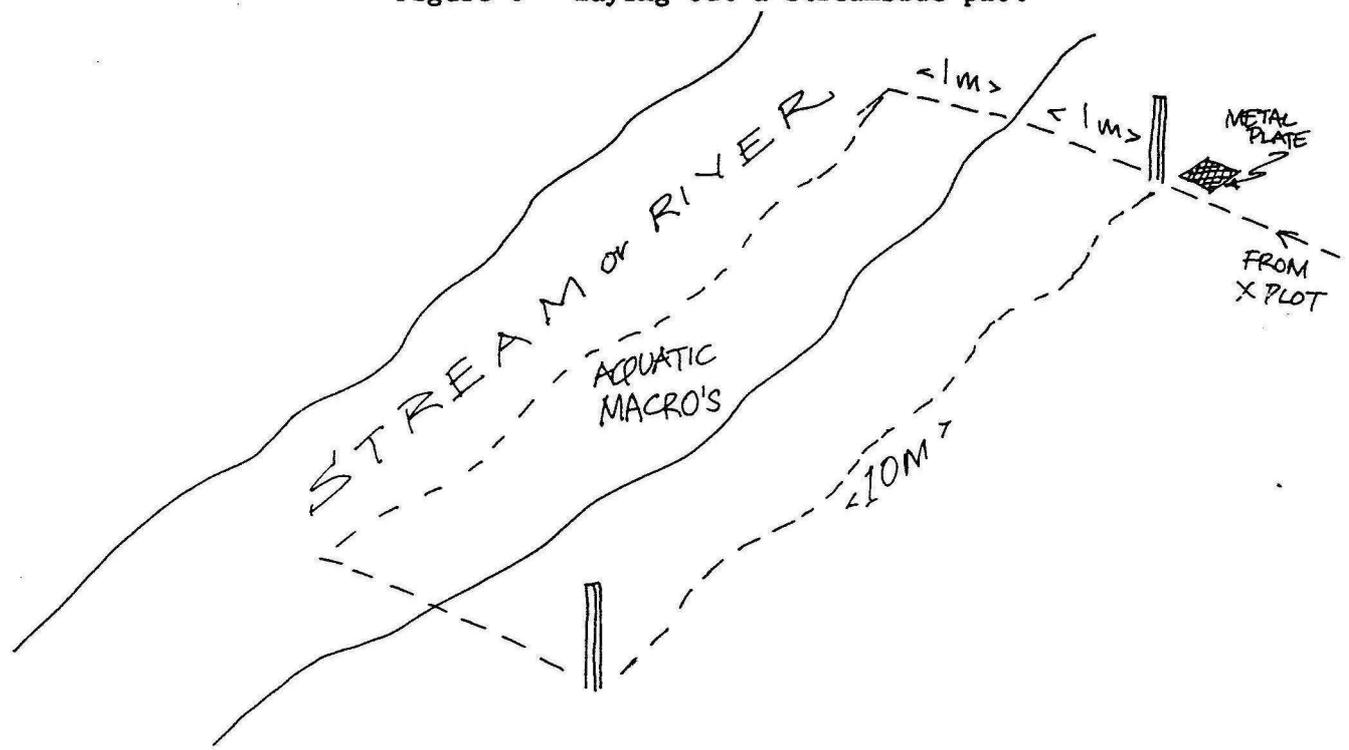
If the plot coincides with a Boundary plot, then it should be moved to the nearest permissible length of stream/river/ditch so that no part of the plot is within 10 metres of the Boundary plot.

Streams that have dried out in a temporary/seasonal drought, should be used if the usual presence of water has influenced the species composition of the streamside.

Laying out and recording

The position of the plots should be marked with a plate at the right end of the plot when you are facing it from the field (see Figure 6) - the location of the plate should be indicated on a sketch with distances from a marked feature, eg. gate.

Figure 6 - laying out a Streamside plot



The waterside edge of the plot should be along what appears to be the normal highest point that water reaches (ie excepting flood situations). All species found within a 1 metre width from this edge should be recorded and marked on the standard recording form with a "1" in the "Q" column.

