



# Countryside Survey

CS Technical Report No.2/07  
**Vegetation Plots  
Handbook**

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## INTRODUCTION

The survey involves recording plant species presence and abundance in different sizes and types of vegetation plot as described below. Being able to repeat plots (by re-finding their exact location) is a very important part of CS and provides us with a globally unique dataset allowing large-scale yet fine-grained change in vegetation over time to be documented at four points over the last 29 years. In order to maintain this valuable dataset it is essential that the following information is collected for each plot.

- General information about the plot including plot number and type, vegetation height etc (header information) as well as species presence and (usually) cover.
- Plot photo – for plot relocation (i.e. finding the position of the previously recorded plot) by surveyors in the next survey and to provide visual information about the plot.
- Paper map – for plot relocation by surveyors in the next survey.

For the first time in 2007 most of this data will be collected in a digital format. This saves time with data entry and avoids issues with poor writing/spelling. To this end a forms-based software tool called Vegplots will be used for the plot data capture (as described below). A digital camera will be used for plot photos and surveyors will download photos directly into a file labelled 'New\_Plot\_Photos' within the **C:\CEH\{square number}\New Plot Photos** directory on the tablet. For ease of use, plot maps will continue to be provided on and recorded on paper although digital copies will be available on the tablet.

### ***Relocation of plots***

A summary plot location map showing the distribution of all vegetation plots within the 1km is provided on both tablets in an ArcMap document (**Figure 1**). To access this map surveyors will need to open up ArcMap and locate the plot



map. Press on this icon **ArcMap** and select File > Open and navigate to **C:\CEH\square number\Field\_Data\** and select VegPlots.mxd.

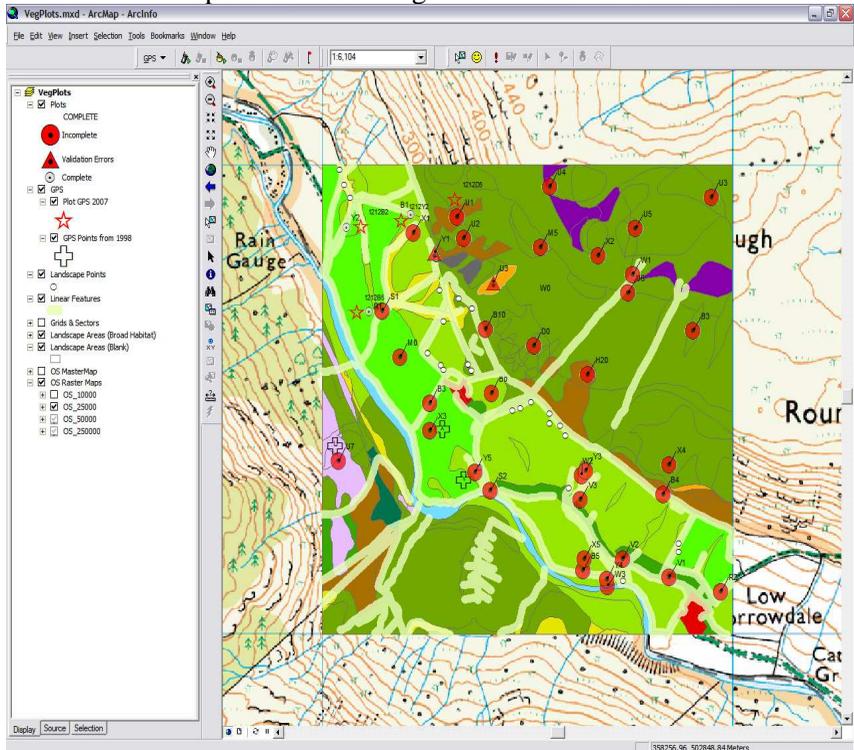
Further instructions on simpler ways to open the map may be provided at the training course. These plot maps have been digitised from a small paper map on which plot positions were originally marked. These plot maps are a first step in finding the position of a previously recorded plot location. They provide surveyors with information as to where plots are located in relation to one another and to prominent features in the landscape such as linear features. N.B. Plot locations are also visible in Surveyor.

