CHANGES IN KEY HABITAT: SURVEYS OF CHALK & LIMESTONE GRASSLAND, COASTAL, AND UPLAND LANDSCAPES

FIELD HANDBOOK

May 1993

Draft 3
23 May 1993

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1. INTRODUCTION

1.1 Land use research has become an area of scientific and political interest during the last decade. The Natural Environment Research Council (NERC) has listed the major aims of land use research as: to classify land according to its capability and quality, for different purposes; to determine the constraints on land use; to assess the sustainability and consequences of land use; to test which combinations of land use are most suitable for particular areas; to monitor change in land use and quality; and to provide a basis for policies which optimise the environmental, social and economic benefits of changes in land use. Data collection is clearly essential in order to provide inputs to all areas of land use research.

1.2 ITE has carried out three major surveys of GB to gather data on the natural environment; these 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. The third formed a contract to ITE, part-funded by NERC, DOE and the former NCC, and was known as "Countryside Survey 1990" (CS1990). This project, by far the largest of the three, included field surveys of land cover, landscape features and vegetation plots. It also included soil surveys of all sample squares and was linked to a project mapping the land cover of GB using satellite imagery.

1.3 In all three field surveys, a sample unit of 1 x 1 km square has been used. In 1978, eight squares were drawn from each of the 32 ITE 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). The same squares were surveyed in 1990 and an additional 124 squares were added to the sample, being allocated to Land Classes in proportion to their size, and giving a total of 508 squares. A further 25 essentially urban squares were also surveyed as a separate subproject. These three surveys are known as the ITE Countryside Surveys.

1.4 Data collected from these 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 surveys has allowed quantitative assessments of recent changes in the countryside to be made. The survey data have also been used in a series of contract projects, forming a basis for modelling the rural environment.

1.5 Although the ITE Countryside Surveys provide comparatively up to date information on general changes in the British Countryside, the sample-based system has not been developed to yield data on rarer, or specialised, habitats. To complement the Countryside Surveys, DOE have commissioned ITE to carry out additional surveys work into habitats which are perceived to be under threat, or which represent areas of concern to the Department. These broadly correspond to the five Landscape Types as defined by the Countryside Commission's Stewardship Scheme:

i) Lowland heath
ii) Chalk and limestone grasslands
iii) River valleys and waterside landscapes (lowlands)
iv) Coasts
v) Uplands

1.6 The objectives of the project, paraphrased from the schedule of work, are:

For each Landscape Type:

i. Assess the distribution in England

ii. Survey habitats and historic features and determine quantity and quality of these features

iii. Assess the effects of current designation on the preservation of these features

iv. Develop conceptual models to predict the effects of changes (eg climate, policy) on distribution of the Landscape Type

v. Recommend policy refinements which would increase protection

vi. Develop methodologies to measure change

1.7 The first of the Landscape Types, lowland heath, was surveyed in late summer 1992, with a report to be produced in late 1993. Chalk & Limestone grassland, coastal and upland landscape types will be surveyed during 1993 and the project concludes in 1994. To provide essential background data for monitoring change, the survey includes sites which have potential to support the relevant habitats, given appropriate management.

1.8 Although the survey approach is a compromise designed to achieve a number of goals, Landscape Types, it has the advantage of being broadly objective, and reproducable, and is more or less compatable with previous Countryside Surveys. This is essential if these rarer habitats are to be related to changes taking place in the wider countryside.

1.9 An important lesson that has been learned from previous ITE surveys is that variation in field recording (observer bias) 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, a Quality Assessment (QA) programme was carried out to check on the consistancy of approach. Many lessons were learned from this exercise and a comprehensive and unambiguous Field Handbook was shown to be a vital prerequisite to survey.

1.10 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. A set of definitions of features to be

surveyed 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.

1.11 Further information on the ITE surveys, and on the way the list of sample squares for lowland heath survey has been derived, is available from ITE, Merlewood Research Station, Grange over Sands, Cumbria. LA11 6JU.

2. SURVEY LOGISTICS

2.1 The 1993 field survey will involve a sample of 60 1km squares from chalk & limestone grassland (hereinafter called calcareous grassland) landscapes, a further 60 squares from coastal landscapes and 40 from upland landscapes.

2.2 For each landscape type, the squares have been selected randomly within various strata, to provide a representative sample of England. All landscape types are stratified into 'designated' and 'non-designated' status. Upland landscapes are further sub-divided into 'marginal uplands' and 'true uplands' on the basis of the ITE Land Classification. Calcareous landscapes are stratified into 'chalk and soft limestone' and 'hard limestone' types and the coastal landscapes are divided into 'hard', 'soft' and 'estuary' types.

2.3 There will be two regional survey teams, one working in the north of England and one in the south and each team will cover all of the landscape types in the region. Each survey team will comprise three pairs of surveyors and one Field Manager. The order of survey will depend on a variety of factors and will be decided by the Field Managers.

2.4 Each square is reckoned to take between two and three team-days to survey. The day-to-day working arrangements are in the hands of the Field Managers and will be guided by the following principles:

a. Each survey team will comprise two persons who are expected to work closely together.

b. The survey teams are expected to be reasonably flexible in their working arrangements and, similarly, the Field Manager will be sympathetic to requests for leave of absence for special occasions, when possible.

c. Travelling 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 but any large accumulations of overtime will be compensated by 'time off in lieu'. Surveyors are advised to keep a record of their hours.

d. The costings of the project are based on the assumption that accommodation will be required for five nights each week, and that surveyors will meet on a Sunday night so that a prompt start can be made on Monday mornings.

e. By arrangement, a team of two persons may work for a weekend and take two days off in lieu. However, to ensure that surveyors have some break from their work, no two consecutive weekends should be worked.

f. During the week, surveyors are expected to stay in the same area each night so that they can meet to discuss progress; species records can be compared and checked, if time permits. As far as possible, accommodation will be arranged in advance by the Field Managers.

3. EQUIPMENT

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

3.2 Equipment may be divided into two categories:

i) provided by Merlewood

- Recording booklets (FAB's)
- Maps of the site (1:10,000)
- Aerial photographs of the site (where available)
- Handouts (explaining project and Land Use Group)
- Weatherproof clipboards
- Metal marker plates
- Hammer
- Navigation equipment
- Measuring tape (50 metre)
- Identity card
- Maps to locate sites
- Pencils and rubber
- Camera
- Print films
- First Aid kit
- Whistle
- Dry-board and pens
- Ranging poles
- Wooden stakes
- Plot poles
- Skewers
- Protractors
- Rucksack

ii) provided by surveyor

- Personal waterproof clothing etc.
- Reference books (if available)
- Binoculars (if available)
- Hand lens

4. PERMISSIONS

4.1 There are several reasons why permission to access land must be obtained. 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. In no circumstances should on-the-site survey be carried out where access has not been agreed.

4.2 Where possible, early contact has already been made with owners of sites (especially where English Nature have an interest). The Field Manager will arrange permissions for access on a weekly basis and surveyors must satisfy themselves that permissions have been obtained before proceeding with survey.

4.3 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 always carry their ITE identity card.

4.4 If access to any part of the square (except arable) is refused, then survey of the square should be abandoned. If only access to arable land is refused, then an attempt should be made to record the crops at the relevant grid points, from neighbouring land.

4.5 If permission to access land is refused, surveyors should contact the Field Manager as soon as is possible and arrange to start surveying a new site. Details of a replacement square will be provided in due course.

5. GENERAL FIELD SURVEY PROCEDURE

5.1 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 motorised access permits), assess likely problems and generally acquaint themselves with the area.

b. Although permissions for access will usually have been obtained in advance (by the Field Manager), surveyors will be informed if contact with farmers or landowners is required on the day of survey. This should be done before commencing survey.

c. A suitable route should be chosen which will allow a full and detailed examination of the whole square. Barriers, such as large rivers, should be noted to optimise travelling around the 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.

5.2 For some sites (and eventually for all) aerial photographs will be available. These will be useful aids to locating positions on the ground and should not be used in any other way during field survey.

5.3 Aerial photographs should be protected against weather and should not be marked in any way. They must be returned to ITE Merlewood by the end of the survey.

6. THE FIELD ASSESSMENT BOOKLET (FAB)

6.1 For each square, the data recording forms, together with their 1:10,000 scale 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.

6.2 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.

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

i. The square series number should be recorded on every page.

ii. Where possible, a pencil should be used - mistakes can then be erased and waterproofing is enhanced.

relating to mapping specifically:

iii. 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.

iv. Dotted lines after a coded category are intended to invite further information e.g. what type of quarry/mine or what sort of race track, etc.

v. Note the guidelines below for recording information in woodlands and immediately adjacent to non-agricultural curtilages.

6.4 The FAB should contain the following pages:

Front cover
Map of area at 1:50,000 scale - for information
Ownership map
Farmer/Landowner information page
Land cover map and recording form
Boundaries map and recording form
Historical features map and recording form
Up to 15 plot recording forms

Front cover of the FAB

6.5 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 location.

Ownership

6.6 This page will usually be completed by the Field Manager but, for information, guidelines on its use are given here.

6.7 As explained previously, permission must be obtained before survey commences. 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.

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

6.9 While recording ownership information, the letter "T" should be written against the name of tenant farmers.

6.10 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.

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

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

Farmer/Landowner information

6.13 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.

6.14 The clipboard should not be much in evidence but notes should be made, or a summary of the conversation recorded, on leaving the premises.

7. DATA COLLECTION

7.1 The Changes in Key Habitat Survey will record three types of data in each 1km sample square:

1. codes describing land cover and the nearest boundary at 16 points on a grid
2. species presence and cover in plots, of various types
3. descriptions of any archeological sites/features

8. RECORDING LAND COVER AND BOUNDARIES

8.1 To obtain quantitative information on land cover and vertical boundaries from each sample square, the land cover at each of a regular grid of 16 or 25 points (depending on the landscape type) will be described using Countryside Survey 1990 code numbers (as defined in 8.18 onwards). Similarly, the nearest vertical boundary (within 100m) will be described using CS1990 codes, except in built environments (see below).

Grid points

8.2 The grid of points will be marked on maps within the FABs. Locating the points on the ground must be done using measurements and bearings from prominent features. In particularly featureless terrain, it may be necessary to construct a transect using ranging poles. If using compass bearings to obtain the straight line then, to fit the grid on the map, grid north must be used (ie a correction for magnetic north must be made).

8.3 The acronyms MGS (Mugs) and GMA (Guma) may help in remembering bearing corrections:
i) MGS: when taking a bearing in the field (ie Magnetic) to be recorded on your sketch (ie on Grid North), then Subtract the magnetic variation (shown on the front of your FAB).
ii) GMA: when taking a bearing from the map Grid North to locate a position on the ground (eg Compass Magnetic North) Add the magnetic variation.