In addition to the 10m x 1m plot, a further linear plot of the same size should be recorded on the water side, to record species which are rooted or floating in the water (not rooted on the bank of the stream/river) - species in this additional plot should be recorded using the standard form but with a "2" in the "Q" column. If the waterway is less than 1m wide then record additional species but also make a note of the average width of the waterway over the ten metres.

Extra wet (ditch/stream/river) plots - 10x1m - W1, W2, W3

If the existing stream plots (S1, S2) are within the area designated by IFE for the 'freshwater sample' (and satisfies the appropriate criteria) then this should be used as the freshwater sampling point.

However, if this is not the case, then the first priority in locating one of the 3 extra 'wet' linear plots, is that it should coincide with the site for recording the freshwater sample (which are marked on maps, usually as "W3"). If the plot marked on the IFE map coincides with a "S1" or "S2" plot, then the name should be changed on the IFE map.

If the site chosen for the IFE biota sample has to be moved, then the linear vegetation plot should be moved with it.

The other 'wet' plots should be used to ensure that different types of ditches/streams/ivers are sampled where they exist. If all types are not represented, then samples should be allocated according to the

total lengths of the different types present (ie the type with the longest length has most plots). If possible, the variation within more common types should be expressed in the choice of plots.

The following categories are recognised :

River or canalised river
Stream
Canal
Non-roadside ditch
Roadside ditch
(as defined for map codes 53 - 58)

Dry ditches should not be included. The first priority is to ensure that there is at least 1 plot in each category existing in the square, including the 2 original plots S1 & S2. The second priority is to include as much variation as possible so that lengths of stream with species assemblages not covered by the existing plots are sampled.

The plots should be located in the centre of that part of the 'waterway' type which lies within the square. If there is only one type of waterway then all 5 plots should be placed along its length, providing that it is long enough to put them more than 10m apart. The plots should not be put within 10m of each other.

The position of these plots must be marked with plates and sketched as for S1 & S2. The type of ditch/stream/river adjacent to the plot should be indicated on the recording sheet.

Aquatic species in the adjacent metre should be recorded in the same way as for S1/S2 plots.

vi. **ROADSIDE PLOTS (R1 - R2; V1 - V3)**

Roadside plots 10x1m (V1, V2)

Location/Relocation

In the case of squares recorded in 1978, the original positions will be marked on the map - they should be relocated as closely as possible. If one or both verges are not marked but road verges exist in the square, they should be added using the methodology developed in 1978 (para 6.2.4). However 2 plots should not be nearer than 10m to each other, so if there is not more than 20m of road verge in the square, only one plot should be recorded.

In the case of squares which were not recorded in 1978, the position of these 2 plots should be located using the methodology developed in 1978 (para 6.2.4).

Verge plots should not be located where the verge is less than 1m wide; instead the nearest verge with a 1 metre width should be located.