The precise locations of individual plots are then found using individual plot maps (in most cases, one per plot, in others one map for 2 or more associated plots) and plot photos. Both photos and maps are provided for each square digitally on the tablet. Back-up digital plot maps are to be found in the folder labelled '2007\_plotmaps' in **C:\CEH\square number\FAB\2007\_plotmaps** and in paper form in the plastic file. Back-up digital plot photos from previous surveys are to be found in the folder labelled 'plot\_photos' in **C:\CEH\square number\FAB\plot\_photos** and in paper form in the wallet provided. In most cases plots were marked using either a metal plate (20 x 20cm aluminium tile) or a wooden stake (particularly in upland areas) as indicated on the plot maps. Finding the metal plate or stake is the proof of relocation. Metal detectors are

CS Technical Report No. 2/07: Vegetation Plots Handbook v1.0 provided to enable surveyors to detect the metal plates. Note however, that many plates will now have been buried for 23 years and may have been covered by layers of soil or may have moved. This will be especially true in damp areas or alongside streams. If the plate cannot be detected within 5-10 minutes of searching (less if surveyors have other evidence of being in the correct location or more if time allows and other location aids are poor (e.g. U plots on open moorland), then the plot should be located as well as possible using the plan and photograph or re-sited if surveyors are not confident that the plot will be a valid repeat.

Protocols for recording plots including failure to locate plots and the creation of new plots are described below. These protocols rely on BOTH the ArcMap plot map and the Vegplots software which are integrally linked.

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**Figure 1a and b. Summary Plot Location Map**

## *Adding New plots*

A new plot may be added for a number of reasons:

- An old plot cannot be found at the location.
- A new plot type has been added to the Survey (M plots).

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- A new square is being surveyed (Wales).
- Change in land use in the square has resulted in the addition of an extra plot (A, D, U).
- Re-allocation of D plots to include different kinds of Woody Linear Feature.
- Extra U, D or A plots may need to be located in some Scottish squares (see individual plot protocols below).
- Extra S/W plots will be required in certain squares where the River Habitat Survey site has been re-located (as indicated in the relevant square folders).
- Extra Y plots will be required where Priority Habitats (PH's) are mapped for the first time and where these habitat types are not sampled by the existing plot series in the square.

Plots can be located in any semi-natural vegetation; this includes amenity grass such as playing fields or on golf courses where permission has been given. Specific instructions for locating particular plot types are given in the Plot types section below.

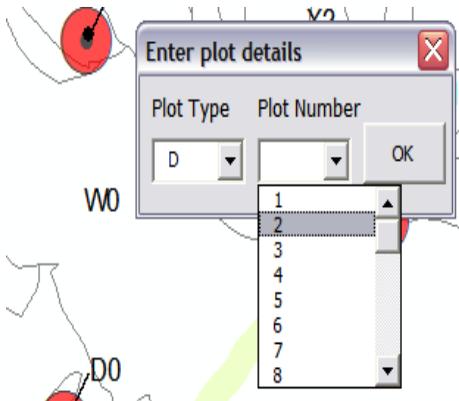
New plots should be permanently marked using either a metal plate or a wooden stake. The plate should not be within the plot itself; it should be driven into the ground at an angle of 45 degrees until the top edge is just below ground level (aligned to give maximum likelihood of easy relocation with a metal detector). Wooden stakes may be suitable in woodlands and moorland situations where metal plates would be difficult to re-locate. Stakes should be hammered in so that about 10-15 cm protrudes above ground.

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Adding new plots will depend on the findings from the mapping exercise and therefore surveyors carrying out the mapping will need to communicate with those doing the vegetation plots in order to alert them to areas requiring new plots and where necessary note details down on paper. N.B. Mappers will be provided with plot locations in Surveyor.

### *Adding New plots in ArcMap*

A new plot is added in the ArcMap file as a point. The surveyor can add a point by clicking the exclamation mark  (see Figure 1) to start an Edit session and selecting the Add plot button . Upon clicking on the map the surveyor will be asked to enter Plot type and Plot number.



In order to Save the new plot the surveyor will need to click on the Save button  and to stop editing by pressing the Stop editing button . If you have added a plot by mistake do not press the Save button, press Stop editing and in the Save dialog box press 'No'. Only once a plot has been added in ArcMap will it be available for data entry in VegPlots as described above.

\*\*\*\*\*

**All vegetation plots that are recorded for the first time in 2007 must have**

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**their positions marked on the tablet plot map. Unless they are M plots or plots in new squares they must be given a number greater than the current maximum number for the plot type within that square This must be done to ensure that the newly positioned plot is not treated as a repeat plot that was recorded in the same place as in previous surveys. Hence, if there were 5 Y plots in a square, a new Y plot MUST be labelled Y6, Y7 etc. If there were only 6 U plots, then new U plots can be labelled from U7 upwards.**

\*\*\*\*\*

### ***Moving Plots***

If a surveyor feels that the plot position on the ArcMap file is inaccurate in relation to landscape features (e.g. the wrong side of a hedge or road) they are able to move the plot by clicking on the edit tool  and dragging the plot to its new location. N.B. do not attempt to move plots in relation to their GPS position.