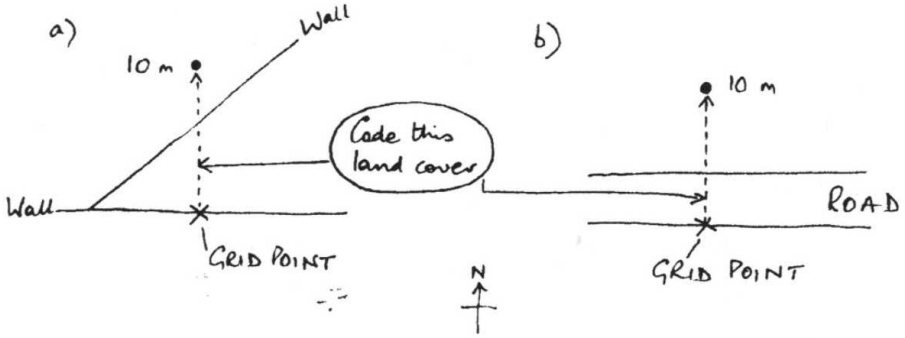
8.4 The area to be coded should reflect the "mappable unit" in which the point falls. Mappable units were the areas of land cover that were recorded as part of CS1990 where the minimum mappable area was 1/25th ha (400m2). Each mappable unit was determined by the constancy of the codes which described it. If one characteristic (eg cover of a dominant plant species) was sufficiently different from an adjacent area to be given a different code, then a new mappable unit was recognised.

8.5 There are a number of rules concerning the recording of information depending on where a grid point falls:

i. if a grid point falls on a linear feature which can be described as a vertical boundary (see 8.8, below), or any other linear feature which is normally <2.5 m wide (eg a stream or an unconstructed track), then the land cover description should be given for a point which is 10m away from the original grid point, in a direction at right angles to the linear feature, and on the more northerly side of the linear feature. (Where a linear feature runs North-South, the point should be re-located on the easterly side of the boundary)

ii. if, however, the 10 m distance takes the point past the neighbouring land cover type (eg across a road), then the point should be moved to the centre of the land cover type that has been crossed (ie the road).

Figure 1: Procedure if displacement of 10m goes past adjacent land cover



iii. if a grid point falls on any other linear feature (eg a road, or a railway - which is >2.5 m wide) then this should be described as a land cover type and, additionally, a nearby boundary should be described. If the feature is vegetated (eg a river bank), then the vegetation should be described.

iv. if a grid point falls on the non-physical boundary between two land cover types (eg edge of an unfenced wood) then the land cover description should refer to a point 10m away, as in (i) above, and marked on the map accordingly.

v. if a grid point falls in a built area, then land cover should be recorded at that point, but no adjacent boundary information should be recorded.

vi. if a grid point falls close to a built environment, then the boundary information should be taken from the nearest boundary which is not adjacent to buildings (curtilages), but still falls within 100m.

vii. if a grid point falls on a linear feature (road, railway, river bank, that is >2.5m wide) which is bordered by built environment on both sides, then no boundary information should be recorded (as in v. above).

Boundary points

8.6 For each grid point, a vertical boundary should be recorded, if within 100m. The point on the vertical boundary which is nearest to the grid point should be recorded as part of a length which can be coded constantly as a single unit, of not less than 20 m (the minimum mappable length). If the nearest point on the boundary is part of a length of less than 20 m, then this should be coded as part of a longer length, in which case the coding should reflect the variability present (see 8.41 - Boundary codes).

8.7 If the nearest point on a vertical boundary falls on the divide between two distinct boundary types, then the boundary to the right of this point (as faced from the associated grid point) should be recorded.

8.8 Vertical boundaries, in this context, include the following:

- hedgerows
- walls
- fences
- earth or stone banks acting as a field boundary
- any combination of the above

8.9 The nearest vertical boundary length of 20 m to each point (provided it is within 100 m) should be described using combinations of codes. Its position should be marked on the map and a line drawn between the grid point and its associated boundary. Only vertical boundaries listed in 8.8 should be recorded; it may be necessary to cross roads and rivers to reach the nearest vertical boundary.

Use of codes

8.10 Surveyors will be provided with two recording sheets, one for land cover and one for boundaries, each of which will comprise a 1:10,000 scale map and a matrix of boxes for recording coded information. The maps will have the grid of points marked on them, coded with letters (eg from A - P). Information on land cover and boundaries will be entered as a string of codes underneath each map. Wherever possible, this information should be coded according to the standard code list, but rarely it may be necessary to add other categories to the list ('unique codes').

8.11 Codes may be taken from any part of the code list to describe a land cover or a boundary feature, eg a boundary may include a ditch or a hedgerow tree. However, in describing boundaries, the ground flora (eg codes 146 - 168) should not be coded.

8.12 There are two types of code: primary, which are generalised names for the land cover and boundary types, and secondary, which provide additional descriptive information. All features must be annotated with at least one primary code (which are shown in bold on code lists). In contrast to CS1990, where information was recorded on several different maps, each pertaining to one theme (eg woodlands), in this survey more than one primary code may be used to describe a grid point.

8.13 The strings of numeric codes used to describe a land cover type or a boundary should be written into the boxes at the foot of each recording sheet, preceeded by the Alpha code for the grid point. For instance the nearest length of boundary for point "A" might be coded as 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.

8.14 In general, the use of more than one primary code from any section of the code list, should be avoided. Where more than one primary code has to be used (eg multiple land use, or vegetation mosaics) then the code reflecting the dominant use must come first. 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)

8.15 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.

8.16 Wherever possible, codes from the exisiting list should be used to describe a feature. Only as a last resort, where a feature cannot be adequately described, should a new code be invented. Such 'unique' codes should be numbered in the 700s and both the code, and its meaning, should be written on the mapping page of the FAB. Unique code numbers may be used to mean different things, only on different pages in the FAB (ie there should never be more than one meaning to a code number on the same page of the FAB).

8.17 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, instead, is forced onto the data-processor "back in the lab". Decisions must be made on the spot and, in exceptional circumstances, may be accompanied by a qualifying note or comment.

8.18 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.

N.B. The following codes and definitions are MODIFIED versions of those used in the ITE Countryside Survey 1990.

Descriptions in bold indicate primary codes.

Physiography/Inland water/Coastal

All unvegetated ground should be given a cover value (eg limestone pavement; 95-100%). If there is a mosaic of vegetated and non-vegetated ground, where the vegetated part is >10% (eg as might occur in a saltmarsh, fore dune, peat hag), then two primary codes should be used, each followed by a cover value to indicate proportional cover.

Inland physiographic features (to be followed by a cover code)

1. **Cliff >30m high:** a vertical or near-vertical face of rock
2. **Cliff 5-30m high:**
3. **Rock outcrop and/or cliff <5m:** areas of bare rock should be included here
4. **Scree:** (patches of) loose stone and rocks, the majority of which are >25cm across.
5. **Surface boulders:** boulders are defined as >50 cms in any direction and should be mapped as an area with a % cover code (651-655)
6. **Limestone pavement:**
7. **Bare peat- natural:** includes any peat which is naturally bare or eroding eg non-vegetated part of peat hags, as opposed to ...
8. **Current peat workings:** where peat has obviously been extracted in the current or previous season
9. **Old peat workings:**
10. **Eroded mineral soil:** includes both human and natural erosion (but not ploughed land, road works, spoil heaps)
11. **Ground levelling:** includes any formerly raised area that has been reduced to the level of the surrounding terrain (eg for development)

Coastal features

31. **Cliff > 30m high:**
32. **Cliff 5-30m high:**
33. **Rock outcrop and/or 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:** pebbles to be <10cm diam
36. **Sandy shore (or dune):**
37. **Bare mud:**
    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 and including ponds, should be mapped using this code.
52. **Lake - artificial:** usually distinguished by the presence of a dam or embankment; also includes recently dug ponds..
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:** steep, parallel-sided, usually rocky, water passage of >5m average height.
64. **Levee:** artificial raised banks at the sides of rivers, characteristic of canalised rivers.

8.19 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 over the ground surface, 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:**

Agriculture/Natural vegetation

8.20 It is important to note that these cover types should not be used in a **built-up** area. Once a **curtilage** has been recognised (defined as land associated with a building, or recreational land in an urban context) then all land within the curtilage is to be recorded using only codes in the 400s. Hence an orchard in a **residential** garden is not to be recorded.

Cover types

8.21 Cover types - these categories are defined to meet the specific requirements of this survey technique - the definitions given may not be those with which surveyors are familiar. The categories must be used as defined here, regardless of any other interpretations, to ensure consistent recording.

8.22 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.

101. **General grassland:** includes improved, or semi-improved, grassland; any grass crop or pasture in a generally lowland, or enclosed, situation (ie most grass), not defined elsewhere.
102. **Acid grassland:** semi-natural grassland (unimproved), often in an upland situation but with a high proportion of palatable grasses and usually on an acid, mineral soil. Typical species include Festuca ovina, Agrostis capillaris, Anthoxanthum odoratum, Galium saxatile, often with bracken. Found in both enclosed and unenclosed land.
103. **Moorland - grass:** coarse grass occuring in a moorland setting (incl lowland heath), dominated by Nardus, Molinia, Deschampsia flexuosa, or Juncus squarrosus. Sphagnum spp rare but , if present, associated with Anthoxanthum and/or Juncus spp (ie soligenous flushing). Dwarf shrubs may be frequent but never dominant.
601. **Dry heath:** >25% dwarf shrub species - usually Calluna vulgaris or Erica cineria but sometimes Vaccinium myrtillus or Empetrum. Molinia caerulia, Trichophorum cespitosum and Sphagnum spp scarce or absent.
602. **Wet heath:** Molinia and Tricophorum common (often >25% and may be dominant) but always in association with >25% Calluna and/or Erica tetralix. Distinguished from 111 by Eriophorum vaginatum being more or less absent and Sphagnum hummocks only occasional.
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.

605. **Rock crevice vegetation:** large proportions of bare rock with eg Spergularia rupicola, Inula crithmoides, Crithmum maritimum.
606. **Bird cliff vegetation:** obvious evidence of bird droppings. Vegetation with, typically, a mixture of Matricaria maritima, Stellaria media, Beta vulgaris, Rumex acetosa.
607. **Maritime therophyte vegetation:** open vegetation with little grass cover. Would include: Plantago maritima, Sedum anglicum, Sedum acre, Bromus spp., Sagina spp.
608. **Maritime grassland:** closed vegetation dominated by perennial grasses, mainly Festuca rubra with Holcus lanatus, Anthyllis vulneriana often present. Ericaceous sub-shrubs can occur but are always at low cover (<25%).
609. **Maritime heath:** vegetation in which sub-shrubs comprise more than 25% of the vegetation.
610. **Strandline vegetation:** open vegetation on the drift line, typically with Rumex crispus, Potentilla anserina, Atriplex spp. Matricaria maritima, Cackille maritima.
611. **Foredune:** low ridges of very open plant cover usually with Elymus farctus, Leymus arenarius and low density Ammophila.
612. **Mobile dune:** variably, but not fully, colonised. Usually dominated by Ammophilla arenaria with low density Carex arenaria and scattered plants of eg Sea Holly and Euphorbia paralias.
613. **Stable yellow dune:** more or less completely vegetated. Usually dominated by Festuca rubra with scattered Ammophilla; usually rich in small vascular species.
614. **Grey dune:** complete vegetation cover usually with Agrostis capillaris prominent, sometimes with Festuca ovina and often with prominent lichens and bryophytes (often comprising golf courses!)
615. **Dune slacks:** low-lying, often inundated areas between dunes.

[A diagramatic representation of a dune system is given in Figure 2]

616. **Inundation grassland:** often occuring in brackish situations eg inland of sea walls. Dominated by Agrostis stolonifera, Alopecurus geniculatus or, occasionally, smaller Glyceria spp.