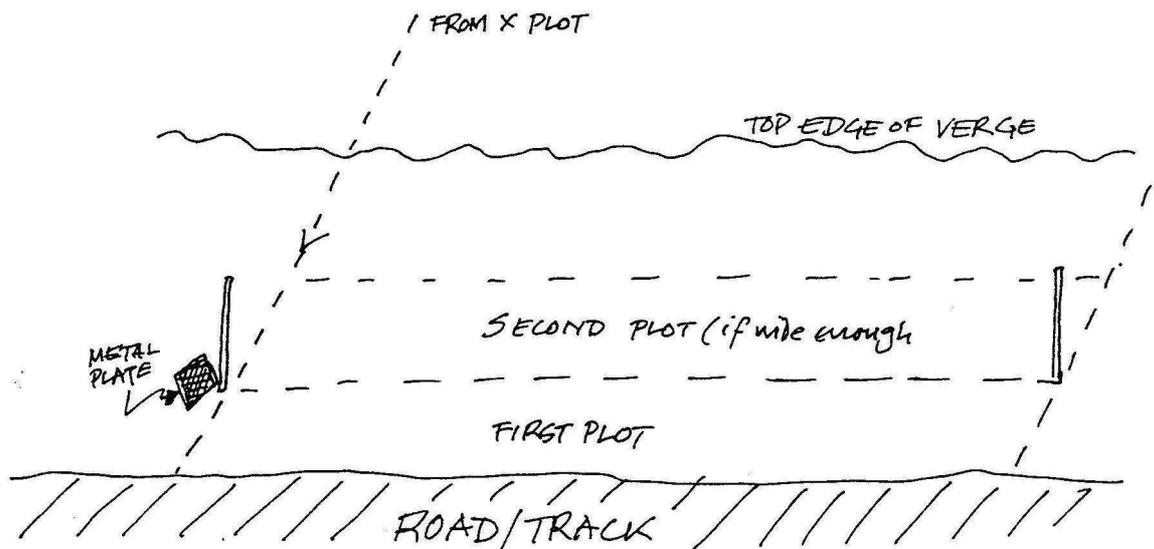
Laying out and recording

The position of the plots should be marked with a plate at the right end of the plot when you are facing it from the field (see Figure 7) - the location of the plate should be indicated on a sketch with distances from a marked feature, eg. gate. As it may be necessary to

move the plot to the other side of the road (because the first verge is not wide enough) it should be made clear which side of the road is recorded. (In such cases, the plate is still on the right hand side of the plot when viewed from the X plot).

The roadside edge of the plot should start at the interface between soil and tarmac, not where overhanging vegetation starts.

Figure 7 - laying out a Roadside plot



Where the verge is more than 2m wide (from the edge of the road, to 1m from the centre of the next feature, ie. hedge, wall, fence) then a supplementary verge plot should be recorded adjacent to the first to sample the vegetation between 1m and 2m from the roadside. However, only additional species should be recorded and a number '2' recorded in the "Q" column of the standard recording sheet. If there are no additional species, then this should be noted accordingly.

Extra verge plots - 10x1m - V1, V2, V3

Three further verge plots should be used to ensure that different types of roads and tracks are sampled where they exist. The following categories are recognised :

- i. 'A' and 'B' roads including dual carriageways (red and brown)
- ii. Yellow roads if tarmac
- iii. Constructed tracks and non-tarmac roads

(motorways are excluded from this classification)

The first priority is to ensure that there is at least 1 plot in each category of road present in the square, including the 2 original verge plots R1 & R2. The second priority is to include as much variation as possible so that lengths of verge with species assemblages not covered by the existing plots are sampled. The plots should be located in the

centre of the verge type. If there is only one type of verge then all 5 plots will be on that verge, providing that it is long enough to put them more than 10m apart.

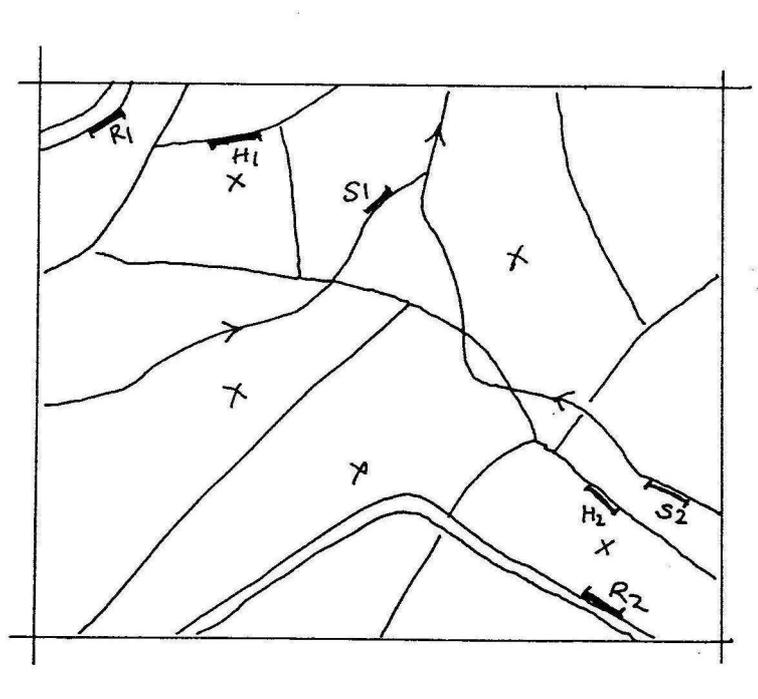
The position of these plots must be marked with plates and sketched as for R1 & R2.