### ***Using and Logging GPS locations for plots***

For some squares (particularly in the uplands) GPS locations were recorded in the last survey using a differential GPS (which at the time was probably comparable to a non-differential GPS today). These locations (where possible) are shown in the ArcMap plot location file on the tablet as the outline of a black



cross with a letter (indicating plot type, but not number) in the centre. It is usually fairly straightforward to work out which cross refers to which plot. To use these GPS locations effectively surveyors should use the GPS on the tablet (see technical manual) as an aid (alongside the plot maps and photos) to establish whether they are in approximately the location recorded previously.

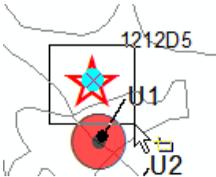
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Although the tablets only have a non-differential GPS it has been decided that in order to aid plot location in the future surveyors will need to log the GPS coordinates of plots as they are recording vegetation in those plots. This will be done within the ArcMap plot map file. As surveyors are recording the plot they

should use the stamp tool on the toolbar  to mark the plot GPS

location  on the map. To label the star with the plot type and number the

surveyor should first click on the select feature tool  and drag a box over



the star . The star will then be highlighted with a blue circle

in its centre. To label the star the surveyor should select the label tool 

upon which a small text box will open allowing the surveyor to select a plot type and number as for adding plots (above). On closing this box the plot will be labelled with the square number, plot type and plot number.

## PLOT RECORDING IN VEGPLOTS

\*\*\*\*\*

**Take care to disturb the vegetation as little as possible - this applies particularly to fragile assemblages in flushes and other wetlands - but bear in mind that a full census of the vegetation species composition must be carried out.**

\*\*\*\*\*

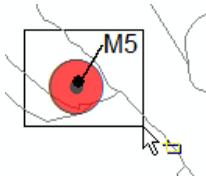
### *Logistics of recording on tablets*

Ideally vegetation plots will be recorded on one of the two tablets per team. However, it is recognised that there may be times when in order to complete the plots in a square surveyors will want to use both tablets to record plots. If this is going to be done it is essential for surveyors to differentiate between the two vegplots datasets being created for the square in order to ensure that they do not overwrite one another when they are uploaded. To do this the datasets should be labelled according to whether the tablet is labelled A or B at the **end** of plot data collection. On tablet A **C:\CEH\square number\Field\_Data\VegetationPlots.mdb** becomes **VegetationPlotsA.mdb**. Detailed instructions on uploading the data will be provided at the training course.

### *Data entry*

In order to begin plot data entry (including recording when a plot has **not** be found) surveyors will need to locate the position of the relevant plot in the ArcMap file. Once the point representing the plot has been located in the ArcMap file. The surveyor can click on the select feature icon  and drag

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the pen across the point marking the plot location on the map



. Once selected the surveyor needs to click on the smiling face icon  in order to start up the VegPlots software which opens up on the Standard Recording screen for the relevant plot number.

Countryside Survey: VegPlots (v1.1)

Select Plot ID and Nest Plot Identity

Plot ID 1212U2 Nest 1 Square 1212 Plot Type U Plot Number 2 Plot ID 1212U2 Validate Save Exit

Header Plot Specific Headers Common Sp Grasses Sedges/Rushes Ferns Forbs/Woody Species Mosses/Lichens Crops Unidentified Sp Selected Species

Plot Relocation Plot Recorded Plate detected? If plot is a replacement for an unfound plot Plot ID of unfound plot

Plot Description Slope Aspect Shade Photos taken? Plot Map drawn?