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 crocata etc

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

110. **Raised bog:** may occur in upland or 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. Dominated by Sphagnum spp. often forming a carpet.
111. **Blanket bog:** characteristic of large areas in north-west, upland, high-rainfall parts of Britain. Characterised by Eriophorum vaginatum at >25% (either alone or dominant with Trichophorum). Often a high cover of Calluna, with or without Erica tetralix.

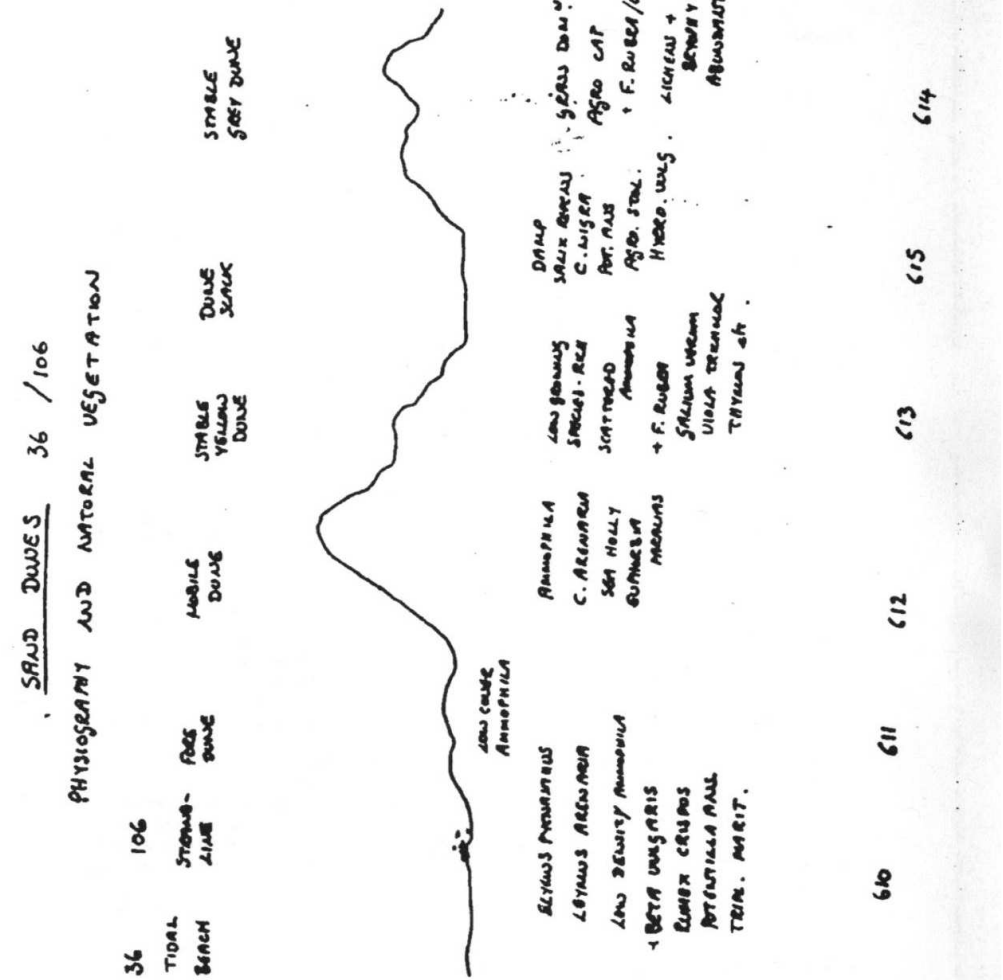


Fig 2

Molinia is frequent but rarely >25% (see 602+103). May have Sphagnum hummocks (rarely carpets - see 110) but Sphangnum may be absent in severely disturbed or polluted areas.

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 or Carex spp. often with Sphagnum.
116. **Saltmarsh:** Should only be recorded where the area is vegetated, otherwise bare mud (Physiography section) is appropriate.
621. **Pioneer saltmarsh:** vegetation cover less than c.25% dominated by Salicornia and/or Spartina.
622. **Low marsh:** dense vegetation including Spartina, Suaeda, Puccinellia spp., Aster spp.
623. **Middle/Upper marsh:** ususally dominated by Festuca rubra, commonly with Halimione, Juncus gerardii, Elymus pycnanthus (previously Agropyron pungens).

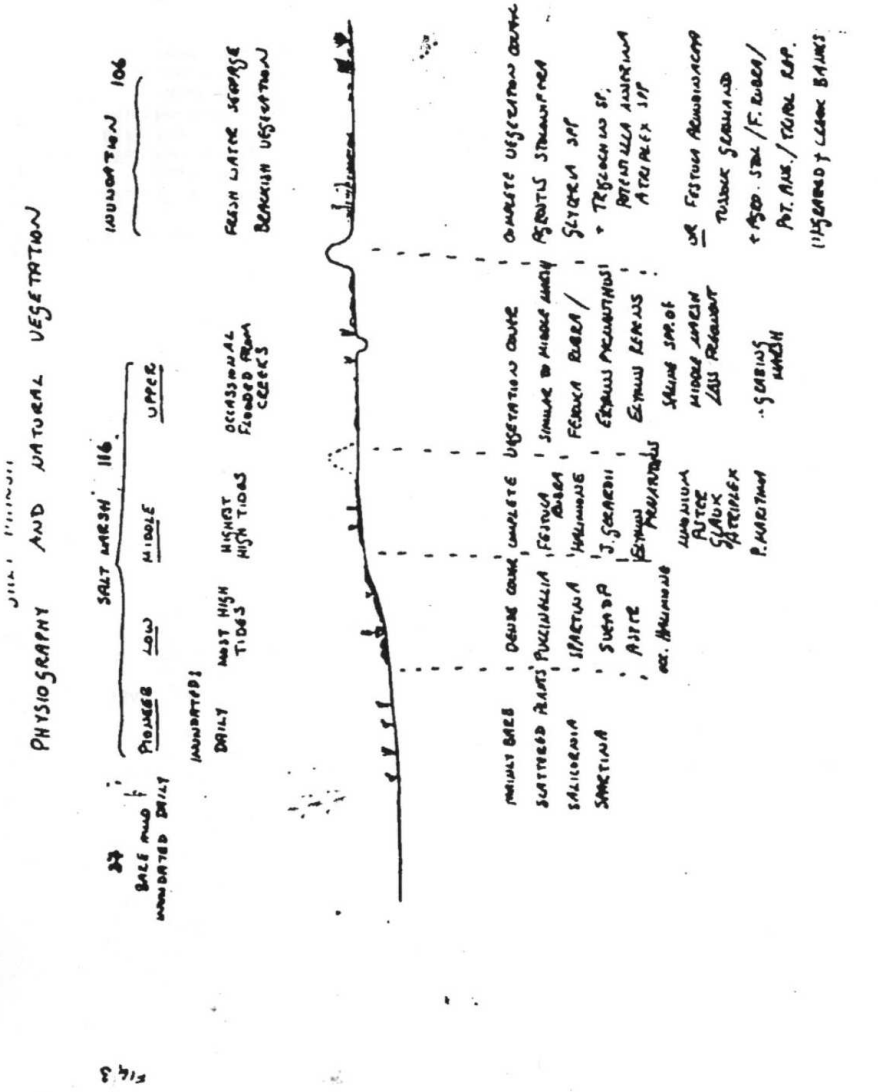
[A diagramatic representation of a saltmarsh is given in Figure 3]

8.24 117-132 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.

8.25 The survey is intended to collect information relating to the current year's field season and coding should relate to the land cover at mid-summer. If two crops are present (eg wheat undersown with grass) then both may be recorded with the summer crop coded first.

117. **Wheat:**
118. **Barley:**
119. **Oats:**
120. **Sugar beet:**
121. **Turnips/Swedes/Roots:**
122. **Kale:**
123. **Potatoes:**
124. **Field Beans:**
125. **Peas:**
126. **Maize:**
127. **Rye:**



128. **Oilseed rape:**
129. **Other crop....:** specify with a unique code.
130. **Flowers:** where grown commercially
131. **Commercial horticulture:** does not include nurseries (see 409)
132. **Orchard:** commercial, including derelict
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). Grazed grassland should be recorded under 101,102 or 103.
134. **Tall herb vegetation:** semi-natural vegetation, often in wet positions; dominated by tall herbs but usually with grasses present (weedy fields would be recorded as 141 or 142).

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, Planatago lanceolata, Lotus corniculatus etc. Would include most 'hay meadows'.
138. **Forbs >10%:** herbaceous species, used as an indicator of species-richness. May be used in any situation but are likely to occur most frequently in grasslands. In this context, species may include Carex spp but should not includee grasses, pteridophytes and bryophytes. Annual weeds (eg Stellaria media), perennial weeds (such as docks and thistles) and sown species (such as Trifolium repens) should not be recorded as forbs. Bevare Rumex acetosa and Ranunculus repens which may be forbs or weeds (see below) depending on their associates.
139. **Forbs >25%:**
140. **Forbs >50%:**
625. **Weeds >10%:** agricultural weed species, but not including grasses, which may be recorded in arable crops or in grassland.
626. **Weeds >25%:**
627. **Weeds >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. There is a separate code to describe set-aside land 631 (in the Uses section).
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:** although this may be used as an extra description, the crop harvested before ploughing should be identified (from fragments that remain) and coded first.

144. **Burnt:** land which has been burned deliberately as a management practice e.g. for grouse (muirburn).
145. **Mown:** to be used for any agricultural 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)

8.26 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. **Lolium multiflorum**
147. **Lolium perenne**
148. **Trifolium repens**
149. **Dactylis glomerata**
150. **Anthoxanthum odoratum**
151. **Phleum pratense**
152. **Cynosurus cristatus**
153. **Holcus lanatus**
154. **Agrostis capillaris**
155. **Festuca ovina**
156. **Pteridium aquilinum**
157. **Pteridium aquilinum <25%**
158. **Juncus effusus**
159. **Deschampsia flexuosa**
160. **Nardus stricta**
161. **Calluna vulgaris**
162. **Vaccinium myrtillus**
163. **Molinia caerulea**
164. **Eriophorum angustifolium**
165. **Eriophorum vaginatum**
166. **Tricophorum cespitosum**
167. **Sphagnum spp**
168. **Juncus squarrosus**
169. **Erica tetralix**
170. **Erica cinerea**
628. **Festuca rubra**

Heights (Calluna & Pteridium)

8.27 179-184 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. Cover estimates, on the other hand, should be estimated for the maximum growth.

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

8.28 The following codes (after MacDonald and Armstrong, 1989) should be used to describe heather condition for any area in which heather occurs, irrespective of 25% cover values (note the use of different height categories):

90. **Burnt heather:** recently burnt heather with a low vegetation cover.
91. **Regenerating heather:** young regenerating heather stands. The sward/canopy height will be less than 15 cm and the vegetation will be recognisably short even from some distance. Heather cover will be variable and may be low. The cover of grasses such as wavy hair-grass (Deschampsia flexuosa) or other dwarf shrubs such as blaeberry/bilberry (Vaccinium myrtillus) may be high.