The type of road or track adjacent to the plot should be indicated on the recording sheet. Additional species should be recorded from a second linear plot on wide verges, as for R1/R2 plots.

6.2.4 1978 Rules for locating linear plots

The linear plots (2 each for hedgerows, streamsides and roadsides) are 10 x 1 m; they should be located as close as possible to the two large quadrats (200m²) which are furthest apart (see Figure 8). They must then be marked on the map provided.

Figure 8 - location of linear plots in 1977/78



On reaching the linear feature, from the 200m² quadrat, the 10m plot is laid out to the left and the width is defined as follows:

- Hedgerows: the 1m width extends out towards the field from the centre of the hedge.
- Roadsides: the 1m width extends inwards from the edge of the road edge.
- Streamsides: the 1m width extends landwards from the point where it appears that water reaches when the watercourse is full (but not flooded).

Only permanent water courses should be included; ditches may be included if they appear to be normally wet.

Where the nearest feature is ineligible (because it is not wide enough, or is confused by the presence of a different type of linear within its width) then a new location should be chosen at the nearest permissible position. Any changes should be noted and clearly marked on sketch maps.

6.2.5 Guidelines on species identification

Using the same criteria as were used in 1978, the following section gives some guidelines on species identification.

Surveyors are expected to record to the species level. However, there are certain species which are notoriously difficult to separate out from closely related examples of the same genus. It is therefore necessary, in order to remain consistent with previous surveys, to allow certain combinations to be recorded.

The combinations were determined on the basis of experience, where it is considered that unless good specimens are available it is not possible to identify the species accurately. A number of the species combinations have similar ecological amplitudes e.g. *Cardamine hirsuta/flexuosa*. The following are acceptable combinations:

Arctium sp
Betula sp
Callitriche sp.
Cardamine hirsuta/flexuosa
Epilobium tetragonum/obscurum
 Small *Euphorbia* sp
Euphrasia sp
Hieracium sp (except *pilosella*)
Juncus articulatus/acutiflorus
Luzula multiflora/campestris
Mentha sp
Myosotis sp
Poa trivialis/nemoralis
Polygala serphyllifolia/vulgaris
Quercus sp
Rhinanthus sp
Rosa sp (except *R arvensis*, *R pimpinellifolia*)
Rumex conglomeratus/sanguineus
Sagina sp
Taraxacum sp
Viola riviniana/reichenbachiana
Viola hirta/odorata
 Non suckering elms (*U glabra*)
 Suckering elms (*U procera*)

Only the following Bryophytes and Lichens should be recorded (with individual cover values).

<i>Calycierson cuspidatum</i>	<i>Lophocolea</i> spp.
<i>Atrichum undulatum</i>	<i>Mnium hornum</i>
<i>Aulacomnium palustre</i>	<i>Mnium undulatum</i>
<i>Brachythecium rutabulum</i>	<i>Pellia</i> spp.

Breutelia chrysocoma	Peltigera canina
Bryum spp.	Philonotis
Campylopus atrovirens	Plagiothecium undulatum
Campylopus pyriformis/flexuosa	Pleurozium schreberi
Cladonia arbuscula	Polytrichum commune
Cladonia impexa	Polytrichum formosum
Cladonia pyxidata/coccifera	Polytrichum juniperinum/piliferum
Cladonia uncialis	Pseudoscleropodium purum
Dicranella heteromalla	Rhacomitrium lanuginosum
Dicranum majus	Rhytidiadelphus loreus
Dicranum scoparium	Rhytidiadelphus squarrosus
Drepanocladus	Rhytidiadelphus triquetrus
Eurhynchium spp.	Sphagnum (green/fat/hooded)
Fissidens	Sphagnum (green/thin)
Hylocomium splendens	Sphagnum (red/fat)
Hypnum cupressiforme	Sphagnum (red/thin)
Leucobryum glaucum	Thuidium tamariscinum

The 200 most frequent species in the ITE 1977/78 survey are listed on the field recording sheets; they are abbreviated and their full names are as follows:

CROPS :

213	BARLEY	Hordeum vulgare
454	WHEAT	Triticum aestivum

GRASSES :

8	Agro rep	Agropyron repens (Elymus repens)
10	Agro can	Agrostis canina
11	Agro sto	Agrostis stolonifera
12	Agro ten	Agrostis tenuis (A.capillaris)
20	Alop gen	Alopecurus geniculatus
21	Alop pra	Alopecurus pratensis
28	Anth odo	Anthoxanthum odoratum
37	Arrh ela	Arrhenathrum elatius
562	Aven fat	Avena fatua
55	Brac syl	Brachypodium sylvaticum
58	Brom mol	Bromus mollis (B.hordeaceus)
61	Brom ste	Bromus sterilis
123	Cyno cri	Cynosurus cristatus
124	Dact glo	Dactylis glomerata
129	Desc ces	Deschampsia cespitosa
130	Desc fle	Deschampsia flexuosa
165	Fest ovi	Festuca ovina
166	Fest rub	Festuca rubra
209	Holc lan	Holcus lanatus
210	Holc mol	Holcus mollis
253	Loli mul	Lolium multiflorum
254	Loli per	Lolium perenne
283	Moli cae	Molinia caerulea
287	Nard str	Nardus stricta
304	Phle pra	Phleum pratense
319	Poa ann	Poa annua
321	Poa pra	Poa pratensis
847	Poa triv	Poa trivialis
404	Sieg dec	Sieglingia decumbens (Danthonia d.)

SEDGES, RUSHES :

74	Care bin	Carex binervis
76	Care dem	Carex demissa
78	Care ech	Carex echinata
81	Care nig	Carex nigra
85	Care pan	Carex panicea
86	Care pil	Carex pilulifera
152	Erio ang	Eriophorum angustifolium
153	Erio vag	Eriophorum vaginatum
228	Junc a/a	Juncus articulatus/acutiflora
230	Junc bul	Juncus bulbosus
231	Junc con	Juncus conglomeratus
232	Junc eff	Juncus effusus
235	Junc squ	Juncus squarrosus
260	Luzu c/m	Luzula multiflora/campestre
443	Tric cae	Trichophorum caespitosum (Scirpus caespitosus)

FERNS :

41	Athy fil	Athyrium filix-femina
53	Blec spi	Blechnum spicant
851	Dryo dil	Dryopteris dilatata
138	Dryo fil	Dryopteris filix-mas
147	Equi arv	Equisetum arvense
348	Pter aqu	Pteridium aquilinum

FORBS/WOODY SP.:

2	Acer pse	Acer pseudoplatanus
4	Achi mil	Achillea millefolium
5	Achi pta	Achillea ptarmica
18	Alli pet	Alliaria petiolata
26	Ange syl	Angelica sylvestris
29	Anth syl	Anthriscus sylvestris
587	Arum mac	Arum maculatum
47	Bell per	Bellis perennis
50	Betu sp.	Betula spp.
64	Call vul	Calluna vulgaris
68	Camp rot	Campanula rotundifolia
69	Caps bur	Capsella bursa-pastoris
70	Card h/f	Cardamine hirsuta/flexuosa
71	Card pra	Cardamine pratensis
92	Cent nig	Centaurea nigra
96	Cera hol	Cerastium holosteoides (C.vulgatum, C.fontanum)
97	Cham ang	Chamaenerion angustifolium (Epilobium angustifolium)
98	Chen alb	Chenopodium album/polyspermum
101	Chry opp	Chrysosplenium oppositifolium
103	Cirs arv	Cirsium arvense
104	Cirs pal	Cirsium palustre
105	Cirs vul	Cirsium vulgare
113	Cono maj	Conopodium majus
114	Conv arv	Convolvulus arvensis
117	Cory ave	Corylus avellana
118	Crat mon	Crataegus monogyna
121	Crep sp.	Crepis spp.
590	Dact mac	Dactylorhiza maculata agg.
132	Digi pur	Digitalis purpurea
136	Dros rot	Drosera rotundifolia