Vegetation Height Canopy Shrub Ground

Admin Surveyors Plot completed? Notes Save Names

**Figure 2. Standard VegPlots Recording screen**

On the standard recording form the **Select Plot ID** and **Nest** fields will appear in the top left hand corner. The Select Plot ID field will be filled with the plot

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ID as selected from the ArcMap file and the Nest field will default to 0. Once the plot has been completed and entries validated the surveyor is able to select another plot to record from within the Vegplots application by choosing from the Select Plot ID dropdown. The Nest field is described under the Selected species section (below). At the top right of the form; Square, Plot Type, Plot Number and Plot ID of the plot which was clicked on in the Arc Map screen will be already entered, consisting of the following;

- **Square** - CS square number
- **Plot Type** - A,B,D,H,M,R,S,U,V,W,X,Y
- **Plot Number** - 1, 2, 3,...
- **Plot ID** - Square + Plot Type + Plot Number

Adjacent to these fields are the **Validate**, **Save** and **Exit** Buttons which are to be used on completion of recording (see Completing Plots below). Underneath this information a series of tabs are present across the screen, the first of which 'Headers' will be open for data entry.

## **HEADER**

The various bits of information within Vegplots have been organised under a series of sub-headings;

### ***Plot relocation***

If a previous plot position cannot be relocated satisfactorily using previous maps and photos and/or other markers the plot should be recorded as 'Not found' and a new plot created. This information will enable us to carry out analysis differently dependent on whether plots were considered as valid

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repeats or not. A degree of judgement is needed. If for example, the vegetation being sampled is reasonably homogenous fertile grassland or upland heath then a greater amount of relocation error might be allowed i.e. you believe you are in roughly the right location but 10-20 metres either way might not bring the plot into a different habitat type. On the other hand, the same uncertainty over the location of a Y plot could result in the plot being in a very different habitat type than that originally targeted – Y plots target uncommon assemblages in the survey square. This might lead you to recommend that the data cannot be reliably analysed as if all records were taken from the same position. The decision is left to the surveyor as they are in the best position to decide.

N.B. A plot will also not be recorded if it is no longer appropriate to record the plot due to changes in land use/habitat, e.g. Arable margin (A) plots should not be recorded in non-arable fields, a new housing estate built on a grass field would no longer have an X plot.

- **Plot Recorded** [Found, Not Found, New Plot (Replacement for unfound plot), New Plot (New feature/Land cover), Not appropriate, No Longer Required (some D plots will be dropped in this survey- see below), Access Denied, Too Dangerous]

*If a plot is recorded as 'Not Found' the only other information to be recorded on the Header tab is that under the Admin sub-heading (below). New plots should be added as described at the end of this section.*

- **Plate detected?** [– Yes, No, 'No (new plate buried)', No plate to find (this may refer to upland plots where metal plates were considered inappropriate plot markers)]

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- **Plot ID of unfound plot** [- Rep ID of plot that has been replaced when plot not found. – list of all plots in square]

### *Plot description*

- **Slope** - Flat, Slight, Moderate, Steep
- **Aspect** - None, N, NE, E, SE, S, SW, W, NW
- **Shade** (as at 12 noon) - None, Partial (some direct sunlight is reaching the plot), Full
- **Photos taken?** - Yes, No. In most cases this is just a reminder to ensure that you DO take a plot photo. Answer 'No' only where a new photo would make plot re-location harder (e.g. in thick fog) See Plot photo protocol (pg 13)
- **Plot Map drawn?** [MAP]- Yes, No, Edited, Redrawn. Plot maps are essential data, we need both a record of what has been done with the maps and copies of the maps themselves. See Plot Map protocol (pgs 13 & 14)

### *Vegetation Height*

*Surveyors are asked to provide an estimate or measure of modal (the most frequently encountered) vegetation height at three levels in the plot*

- **Canopy** subdivided into None, 3-5m, 5-10m and >10m
- **Shrub** subdivided into None, 0-5cm, 5-15cm, 15- 40cm, 40cm -1m, 1-3m, 3-5m, and >5m
- **Ground** subdivided into None, <1cm, 1-5cm, 5-15cm, 15- 40cm, 40cm -1m, and >1m

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### *Admin*

- **Surveyors** - free text initials (will automatically enter previously entered sets of initials if 'Save Names' to the right of the field is clicked)
- **Plot Completed?** - Complete, Complete with validation errors, Incomplete (as default)

### *Notes*

Free text, mainly to describe why plot has been lost or other reasons why it was not appropriate to do plot (max 250 characters).

## PLOT SPECIFIC HEADER INFORMATION

This tab contains a range of information which is required for the different plot types. The surveyors will only be able to enter data relevant to the plot type as featured at the top of the screen. The header information relevant to the different plot types is detailed under each plot type which is described later on in this plot manual.