92. **Vigorous heather:** areas of well developed, taller heather bushes intimately mixed with other species. The heather bushes will be erect and taller than about 30 cm.
93. **Heather mosaic:** areas where there is a mosaic of small heather-dominated patches (each smaller than about 30 m x 30 m) among other vegetation.
94. **Heather dominant:** areas of complete heather dominance which are neither very short regenerating stands nor tall mature-to-old stands. The canopy height will be about 15 - 30 cm. These areas will appear dark and with a relatively even, fine texture on aerial photographs.
95. **Collapsing heather:** areas of tall, mature or old heather, more than 30 cm tall, or with branch lengths longer than 30 cm, where holes may be developing in the canopy due to the outward collapse or death of central branches of larger heather bushes.
96. **Mat heather:** areas where the heather forms a short carpet or mat, less than 15 cm tall, of densely packed intertwined branches. Many of the branches will be growing horizontally or at an oblique angle and they may be more or less contorted. These areas may not be apparent till the ground is walked.
97. **Bushy heather:** areas where the heather bushes are taller than 15 cm, or do not form a carpet, and have compact, rounded canopies of densely packed, contorted and intertwined branches and shoots. The heather bushes may be in patches or may be individual bushes intimately mixed with other species. These areas may not be apparent till the ground is walked.
98. **Mop heather:** areas of 'drumstick' or 'mop' heather in which heather bushes comprise lengths of bare woody stem each ending in a small rounded mass of contorted shoots and foliage.
99. **Dead heather:** areas of dead heather canopy. If damage has been recent, foliage and shoots will be orange-brown but this will gradually bleach to pale grey. This may not be apparent till the ground is walked.

Uses etc

8.29 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 185/186
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 Freisians.
630. **Cattle:** (to be used when type unknown)
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.
631. **Set-aside:** should only be used if certain that land is being used for set-aside. Can be used as a primary code if no other description is appropriate and may relate to short- or long-term set-aside, uncropped, or tree-planted.

Forestry/Woodland/Trees

8.30 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 parts of the code list should not be recorded within woodland, unless they are above a minimum mappable unit in size (ie exceeding 1/25th ha).

8.31 Trees/scrub should be recorded where the grid point is within a wood or clump of trees or scrub, except inside the curtilages of buildings (see 402).

8.32 It is important that the double use of land is recorded eg individual trees growing in farmland, or sheep grazing in an abandoned orchard.

8.33 Tree species (with apical dominance leading to the formation of recognised trunks) of all sizes should be recorded, as should shrubby species (which, collectively are called 'scrub').

8.34 Cover types - all occurences 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 included if one or more falls within the mapped unit (as determined by the agriculture/semi-natural vegetation codes) 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 recorded if they fall within the mapped unit.
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 (otherwise it is coded as a Clump or Woodland/Forest).
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%. This code should also be used for: i) young forestry plantations (conifer or broadleaf) where the planting distance is designed to achieve a closed canopy at maturity, and ii) where a complete tree cover has been

clear-felled but the land has not changed its use.
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 recorded 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 (can be used to describe areas or lines of trees).
216. **Canopies not touching**: to be used with areas or lines of trees; for linear features, should be used 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.
360. **Line of relict hedge**: usually a line of shrubs showing where a 'hedge' has degenerated and is no longer present (see definition of hedge).
218. **Parkland**: a series of isolated mature trees over usually grazed grassland, often associated with large country houses or recreational areas.

8.35 Species (if >25%) - to be used with areas of trees to denote the % of the canopy, or with lines of trees, or individual trees, to show the proportions of individuals.

221. **Fir - Douglas**
222. **Larch**
223. **Pine - Corsican**
224. **Pine - Lodgepole**
225. **Pine - Scots**
226. **Spruce - Norway**
227. **Spruce - Sitka**
228. **Unspecified conifer**: to be used if species not known, otherwise use a unique code.

231. **Alder**
232. **Ash**
233. **Beech**
234. **Birch**
640. **Blackthorn**
235. **Bramble**
236. **Elder**
237. **Elm**
238. **Field maple**
239. **Gorse**
240. **Hawthorn**
641. **Hazel**
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**: to be used if species not known, otherwise use a unique code.

8.36 Ground layer species - if the cover of any ground cover species (eg as listed in Paragraph 8.25 above) is >25%, then this should be recorded within the string of codes which describes the woodland feature, together with its % cover code.

8.37 Proportions - when using universal % codes (652 - 655) with tree species, they should refer to the percentage cover of the dominant canopy layer present. No more than three species codes should be used to describe any one feature.

8.38 Age - should be used in conjunction with any of the cover-type codes to indicate the dominant age class of the standing timber/wood. If there are two distinct age classes, eg due to underplanting, then use a separate code after each species code; otherwise indicate the dominant age. To help with age category recognition Table 1 may be used. 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.

Table 1: Generalised relationship between height and dbh

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**

8.39 Use - To be used only for an area of trees (ie not linear features or individuals, or any other land cover). 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**: most coniferous forest and highly managed broadleaved woodland should 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 primarily 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)

8.40 The condition of areas of forest/woodland should be described using the following codes. Note that the degree of management relates to the use of the trees (as defined by codes 266 - 271), so that 'managed' may refer to commercial forestry or to coppice management for nature conservation.

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, coppicing, 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 and, although trees are healthy, the wood has no structure or natural regeneration (eg prevented by grazing).
278. **Declining**: trees not healthy, often old, and with no structure and no regeneration; it would no longer be woodland if existing mature trees were removed.

Descriptions/Features

281. **Felling/Stumps**: to be used if area is wholly felled, or if some stumps are present within standing trees. If clear-felled, then the species of felled trees should be coded following code 281.
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 (and therefore including areas of recent clear-felling).
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 (may be used as a primary or secondary code).
291. **Regrowth - cut stump**: only to be used for isolated regenerating trees outside woodland, and not for coppice (for which a unique code would need to be generated).
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**: if the ride or firebreak is >2.5m wide and a minimum mappable unit, then the ground vegetation cover should be described.
645. **Glade**: to be used where the minimum mappable unit is achieved within woodland (and the ground vegetation should therefore be recorded).
294. **Bracken**: any bracken in a woodland area must be recorded as for codes 156 and 157 (which only apply in non-wooded situations).
295. **Bracken <25%**:

Boundaries

8.41 All vertical boundaries are eligible for recording **unless** they form part of a curtilage or they are within the canopy of a woodland (except that vertical boundaries of woodlands may be recorded).

8.42 Each boundary feature should be coded as a single unit, even if it has several parallel elements. The coding must be constant along the length that is being described and that length must be >20m long. Where there is more than one element, the most complete (stockproof) element of the boundary should be coded first and the code for stockproof (351) should be used to divide the stockproof elements from others. The height and management codes should relate to the mapped length as a single unit, but each code should follow the element to which it refers. For example, a derelict wall with an overgrown hawthorn hedge, made stockproof by a wire fence, might be coded as:

313/351/321/341/359/301/359, where:

313 = Fence, wire on posts
351 = Stockproof
321 = Hawthorn hedge
341 = >2m high
359 = Derelict
301 = Stone wall
359 = Derelict

8.43 Other features which are integrated with the vertical boundary (eg ditches) must be recorded.

Walls

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

Fences

(Temporary, or semi-permanent, electric fences should not be recorded; permanent electric fences are usually multi-stranded with spacers and often with strainer posts)

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

Hedges

8.44 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 (ie 20m).
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 (apply to the whole boundary as a single feature)

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**:

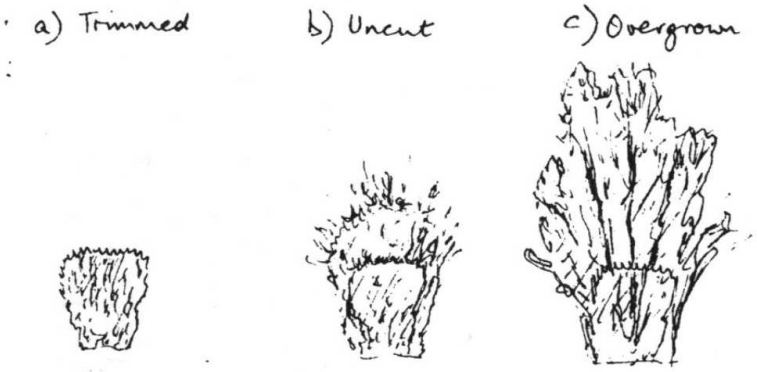
351. **Stockproof**: where possible, this should apply to the stock that would normally use the surrounding fields; if in doubt, assume sheep. It only applies to the length that is being described, even if other parts of the boundary of that field are not stockproof.
352. **Not stockproof**:

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 - 363 refer to hedges only. Codes 357 - 360 represent a transistion 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' for up to three seasons.
359. **Overgrown:** still obviously a hedge but all attempts at management appear to have been abolished.

Figure 4: Diagramatic examples of types of hedges



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 (in addition to trimmed) 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.

Buildings/Structures/Communications

8.45 These codes cover features associated with built structures and routes of communication.

Cover types

8.46 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.

8.47 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 use of 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 reservoir is not curtilage).

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

8.48 Gardens/Grounds apply to curtilages associated with residential or other buildings (eg farm yards). 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).
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, reservoir 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, except farmhouses (see Agricultural).
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, cemetries etc.
428. **Agricultural**: includes farmhouses.
429. **Sporting/Recreational**:
430. **Vaste - domestic**:
431. **Vaste - 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**: includes associated land, embankments etc within railway property.
452. **Road (tarmac)**: includes any road, whether private or not, which is totally tarmac across its width.

8.49 453-455 **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, and any built or bulldozed track.
457. **Unconstructed track**: those tracks which are not defined as above ie no construction has been involved along their length. They may be vegetated or unvegetated (eg due to trampling/vehicles).
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.

Recreation

Designated

8.50 **These are** generally areas deliberately managed 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 ....**: for boats
511. **Other designated area ...**

Non-designated

8.51 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 (but not where horses present on farm land, or fields just used for grazing horses).
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 ....**

Universal codes

8.52 **Percentage** codes can be used in the following ways:

a) **Physiology** - to indicate % cover of rock, peat etc
b) **Land cover** - to indicate the % cover of cover types in mosaics
c) **Dominant species** - to show the dominant species composition of any land cover type
d) **Tree species** - to show the % cover of tree species in a canopy

651. **10-25%**: this code only to be used with primary codes
652. **26-50%**:
653. **51-75%**:
654. **76-95%**:
655. **96-100%**:

678. **Calcareous**: can be used to describe rock, scrub etc.
888. **New to map**: feature present on ground but not shown on OS map.
999. **No longer present**: feature shown on map which is no longer present in reality.

9. VEGETATION RECORDING

Introduction and types of plot

9.1 In 1977/8, as part of the first ITE national sample survey, detailed information on plant species was collected from random plots 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, and additional support from the Nature Conservancy Council, plots were 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.

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

9.3 Although the requirements and methods have been modified for use in the current project, the experience gained from the previous ITE surveys will be used, especially in relation to permanent marking of plots.

9.4 In the 1993 survey, four types of plot will be used:

a) **Main (X) plots:** these will be either $4m^2$ or $200m^2$, depending on the landscape type, and will be located on FIVE of the grid points within the square.

b) **Targetted (Y) plots:** these are $4m^2$ and FIVE will be placed in semi-natural vegetation types/habitats that have not been covered by the main plots.

c) **Streamside (S) and Waterside (W) plots:** these are 10 x 1m plots and up to FIVE will be placed immediately adjacent to watercourses, where present, in Upland landscapes only.

d) **Roadside (R) and Verge (V) plots:** these are 10 x 1m plots and up to FIVE will be placed immediately adjacent to roads, where present, in Limestone and Chalk landscapes only.