140	Empe nig	Empetrum nigrum
141	Endy non	Endymion non-scriptus (Hyaeinthoides n-s)
143	Epil hir	Epilobium hirsutum
747	Epil mon	Epilobium montanum
144	Epil pal	Epilobium palustre
150	Eric cin	Erica cinerea
151	Eric tet	Erica tetralix
160	Euph sp.	Euphrasia spp.
168	Fili ulm	Filipendula ulmaria
170	Frax exc	Fraxinus excelsior
177	Gali apa	Galium aparine
182	Gali pal	Galium palustre
183	Gali sax	Galium saxatile
190	Gera mol	Geranium molle
193	Gera rob	Geranium robertianum
195	Geum urb	Geum urbanum
197	Glec hed	Glechoma hederacea
204	Hede hel	Hedera helix
206	Hera sph	Heracleum sphondylium
207	Hier pil	Hieracium pilosella
208	Hier sp.	Hieracium spp.
220	Hype pul	Hypericum pulchrum
223	Hypo/Leo	Hypochaeris spp./Leontodon spp.
238	Lami alb	Lamium album
239	Lami pur	Lamium purpureum
240	Laps com	Lapsana communis
243	Lath pra	Lathyrus pratensis
255	Loni per	Lonicera periclymenum
256	Lotu cor	Lotus corniculatus
273	Matr mat	Matricaria matricarioides (Chamomilla suaveolens)
277	Merc per	Mercurialis perennis
286	Myri gal	Myrica gale
288	Nart oss	Narthecium ossifragum
296	Oxal ace	Oxalis acetosella
302	Pedi syl	Pedicularis sylvatica
307	Pice sit	Picea sitchensis
311	Ping vul	Pinguicula vulgaris
315	Plan lan	Plantago lanceolata
316	Plan maj	Plantago major
833	Poly vul	Polygala vulgaris
324	Poly avi	Polygonum aviculare
328	Poly per	Polygonum persicaria
336	Pote ans	Potentilla anserina
337	Pote ere	Potentilla erecta
339	Pote rep	Potentilla reptans
342	Prim vul	Primula vulgaris
343	Prun vul	Prunella vulgaris
346	Prun spi	Prunus spinosa
350	Quer sp.	Quercus spp.
351	Ranu acr	Ranunculus acris
354	Ranu fic	Ranunculus ficaria
355	Ranu fla	Ranunculus flammula
357	Ranu rep	Ranunculus repens
370	Rosa sp.	Rosa spp.
373	Rubu fru	Rubus fruticosus
376	Rum a'la	Rumex acetosa
375	Rum a'sa	Rumex acetosella
837	Rume con	Rumex conglomeratus
378	Rume cri	Rumex crispus

380	Rume obt	Rumex obtusifolius
381	Sagi sp.	Sagina spp.
386	Samb nig	Sambucus nigra
401	Sene jac	Senecio jacobaea
402	Sene vul	Senecio vulgaris
405	Sile dio	Silene dioica
413	Sonc asp	Sonchus asper
414	Sonc ole	Sonchus oleraceus
415	Sorb auc	Sorbus aucuparia
420	Stac syl	Stachys sylvatica
421	Stel als	Stellaria alsine
423	Stel hol	Stellaria holostea
424	Stel med	Stellaria media
427	Succ pra	Succisa pratensis
430	Tara agg	Taraxacum agg.
845	Thym dru	Thymus drucei (Thymus praecox arcticus)
441	Tori jap	Torilis japonica
446	Trif dub	Trifolium dubium
448	Trif pra	Trifolium pratense
449	Trif rep	Trifolium repens
841	Trip mar	Tripleurospermum maritimum
458	Ulex eur	Ulex europaeus
462	Urti dio	Urtica dioica
463	Vacc myr	Vaccinium myrtillus
467	Vero arv	Veronica arvensis
469	Vero cha	Veronica chamaedrys
471	Vero off	Veronica officinalis
490	Vero per	Veronica persica
472	Vero ser	Veronica serpyllifolia
477	Vici sep	Vicia sepium
482	Viol pal	Viola palustris
849	Viol r/r	Viola riviniana/reichenbachiana

MOSESSES/LICHENS :