## LISTED SPECIES

For some plot types (see individual plot type protocols) species recording will

The screenshot shows the 'Countryside Survey: VegPlots (v1.1)' application window. The 'Select Plot ID and Nest' section has 'Plot ID' set to '1212X3' and 'Nest' set to '0'. The 'Plot Identity' section has 'Square' set to '1212' and 'Plot Type' set to 'X'. Below these are tabs for 'Header', 'Plot Specific Headers', and 'Sp'. The 'Sp' tab is active, showing a list of species with checkboxes. A dropdown menu is open over the 'Sp' tab, showing options 0 through 5. The species list includes 'Bare Ground', 'Litter', 'Rock', 'Trifolium pratense sens.lat.', 'Anthriscus syl', 'Bellis perennis', and 'Calluna vulga'.

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be carried out in a series of nested plots. The **Nest** field will need to be filled  
as appropriate when recording.

Listed species consists of a series of tabs for different species groups;  
Common species, Grasses, Sedges/Rushes, Ferns, Forbs/Woody species,  
Mosses/Lichens, Crops and Unidentified species provide species lists when  
the relevant tab at the top of the Header screen is clicked on. The Common  
species screen consists of a list of up to 100 common species of plants (herbs,  
grasses, bryophytes, ferns, sedges/rushes). Other screens for each of the  
separate groups of species (i.e. grasses, herbs etc) consist of comprehensive  
lists of possible species. Where any of these is present, then the box against  
the species name should be checked. Where it is not possible to identify a  
species immediately it is possible to enter species A-C on the Common  
species tab and species D-Z on the Unidentified Species tab in the field and  
the species can be collected for later identification. N.B. Plots can be finalised  
despite including Unidentified species but surveyors will be alerted to these  
when validating a plot.

## **SELECTED SPECIES**

As each species is selected using the tablet pen, it is loaded as a record into a  
growing species/nest list for the plot. When the surveyor has completed  
identification of all species in the plot he/she should click on the Selected  
Species tab (Figure 3). The Selected Species tab lists all species ticked in the  
species lists and the nest in which they have been recorded. On this tab the  
estimated total cover % of each species (and covers for particular 'nested  
quadrats' as appropriate) should be entered using presence (recorded as 1%)  
and thereafter 5% cover categories. When clicked on a drop down list of %  
cover will appear in the box adjacent to the listed species, it is essential to

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click on the chosen category for it to appear in the % cover cell of the table.

At the bottom of the selected Species list a **Delete Selected Rows** button enables surveyors to click on the left hand end of a row or series of rows and highlight them for deletion (by pressing the button). Estimates of cover should be constantly checked between partners 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* (100%) over *Agrostis* (25%). Trees and shrubs whose canopies project over the plot should also be listed as present and cover estimated in the normal way. Do not double count overhanging and rooted material of the same species. ‘Bare ground’ does not include leaf litter and rock. All vascular plants should be recorded, together with a restricted list of bryophytes and lichens (as given). Mosses/lichens growing on rocks/trees should be ignored.