9.5 The use and characteristics of the plots can be summarised as follows:

	Coastal	Uplands	Chalk & Lst
X plots	5 ($200m^2$)	5 ($200m^2$)	5 ($4m^2$)
Y plots	5 ($4m^2$)	5 ($4m^2$)	5 ($4m^2$)
S/W plots	-	5 (10 x 1)	-
R/V plots	-	-	5 (10 x 1)

When and where to record a plot

9.6 The purpose of recording vegetation in plots is to give information about the areas within the sample squares that either do have, or might be able to support, semi-natural habitats which are characteristic of the landscape types, eg calcareous grassland, lowland heath, maritime grassland.

9.7 The underlying principle which has guided the formulation of rules on when to place a plot is whether there is now, or could be in the future, vegetation which is relevant to the landscape type under consideration. It is acknowledged that such rules cannot be clear cut and there will always be a minor element of subjectivity introduced by the surveyor.

Main (X) plots

9.8 It is intended that FIVE X plots should be recorded in every surveyed square. These will be located at intersections of the grid, and will have been selected using a random method. In some cases it will not be possible to record as many as five plots (for reasons that will become clear) but every attempt should be made to do so.

9.9 The rules for the placement of X plots are:

a) In coastal squares (500m zone of 25 point grid) the X plots should, where possible, be recorded at points A, L, I, T, W. If the point is outside the 500m zone then another grid intersection should be selected (see rules below). Plots may be recorded at points between HWM & LWM - the locations of these on the map may no longer be correct so it is necessary to visit this part of the square at low tide.

b) In upland and calcareous squares (16 point grid) the X plots should, where possible, be recorded at points A, J, G, D, P.

c) Where land at the grid intersection is built up, curtilage of any type, or a non-vegetated land cover feature, eg. lakes, roads, railway lines, rivers, sea (below LWM), then another grid intersection point must be selected.

d) To select another grid intersection, choose the nearest available point, starting with the nearest northern point and rotating clockwise. (Cardinal points will be closer than diagonals).

e) If the X plot is located in an arable field, or very intensive grassland (ie. a ley or grassland which has been improved by heavy fertilization to the extent that it is composed of a few sown grasses, as defined below), then the plot should not be recorded or marked with a plate. Note the crop or grassland type on the plot sheet and the plot location sheet. [Sown species are: Lolium perenne, Lolium multiflorum, Trifolium repens, Dactylis glomerata, Phleum pratense, Festuca arundinacea]

f) If the grid intersection point lands within a golf course that abutts onto rural land or coast, then the decision as to whether to do a plot depends on the type of vegetation. If the point lands on a green then no plot is required, but make a note on the plot location sheet. If the point lands on a fairway or the rough then apply the same rules as above, ie. if the grassland is reseeded or composed of few sown grasses, then no plot is required, otherwise record a plot as normal. Plates should only be put in the rough, and measurements taken from there to the plot. The same approach should be applied to race courses.

g) If the grid intersection lands on a boundary and moving the land cover point by 10m takes it onto a road or curtilage etc (see above), then it is not possible to do a plot at that point, so another grid intersection must be selected. If moving the land cover point takes it into vegetation which is not arable or intensive grass, then the plot should be recorded there. If it is a 2x2m plot then the point reached after 10m becomes the SE corner of the plot. If the plot is a 400m2 plot then measure a further 10m (20m from the boundary) and make that point the centre of the 400m2 plot. Note on the sketch and on the plot location page that the plot has been recorded away from the boundary.

h) If the point lands on a cliff which would be less than 2.5m wide when viewed from above, then treat it as a linear feature, ie. move the plot by 10m. If it is more than 2.5m wide then lay it out as normal (ie. for a 4m2 plot the point is the SE corner; for a 200m2 plot the point is the centre). If the cliff is less than the width of the 200m2 plot then allow the plot to extend over onto the adjacent land.

i) If the grid intersection lands in a parcel which is vegetated but inaccessible, (eg. a steep cliff), then record the vegetation from that parcel (ignoring transitional edges) as well as is possible from the nearest accessible point, and describe the vegetation type. The same applies if the grid intersection lands at a point where it is not possible to lay out the plot, eg. a shallow pool with emergent vegetation. Note on the plot page and plot location sheet that the plot was not laid out or marked. Make clear on the sketch, (and when you get the photo back, mark on it) the area from which you have listed plant species.

j) If the grid intersection lands in a parcel which is difficult to reach, eg. blackthorn scrub or dense sitka spruce, then every effort should be made to reach the point as accurately as possible. However if this is not possible then the plot should be done towards the edge of the parcel, making sure that none of the plot is affected by edge effect (at least 10m should be allowed from the edge of scrub/plantation). The plot should be laid out and marked. Note on the sketch and on the plot location sheet that the plot has been moved.

k) In coastal squares, where a grid intersection lands on an unvegetated part of the shore (above LWM), then the plot should be accurately located and sketched, (in case the coastline changes and it becomes vegetated in future).

Targetted (Y) plots

9.10 Five small plots (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 plots 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 plots.

2. Habitats which are unlikely to be sampled by the X plots 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 concentrate on those which are most typical of the landscape type ie maritime vegetation for coastal squares, calcareous grassland for chalk landscape squares. 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 plots will be proportional to the size of land cover types available (ie the larger land cover types receive more plots). This can be done by dividing the areas of each type into "mappable areas" and comparing sizes. Having decided which land cover to sample, and its extent, the plot should be placed in the centre of the parcel (ie the positioning of the plot should not be determined by choice).

5. The plot 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 move the plot to the next most suitable position.

6. The plot location page of the FAB should be used to record the options and choices made.

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. **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.**

Streamside (S) & Waterside (W) plots - Upland squares only

9.11 In each square, attempts should be made to record 5 plots adjacent to watercourses. Of these, 2 (the S plots) are associated with the position of X plots, and 3 (the W plots) are to be placed according to the additional variation of watercourses present in the square.

a) Streamside (S) plots

9.12 The linear plots are 10 x 1 m; they should be located as close as possible to the two X plots (200m2) which are furthest apart (if there are two pairs at the same distance apart, select the one which has the most north-easterly point). The positions of the 2 S plots must then be marked on the plot location sheet.

9.13 The 2 plots should not be nearer than 10m to each other, so if there is not more than 30m of stream/ditch/river in the square, only one plot should be recorded. The plot should be on the side of the linear feature closest to the plot. If the nearest watercourse is dry and there are other running watercourses in the square, then these running sites should be used. If there are no alternatives, then the dry watercourse should be recorded, provided that the presence of water has influenced the species composition of the site.

b) Waterside (W) plots

9.14 The other 'wet' plots should be used to ensure that different types of ditches/streams/rivers 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.

9.15 The following categories are recognised :

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

9.16 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.

9.17 The 'W' 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.

9.18 If there is more than one length of the same type, eg if two streams run through the square, then each length should be sampled. If it is only possible to put one plot on a length, then it should be placed in the centre of the length. Otherwise, plots should be used to sample the variation in vegetation or management eg one plot placed where a stream flows through a field where there is grazing to the edge, and another in an arable field. The basis for the decisions in placing plots should be recorded on the plot location sheet.

Roadside (R) & Verge (V) plots - Chalk & Limestone squares only

9.19 Following the same principle used for watercourses, there two types of roadside plot are to be recorded.

a) Roadside (R) plots

9.20 The linear plots are 10 x 1 m; they should be located as close as possible to the two X plots (4m2) which are furthest apart (if there are two pairs at the same distance apart, select the one which has the most north-easterly point). The positions of the two R plots must then be marked on the plot location sheet.

9.21 The two plots should not be nearer than 10m to each other, so if there is not more than 30m of road verge in the square, only one plot should be recorded. 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.

b) Verge (V) plots

9.22 Three further verge plots should be used to ensure that different types of roads and tracks are sampled where they exist and to include as much variation as possible so that lengths of verge with species assemblages not covered by the existing plots are sampled. The following road 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)

9.23 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 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.

Orientation and laying out plots

9.24 The Main (X) plots are either $4m^2$ (Chalk and limestone landscape type) or $200m^2$ (Coastal and Upland landscape types). Once the position of the point which is marked on the map has been located on the ground, then the quadrat should be laid out as follows:

Main (X) plots

a) $4m^2$ plots

9.25 The point which is adjudged to correspond to the centre of the cross, as marked on the map, will form the south-east corner of the quadrat, and should be marked with a cane/pole.

9.26 Locating points of the compass with care, a tape should be run in a westerly direction from the first cane for a distance of 2 metres, and a second cane positioned. The tape is continued in a northerly and then easterly direction until all four sides are measured and marked with poles. The diagonals should be measured to ensure that the quadrat is square (2.8m).

b) $200m^2$ plots

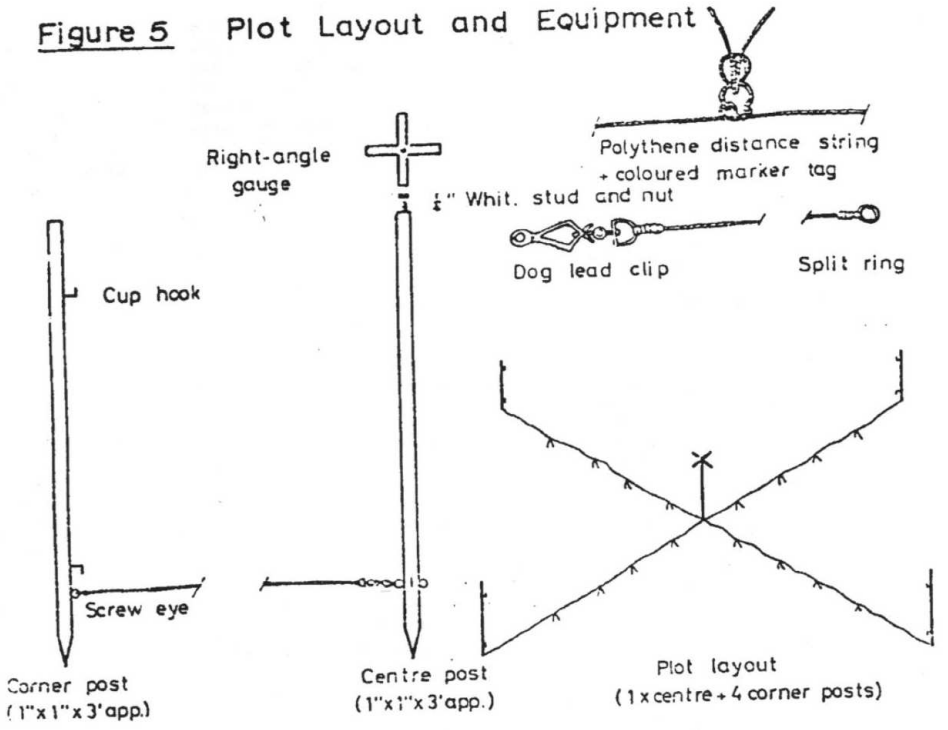
9.27 The 200m2 X plot is set up by using the survey poles provided with the strings forming the diagonal of the square (Figure 5). The diagonals should be orientated carefully at right angles and the quadrat should be orientated with the strings on the North/South, East/West axes. The different plot size markings shown in Figure 5 are approximately marked by different coloured strings on the appropriate position off the diagonal. The central $4m^2$ plot must be set up accurately by measuring 1.4m along each string.