850	Brac sp.	Brachythecium sp.
512	Clad imp	Cladonia impexa
106	Clad pyx	Cladonia pyxidata/coccifera
513	Clad unc	Cladonia uncialis
519	Dicr het	Dicranella heteromalla
131	Dicr sco	Dicranum scoparium
161	Eurh sp.	Eurhynchium spp.
216	Hylo spl	Hylocomium splendens
222	Hypn cup	Hypnum cupressiforme
530	Loph sp.	Lophocolea spp.
280	Mniu hor	Mnium hornum
282	Mniu und	Mnium undulatum
535	Pell sp.	Pellia spp.
314	Plag und	Plagiothecium undulatum
318	Pleu sch	Pleurozium schreberi
331	Poly com	Polytrichum commune
843	Poly jun	Polytrichum juniperinum
279	Pseu pur	Pseudoscleropodium purum
543	Rhac lan	Rhacomitrium lanuginosum
364	Rhyt lor	Rhytidiadelphus loreus
365	Rhyt squ	Rhytidiadelphus squarrosus
558	Spha g/f	Sphagnum (green/fat)

- 559 Spha g/t Sphagnum (green/thin)
- 561 Spha r/t Sphagnum (red/thin)
- 439 Thui tam Thuidium tamariscinum

7. SAMPLING

There are two types of samples that should be collected from each sample square, where possible:

- i. Freshwater biota from flowing waters (the IFE sample)
- ii. Freshwater biota from standing water bodies (the NELUP sample)

7.1 The procedure for collecting freshwater biota samples from flowing waters (on behalf of the Institute of Freshwater Ecology) is fully described in a separate handbook.

7.2 The second freshwater sample is to be collected from static water on behalf of staff working within the NERC/ESRC Land Use Programme (NELUP) at Newcastle University. Although various biota will be sampled, the exercise is based on the collection of water beetles.

From each square, two samples should be taken from available standing waters, and preferably from those which are vegetated. The samples should be chosen from the following list of standing water locations and should be chosen, where possible, to reflect the two most characteristic water habitats of the square:

- a) Lakes/Lochs: these are not ideal as they are usually affected by wave action leading to lack of surface vegetation and often have a bare substrate.
- b) Ponds: these are ideal especially if partially or wholly vegetated and with a mud/silt substrate
- c) Dried-up streams: pools of water which remain are good sampling points
- d) Dried-up or stagnant ditches: good sampling points
- e) Calcareous flushes:
- f) Acid flushes:
- g) Sphagnum bog: even if there appears to be no water present, a puddle can be formed by standing on the bog - beetles are likely to collect in such pools.
- h) Vehicle tracks/ Animal prints: any depression in mud which has filled with water for a time will form a good site for sampling.

The positions of the sample points should be clearly marked on the same map as is used to indicate the IFE sample point. The sites should be marked as NEL1 and NEL2. A one-line description of each NELUP site should be written on the back of this sheet, giving a brief description of the size and type of feature which has been sampled.

Samples of biota should be taken using a sieve and placed in the tray provided. Each sample should involve a maximum of 10 minutes searching

time. After removal of unwanted matter from the tray, the sample should be placed in the plastic bottle and formalyn added. A label should be placed in the bottle giving:

- i. square number
- ii. date
- iii. name of the surveyor.

The bottle should also be marked with the same information (using a black permanent marker pen) and wrapped in two plastic bags.

Arrangements should be made to transport bottles back to ITE Merlewood as soon as is possible.

8. PHOTOGRAPHY

Print films should be used to photograph every vegetation plot in order to show its general appearance and its position relevant to local landmarks or features.

The plot number (X3, V2 etc) should be written on the plastic board provided and should be placed in a prominent position at the edge of plot, preferably covering the position of the marker plate.

PROCEDURES SUBSEQUENT TO SURVEY

At the end of a day's surveying, it is advisable to read through the data sheets and check that no feature has been omitted.

If absolutely essential, then the data may be transposed onto fresh maps and recording forms but this is inadvisable and should only be carried out in the event of damage or spoiling of the original map.

Arrangements should be made to transport FABs, and samples, back to ITE Stations as soon as possible.

Colin Barr
May 1990 (Revised February 1991)