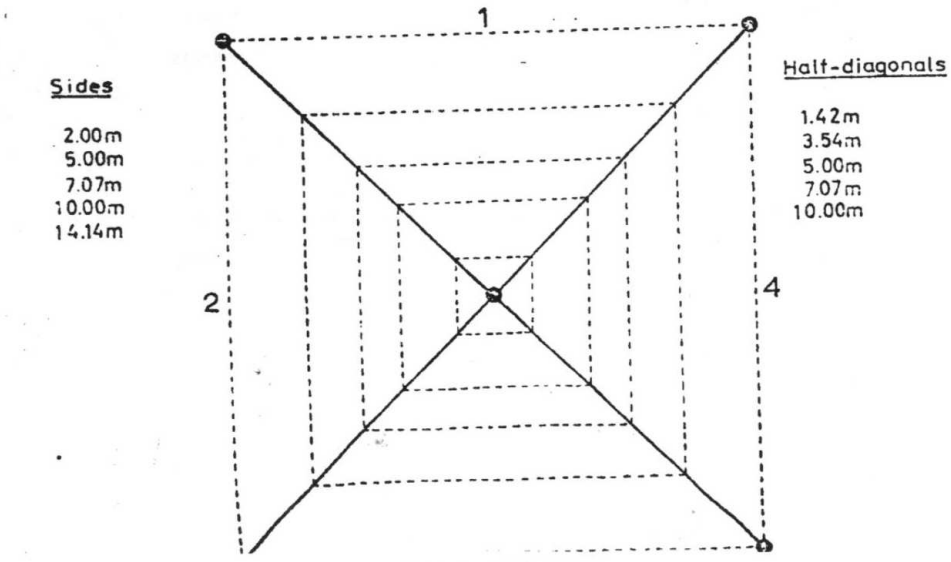
Targetted (Y) plots

9.28 Having decided the location of the Y plots (ie in the 'centre of gravity' of the representative habitats), the plot should be laid out in the same way as the smaller $4m^2$ X plot.

9.29 If the plot is put into a linear feature within which a 2x2 m plot will not fit then this should be laid out as a 4 x 1m plot - this should be clearly depicted with measurements in the sketch on the back of the recording sheet.

Figure 5 Plot Layout and Equipment





9.30 The poles should be used to mark out the corners of the quadrat. As with large quadrats, the poles should be orientated along north/south, east/vest axes. However, in a linear feature, this may not be possible and the main axis of the plot should be measured and recorded.

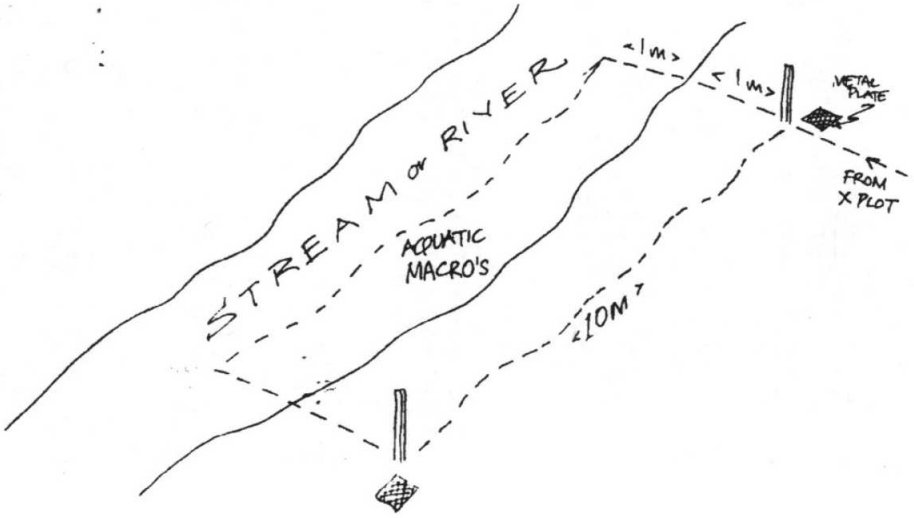
Streamside (S) & Waterside (W) plots - Upland landscapes only

9.31 On reaching the linear feature, from the 200m2 quadrat, the 10m plot is laid out to the left and the width is defined as the 1m width extending landwards from the point where it appears that water reaches when the watercourse is full (but not flooded) - see Table 6.

9.32 The streamside vegetation to be sampled must be at least 1m wide between the 'normal' water's edge and the adjoining land use eg a fence or ploughline.

9.33 Where the nearest feature to the X plot is ineligable (because it is not wide enough, then a new location should be chosen at the nearest permissible position. Any changes should be noted and clearly marked on sketch maps.

Figure 6: laying out a Streamside plot



9.34 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). **This should be completed even if the waterway is <1m wide - the average width should be recorded.**

Roadside (R) & Verge (V) plots

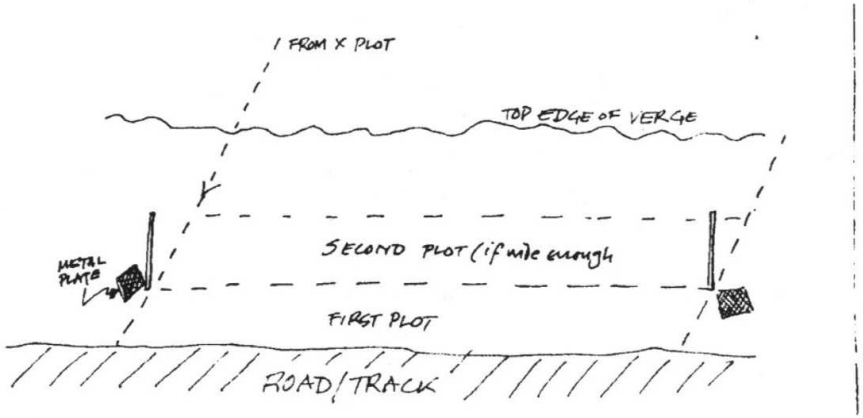
9.35 On reaching the linear feature, from the 200m2 quadrat, the 10m plot is laid out to the left and the width is defined as the 1m width extending inwards from the edge of the road.

9.36 Where the nearest feature to the X plot is ineligable (because it is not wide enough, then a new location should be chosen at the nearest permissible position. Any changes should be noted and clearly marked on sketch maps.

9.37 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 for R plots is still on the right hand side of the plot when viewed from the X plot).

9.38 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



9.39 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.

coast

ITE SURVEY 1993 : X PLOTS

Square:

Land use	Physiog	Slope	Aspect	Shade	Grazing	Substrate	Soil depth
		flat slight mod steep		none partial full	rabbits stock horses deer	mud sand mineral peat	0 <15cm >15cm >40cm

Description :

	Q	%	%		Q	%	%		Q	%	%		Q	%	%		Q	%	%
887 Bare ground				835 Junc art				113 Cone maj				315 Plan lanc				460 Trig mari			
				230 Junc bulb				114 Conv arv				316 Plan maj				446 Trif dub			
GRASSES				231 Junc con				117 Cory ave				317 Plan mari				448 Trif prat			
10 Agro can				232 Junc eff				118 Crat mon				324 Poly avic				449 Trif rep			
8 Agro rep				804 Junc mari				132 Digi pur				833 Polygala v				841 Trip mari			
11 Agro sto				233 Junc ger				143 Epil hir				336 Pote ans				456 Tuss far			
12 Agro cap				832 Luzu camp				150 Eric cin				337 Pote erec				458 Ulex eur			
14 Aira prae								151 Eric tet				339 Pote repl				462 Urti dio			
20 Alop gen				FERNS etc				160 Euph sp.				342 Prim vulg				463 Vacc myr			
21 Alop pra				53 Blec spic				168 Filip ulm				343 Prun vulg				467 Vero arv			
266 Amme aren				137 Dryo dil				170 Frax exc				346 Prun spin				469 Vero cham			
26 Anth ode				138 Dryo fil				177 Gali apa				350 Quer sp.				471 Vero off			
37 Anth sla				147 Equi arv				182 Gali pal				351 Ranu acr				472 Vero serp			
55 Brac syl				348 Pter aqu				183 Gali sax				353 Ranu bulb				477 Vici sep			
58 Brom hor								190 Gera mol				354 Ranu fic				849 Viol riv			
123 Cyno cri				FORBS/WOODY Sp.				193 Gera rob				355 Ranu flam				466 Viol tric			
124 Dact glo				2 Acer pse				195 Geum urb				357 Ranu rep							
404 Danth de				4 Achi mill				196 Glaux ma				370 Rosa sp				888 Tot BRYOS			
129 Desc ces				28 Ange sylv				197 Glec hed				373 Rubu frut				1347 Brac alb			
130 Desc fle				29 Anth sylv				1053 Halim po				375 Rum ace				502 Call cusp			
800 Elym pyc				734 Anth vuln				204 Hede hel				376 Rum act				131 Dior scop			
165 Fest ovi				36 Arm mari				206 Hera sph				378 Rume cris				161 Eurh sp.			
166 Fest rub				567 Arum mac				207 Hier pil				380 Rume obt				216 Hylo spl			
209 Hole lan				40 Aster tri				141 Hyac non				381 Sagi sp.				222 Hypn cup			
848 Leym are				1206 Atri pros				215 Hydro vu				384 Sali cin				280 Mniu hom			
254 Loli per				47 Bell per				220 Hype pul				583 Salix rep				282 Mniu und			
263 Moli coe				50 Beta sp.				877 Hypo rad				386 Samb nig				535 Pell sp.			
287 Nard str				54 Call vul				239 Lami pur				401 Sene jac				318 Pleu sch			
304 Phle pra				66 Caly sep				240 Laps com				405 Sile dio				843 Poly jun			
305 Phrag au				68 Camp rot				243 Lath pra				806 Sile mari				279 Pseu pur			
319 Pba arn				69 Capa bur				879 Leon aut				412 Sone arv				386 Rhyt squ			
321 Poa pra				70 Card hir				255 Lond per				413 Sonc asp				438 Thui tam			
823 Puac sp.				71 Card pra				256 Lotu cor				414 Sonc ole				925 Tort sp.			
714 Spart ag				82 Cent nig				273 Matr mat				1417 Solan dul							
				96 Cera tet				881 Menth aq				1418 Sperg rub				884 Tot LICHEN			
SEDGES				97 Cham ang				277 Merc per				420 Stac sylv				1367 Clad port			
859 Care aren				101 Chry opp				281 Oenan cr				421 Stel ala				1420 Clad pyx			
74 Care bin				103 Cirs arv				292 Orch mas				424 Stel med							
78 Care dem				104 Cirs pal				298 Oxal ace				427 Succ pra							
81 Care nig				106 Cirs vul				302 Pedi syl				430 Tarax agg							
85 Care pan				855 Coch oft				850 Plan cor				845 Thym pra							

OTHER SPECIES	Q	%	%		Q	%	%		Q	%	%

Method of recording vegetation

9.40 The standardised recording sheet (Figure 8) has the following sections:

a) Header - information on the broad environmental and management attributes of the plot should be recorded, according to the following guidelines:

i. The land use should be given using codes from the master code list (land use for road verges refers to the adjacent field or major land cover parcel).

ii. The physiography should also be described using a code from the master code list, where relevant.

iii. The slope should be recorded as:

- flat (no slope discernable by eye);
- slight (<5 degrees, by eye);
- moderate (between 6 and 15 degrees);
- steep (>15 degrees).

iv. Aspect should be given in degrees from North (if the ground is flat, then indicate by using a dash)

v. Shade should be described as:

- open
- partial shade
- full shade (full canopy)

vi. Grazing should only be completed if there is current evidence of grazed vegetation

vii. Substrate should be described in general terms according to the dominant type.

viii. Soil depth can be gauged using plot-marking equipment (poles or skewers).

Any additional comments, not covered elsewhere, should be entered in adjacent space.

b) Listed species - the main part of the form is taken up with a list of 200 common species of plants (herbs, grasses, bryophytes). The basic list varies according to the landscape type.

c) Unlisted species - a space remains at the foot of the form in which should be recorded the names 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.)

9.41 In the $4m^2$ X plots, where any of the species on the list is present, then a '1' should be written in the first column of the recording form. On completion of recording, the estimated cover % should be written against each species, using 5% cover categories, in the second column.

9.42 In the $200m^2$ X plots, using the recording form provided, all species are recorded from the inner nested (4m2) quadrat first by entering a "1" in the column headed "Q" to show that the species was recorded in the first quadrat. Species not included in the "top 200" list should be added at the bottom of the recording form, with a "1" in the "Q" column.

9.43 The cover, in 5% bands, should then be shown in the second column (marked "%"). A species must reach at least 5% cover before it is recorded as such. It is necessary to constantly check between surveyors to ensure 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.

9.44 Information given in Table 2 may help in estimating species cover:

Table 2: % cover within plots - area and lengths of sides of square

	$4m^2$ plot			$200m^2$ plot	
%	Area(cm^2)	side of sq(cm)	%	Area(m^2)	side of sq(m)
5	2,000	45 (*)	5	10	3.2
10	4,000	63	10	20	4.5
25	10,000	100	25	50	7.1
100	40,000	200	100	200	14.1

(*) = three sheets of A4 paper

9.45 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.

9.46 In all of the linear plots, all species found within the 1 metre width should be recorded and marked on the standard recording form with a "1" in the "Q" column.

9.47 Additional species in the second metre width should be recorded using the standard form but with a "2" in the "Q" column. 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.

9.48 In the case of waterside plots, if the waterway is less than 1m wide then additional species should be recorded and a note made of the average width of the waterway over the ten metres. For verge plots, only record the additional species from the second metre if the verge is >2m wide.

9.49 All vascular plants should be recorded, together with bryophytes and non-saxicolous lichens. The list of aggregates and common bryophytes is given in Tables 3 and 4. Species which cannot be easily identified should be collected and pressed or bagged for later identification. Mosses/lichens growing on rocks/trees should be ignored.

9.50 Cover of woody 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 parentheses (brackets), and no '1' in the first column of the recording form.

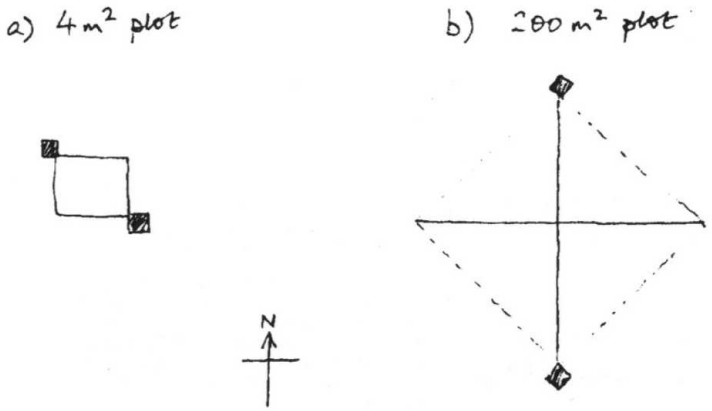
Permanent marking and photography

9.51 Although time-consuming, the permanent marking of quadrats is essential if these plots are to be resurveyed at a future date. It cannot be emphasised enough how important it is to ensure that future field survey teams are given every assistance in locating quadrats.

9.52 Plates should be buried to permanently mark the plot. They should be buried in opposite corners of the plot. Each plate should not be within the quadrat itself; it should be driven into the ground at an angle of <45 degrees with the ground surface, until the top edge is just below ground level (aligned to give maximum likelihood of easy relocation with a metal detector). The plates should be sloped away from the plot so that any contaminated water running across the plate will be shed away from the quadrat.

9.53 For $4m^2$ plots, the plates should be placed at two diagonal corners (these are prefereed to be SE and NW corners). For $200m^2$ plots, the plates should be at the two opposite poles, North and South.

Figure 9: positioning of metal plates in X and Y plots



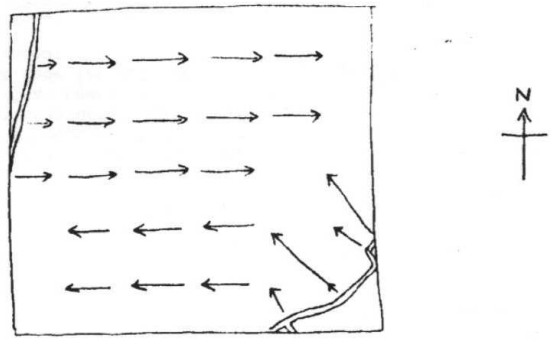
9.54 If it is not possible to place the plate adjacent to the quadrat, then it should be placed at the nearest possible location and distances and angles measured to show the precise location.

9.55 Wooden stakes may be useful supplements to the plates in woodlands and scrub situations as an extra aid to quadrat location. Stakes should be also be used to provide reference points in featureless ground, or adjacent to plots to aid visual location. For example, a large post can be used as a reference point for several quadrats on an open site, like a saltmarsh or exposed moorland. Stakes can also be placed on a woodland edge to indicate the route taken by the previous surveyor. Stakes are essential in unstable substrates.

9.56 In all cases, the position of the quadrat, and marker plates should be sketched on the reverse of the recording sheet, and annotated with distances (measured with a tape) and compass bearings. All distances should be measured from a plate to easily recognisable, and permanent, features in the surrounding landscape. Compass bearings should be given as grid north (ie after correction from Magnetic North) and an indication as to which direction the bearing was taken from should be included in the sketch map. The direction from which the plot was approached should also be given on the sketch map.

9.57 It would also be helpful, particularly in unenclosed land, to indicate the nearest fixed point from which points were located, even if more than 250m away, eg:

Figure 10: example of how to indicate direction of approach to each grid point, from fixed points



9.58 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.

9.59 The photograph should be taken with the plot laid out and the plot number (A6/H, G4/Y) etc should be written on the dry-board provided and be placed in a prominent position at the edge of plot.

9.60 The position from which the photograph was taken, and the direction of the shot, must be clearly shown on the sketch map showing the plot layout and position.

Guidelines on species identification

9.61 Using the same criteria as were used in the 1978 and 1990 surveys, the following section gives some guidelines on species identification.

9.62 Surveyors are expected to record to the species level wherever possible and, where unable to do so, should identify to the nearest taxon (with notes). 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 consistant with previous surveys, to allow certain combinations to be recorded.

9.63 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 list in Table 3 shows the combinations that were accepted in the CS1990 survey:

Table 3: Species aggregates used in Countryside Survey 1990

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 serpyllifolia/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)

9.64 A list of the 200 species which were most common in the ITE 1977/78 survey has been modified for use with the Key Habitats project and is listed on the field recording sheets; species names are abbreviated and their full names are given in Table 4 (listed in the same order as they appear on the recording sheets):

Table 4: species names and abbreviations of the "top 200" species

887 Bare ground
454 Wheat

GRASSES :

758	Agro cur	Agrostis curtisii
10	Agro can	Agrostis canina
11	Agro sto	Agrostis stolonifera
12	Agro cap	Agrostis capillaris (tenuis)
867	Agro vin	Agrostis vinealis
14	Aira prae	Aira praecox
20	Alop gen	Alopecurus geniculatus
21	Alop prat	Alopecurus pratensis
268	Ammo aren	Ammophila arenaria
28	Anth odo	Anthoxanthum odoratum
37	Arrh ela	Arrhenathrum elatius
205	Aven prat	Avenula pratensis
527	Aven pub	Avenula pubescens
1164	Brac pin	Brachypodium pinnatum

55	Brac syl	Brachypodium sylvaticum
57	Briz med	Briza media
606	Brom ere	Bromus erectus
58	Brom hord	Bromus hordaceous
61	Brom ster	Bromus sterilis
123	Cyno cri	Cynosurus cristatus
124	Dact glo	Dactylis glomerata
404	Dant dec	Danthonia decumbens
129	Desc ces	Deschampsia cespitosa
130	Desc fle	Deschampsia flexuosa
800	Elym pyc	Elymus pycanthus
8	Elym rep	Elymus repens
165	Fest ovi	Festuca ovina
166	Fest rub	Festuca rubra
199	Glyc flu	Glyceria fluitans
209	Holc lan	Holcus lanatus
210	Holc mol	Holcus mollis
657	Koel macr	Koeleria macrantha
949	Leym aren	Leymus arenarius
254	Loli per	Lolium perenne
283	Moli cae	Molinia caerulea
287	Nard str	Nardus stricta
304	Phle pra	Phleum pratense
305	Phra aus	Phragmites australis
319	Poa ann	Poa annua
321	Poa pra	Poa pratensis
847	Poa triv	Poa trivialis
923	Pucc mar	Puccinellia maritima
714	Spar sp.	Spartina sp.
1416	Tris flav	Trisetum flavescens

FORBS, WOODY SP, SEDGES, RUSHES & FERNS:

2	Acer pse	Acer pseudoplatanus
4	Achi mil	Achillea millefolium
5	Achi pta	Achillea ptarmica
7	Agri eup	Agrimonia eupatoria
18	Alli pet	Alliaria petiolata
19	Aln glut	Alnus glutinosa
24	Anag ten	Anagallis tenella
26	Ange syl	Angelica sylvestris
29	Anth syl	Anthriscus sylvestris
734	Anth vul	Anthyllis vulneria
36	Arme mar	Armeria maritima
587	Arum mac	Arum maculata
40	Aste tri	Aster tripolium
41	Athy fil	Athyrium filix-femina
1208	Atri pros	Atriplex prostrata
47	Bell per	Bellis perennis
1341	Betu pen	Betula pedula
1342	Betu pub	Betula pubescens
53	Blec spi	Blechnum spicant
64	Call vul	Calluna vulgaris
66	Caly sep	Calystegia sepium
812	Camp glom	Campanula glomerata
68	Camp rot	Campanula rotundifolia

69	Caps bur	Capsella bursa-pastoris
70	Card h/f	Cardamine hirsuta/flexuosa
71	Card pra	Cardamine pratensis
959	Care aren	Carex arenaria
74	Care bin	Carex binervis
621	Care cary	Carex caryophyllea
76	Care dem	Carex demissa
78	Care ech	Carex echinata
509	Care fla	Carex flacca
81	Care nig	Carex nigra
85	Care pan	Carex panicea
86	Care pil	Carex pilulifera
511	Carl vul	Carlina vulgaris
92	Cent nig	Centaurea nigra
645	Cent eryt	Centaurium erythraea
96	Cera fon	Cerastium fontanum
97	Cham ang	Chamaenerion angustifolium (Epilobium angustifolium)
98	Chen alb	Chenopodium album
101	Chry opp	Chrysosplenium oppositifolium
103	Cirs arv	Cirsium arvense
104	Cirs pal	Cirsium palustre
105	Cirs vul	Cirsium vulgare
111	Clin vul	Clinopodium vulgare
655	Coch off	Cochleria officinalis
113	Cono maj	Conopodium majus
114	Conv arv	Convolvulus arvensis
117	Cory ave	Corylus avellana
118	Crat mon	Crataegus monogyna
119	Crep cap	Crepis capillaris
590	Dact mac	Dactylorchis maculata agg.
132	Digi pur	Digitalis purpurea
136	Dros rot	Drosera rotundifolia
137	Dryo dil	Dryopteris dilatata
138	Dryo fil	Dryopteris filix-mas
140	Empe nig	Empetrum nigrum
143	Epil hir	Epilobium hirsutum
747	Epil mon	Epilobium montanum
144	Epil pal	Epilobium palustre
871	Epil tet	Epilobium tetragonum
147	Equi arv	Equisetum arvense
1343	Eric cil	Erica ciliaris
150	Eric cin	Erica cinerea
151	Eric tet	Erica tetralix
152	Erio ang	Eriophorum angustifolium
153	Erio vag	Eriophorum vaginatum
160	Euph sp.	Euphrasia sp.
168	Fili ulm	Filipendula ulmaria
170	Frax exc	Fraxinus excelsior
177	Gali apa	Galium aparine
180	Gali mol	Galium mollugo
182	Gali pal	Galium palustre
183	Gali sax	Galium saxatile
186	Gali ver	Galium verum
190	Gera mol	Geranium molle
193	Gera rob	Geranium robertianum
195	Geum urb	Geum urbanum

196	Glaux mar	Glaux maritima
197	Glec hed	Glechoma hederacea
1053	Halim po	Halimione portulacoides
204	Hede hel	Hedera helix
609	Heli numm	Helianthemum nummularium
206	Hera sph	Heracleum sphondylium
207	Hier pil	Hieracium pilosella
141	Hyac non	Hyacinthoides non-scripta
215	Hydr vul	Hydrocotyle vulgaris
219	Hype per	Hypericum perforatum
220	Hype pul	Hypericum pulchrum
877	Hypo rad	Hypochaeris radicata
836	Junc acu	Juncus acutiflorus
835	Junc art	Juncus articulatus
230	Junc bul	Juncus bulbosus
231	Junc con	Juncus conglomeratus
232	Junc eff	Juncus effusus
233	Junc ger	Juncus gerardii
804	Junc mar	Juncus maritima
235	Junc squ	Juncus squarrosus
238	Lami alb	Lamium album
239	Lami pur	Lamium purpureum
240	Laps comm	Lapsana communis
243	Lath pra	Lathyrus pratensis
879	Leon aut	Leontodon autumnalis
1060	Leon hisp	Leontodon hispidus
99	Leuc vulg	Leucanthemum vulgare
251	Linum cat	Linum catharticum
255	Loni per	Lonicera periclymenum
256	Lotu cor	Lotus corniculatus
258	Lotu ulig	Lotus uliginosus
832	Luzu cam	Luzula campestris
831	Luzu mul	Luzula multiflora
274	Med lup	Medicago lupilina
881	Menth aq	Mentha aquatica
277	Merc per	Mercurialis perennis
570	Myos scor	Myosotis scorpioides
286	Myri gal	Myrica gale
288	Nart oss	Narthecium ossifragum
291	Oenan cr	Oenanthe crocata
292	Onon rep	Ononis repens
296	Oxal ace	Oxalis acetosella
622	Past sat	Pastinaca sativa
302	Pedi syl	Pedicularis sylvatica
307	Pice sit	Picea sitchensis
310	Pimp sax	Pimpinella saxifraga
311	Ping vul	Pinguicula vulgaris
313	Pinu syl	Pinus sylvestris
650	Plan cor	Plantago coronopus
315	Plan lan	Plantago lanceolata
316	Plan maj	Plantago major
317	Plan mar	Plantago maritima
615	Plan med	Plantago media
834	Poly serp	Polygala serpyllifolia
833	Poly vul	Polygala vulgaris
324	Poly avic	Polygonum aviculare

328	Poly pers	Polygonum persicaria
336	Pote ans	Potentilla anserina
337	Pote ere	Potentilla erecta
339	Pote rep	Potentilla reptans
341	Prim ver	Primula veris
342	Prim vul	Primula vulgaris
343	Prun vul	Prunella vulgaris
346	Prun spi	Prunus spinosa
348	Pter aqu	Pteridium aquilinum
1344	Quer pet	Quercus petraea
1345	Quer rob	Quercus robur
350	Quer sp.	Quercus sp.
351	Ranu acr	Ranunculus acris
353	Ranu bulb	Ranunculus bulbosus
354	Ranu fic	Ranunculus ficaria
355	Ranu fla	Ranunculus flammula
357	Ranu rep	Ranunculus repens
370	Rosa sp.	Rosa sp.
373	Rubu fru	Rubus fruticosus
375	Rum a'sa	Rumex acetosa
376	Rum a'la	Rumex acetosella
837	Rum cong	Rumex conglomeratus
378	Rume cri	Rumex crispus
380	Rume obt	Rumex obtusifolius
381	Sagi sp.	Sagina sp.
384	Salix cin	Salix cinerea
563	Salix rep	Salix repens
386	Samb nig	Sambucus nigra
613	Sang min	Sanguisorba minor
393	Scab col	Scabiosa columbaria
401	Sene jac	Senecio jacobea
1026	Sene syl	Senecio sylvatica
402	Sene vul	Senecio vulgare
405	Sile dio	Silene dioica
806	Sile mar	Silene maritima
1417	Solan dul	Solanum dulcamara
412	Sonc arv	Sonchus arvensis
413	Sonc asp	Sonchus asper
414	Sonc ole	Sonchus oleraceus
415	Sorb auc	Sorbus aucuparia
1418	Sper rup	Spergularia rupicola
49	Stac off	Stachys officinalis
420	Stac syl	Stachys sylvatica
421	Stel als	Stellaria alsine
422	Stel gram	Stellaria graminea
423	Stel hol	Stellaria holostea
424	Stel med	Stellaria media
427	Succ pra	Succisa pratensis
430	Tara agg	Taraxacum agg.
432	Teuc sco	Teucrium scorodonia
845	Thym pra	Thymus praecox
441	Tori jap	Torilis japonica
443	Tric cae	Trichophorum caespitosum (Scirpus caespitosus)
446	Trif dub	Trifolium dubium
448	Trif pra	Trifolium pratense
449	Trif rep	Trifolium repens

450	Trig mar	Triglochin maritima
841	Trip mar	Tripleurospermum maritimum
456	Tuss far	Tussilago farfara
458	Ulex eur	Ulex europaeus
459	Ulex gal	Ulex gallii
1220	Ulex min	Ulex minor
462	Urti dio	Urtica dioica
463	Vacc myr	Vaccinium myrtillus
467	Vero arv	Veronica arvensis
468	Vero bec	Veronica beccabunga
469	Vero cha	Veronica chamaedrys
471	Vero off	Veronica officinalis
490	Vero per	Veronica persicaria
474	Vici crac	Vicia cracca
477	Vici sep	Vicia sepium
485	Viol hir	Viola hirta
482	Viol pal	Viola palustris
849	Viol r/r	Viola riviniana/reichenbachiana
486	Viol tri	Viola tricolor

BRYOPHYTES AND LICHENS

42	Atri und	Atrichum undulatum
1346	Aula pal	Aulacomnium palustre
1347	Brac alb	Brachythecium albicans
54	Brac rut	Brachythecium rutabulum
850	Brac sp.	Brachythecium sp.
1348	Cali cus	Calliergon cuspidatum
1386	Camp chyrs	Campylium chrso....
1349	Camp bre	Campylopus brevipylus
892	Camp int	Campylopus introflexus
917	Camp par	Campylopus paradoxus
1350	Camp pyr	Campylopus pyriformis
1351	Cera pur	Ceratodon purpurea
107	Clad arb	Cladonia arbuscula
1360	Clad coc	Cladonia coccifera
1361	Clad fim	Cladonia fimbriata
1362	Clad flo	Cladonia floerkinia
108	Clad fur	Cladonia furcata
512	Clad imp	Cladonia impexa
1397	Clad port	Cladonia portentosa
106	Clad pyx	Cladonia pyxidata
864	Clad rang	Cladonia rangiformis
1363	Clad squ	Cladonia squamosus
513	Clad unc	Cladonia uncialis
1089	Cten mol	Ctenidium molluscum
519	Dicr het	Dicranella heteromalla
131	Dicr sco	Dicranum scoparium
1126	Dipl alb	Diplophyllum albicans
161	Eurh sp.	Eurhynchium spp.
1419	Fiss cris	Fissidens cristatus
911	Fuma hyg	Fumaria hygrometrica
1080	Homo lut	Homothecium lutescens
216	Hylo spl	Hylocomium splendens
1056	Hypo phy	Hypogymnia physoides

222	Hypn cup	Hypnum cupressiforme
1156	Hypn jut	Hypnum jutlandicum
248	Leuc gla	Leucobryum glaucum
530	Loph sp.	Lophocolea spp.
280	Mniu hor	Mnium hornum
282	Mniu und	Mnium undulatum
1316	Neck cris	Neckera crispa
535	Pell sp.	Pellia spp.
857	Phil font	Philonotis fontanum
314	Plag und	Plagiothecium undulatum
318	Pleu sch	Pleurozium schreberi
1352	Pohl nut	Pohlia nutans
331	Poly com	Polytrichum commune
843	Poly jun	Polytrichum juniperinum
844	Poly pil	Polytricum piliferum
279	Pseu pur	Pseudoscleropodium purum
905	Ptil cil	Ptilidium ciliare
281	Rhiz pun	Rhizomnium punctatum
364	Rhyt lor	Rhytidiadelphus loreus
365	Rhyt squ	Rhytidiadelphus squarrosus
1353	Spha aur	Sphagnum auriculatum
1354	Spha cap	Sphagnum capillifolium
1355	Spha com	Sphagnum compactum
1356	Spha cus	Sphagnum cuspidatum
1357	Spha pal	Sphagnum palustre
1358	Spha pap	Sphagnum papilosum
1359	Spha rec	Sphagnum recurvum
1368	Spha ten	Sphagnum tenellum
439	Thui tam	Thuidium tamariscinum
925	Tort sp.	Tortula sp.

10. ARCHAEOLOGICAL FEATURES

10.1 A map is provided for the recording of any archaeological features which are noted in the square.

10.2 Any feature which might be of interest to the Archaeology Unit at Lancaster University should be marked, however crudely, on the map and a verbal description given below. Advantage should be taken of any high points within the square to observe the landscape and any excavations (eg drains, site development) should be examined.

10.3 A photograph (including a scale object) should be taken of any interesting feature.

11. PROCEDURE SUBSEQUENT TO SURVEY

11.1 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.

11.2 Data transfer onto fresh sheets is inadvisable and should only be carried out in the event of damage or spoiling of the original form.

11.3 Arrangements should be made to transport FABs back to ITE Merlewood Research Stations as soon as possible.

Colin Barr
May 1993