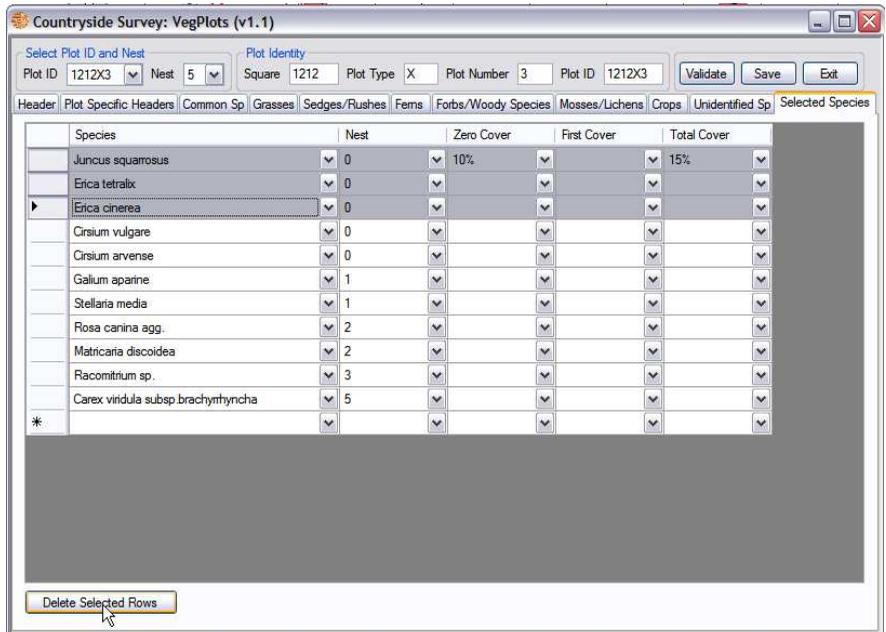
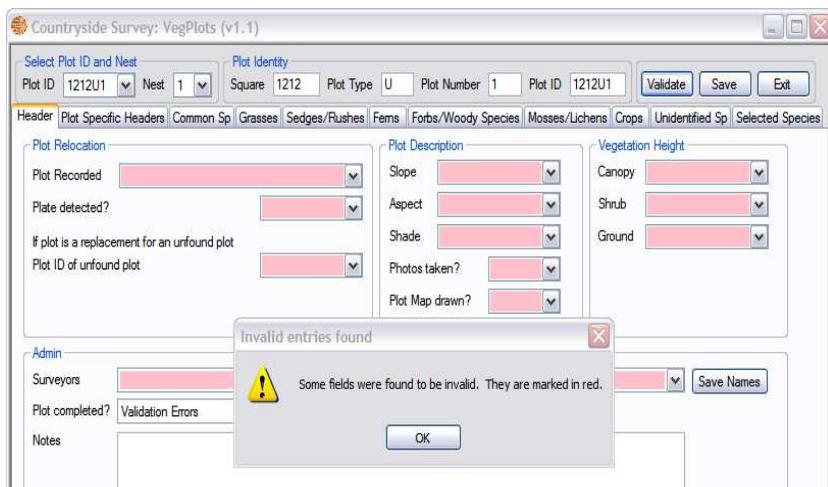


Figure 3. Selected Species tab with three records highlighted for deletion

### ***Completing Plots***

It is recommended that surveyors use the Save button to save regularly to avoid data loss as a result of battery failure or other problem (there is a backup save but this will not avoid loss of all data). On completion of each plot surveyors should use the Validate button to highlight any areas with missing fields. Header fields will be highlighted in Red (Figure 4) and missing information on the Selected Species tab will show a red circle with an exclamation mark .



**Figure 4. Header Validation**

Once data is validated the surveyor should Save and Exit. If the surveyor attempts to Exit or change the plot (using the Select Plot ID button – top left of the screen) they will be asked to validate the data before doing so.

## **PLOT PHOTO PROTOCOL**

Surveyors are asked to take new photos of each plot location. These photos will primarily be used to help surveyors find the same plot locations in the next

CS Technical Report No. 2/07: Vegetation Plots Handbook v1.0 survey. However the photos have also proved useful for illustrating trends in vegetation change. For this reason as far as possible surveyors are asked to attempt to take photos which essentially repeat the photos from the previous survey. The most useful photos provide a reference point to aid plot location, i.e. something obvious, unique, relatively permanent and not too far away e.g. a prominent rock, lamp post etc. It is essential that all plot photos feature information on plot number and type. Surveyors have been supplied with a set of letters and numbers on waterproof paper which can be attached to the back of a weather writer to indicate the number and type of plot featured in the photo. From the evidence of previous surveys the most useful plot photos show the surveyor holding the weather writer vertically behind or to the side of a plot (at plot location marker) NOT facing the sun (which can cause glare and make it impossible to decipher the plot type and number) or including too much sky. As surveyors will be using digital cameras this survey it will be possible to check how good/useful the photo is immediately and take another if the one taken is inadequate. It is anticipated that one or two photos should be adequate for plot re-location. Where plot location is difficult (e.g. in uniform upland vegetation) please indicate direction of photo taken on the plot location map. When all plots are completed the surveyor is asked to download all plot photos into the photo file on the tablet for each survey square **C:\CEH\square number\New\_Plot\_Photos**. This will need to be done indoors using the USB lead. The memory card in the camera is unlikely to be able to hold all photos taken by one team during the survey and therefore at some point during the survey period surveyors will need to erase photos on the camera that have already been downloaded onto the tablet.

## **PLOT MAP PROTOCOL**

Plot maps constitute very important information. When drawing new maps

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please make them as clear and precise as possible using the measuring equipment and compass at your disposal. The maps need not be works of art but they do need to be useable. You will know from your own experience of using plot maps drawn by others what is and is not useful. Try to be as helpful as possible in upland situations where reference points may be scarce. In such situations, surveyors have often taken back bearings from reasonably distant features on the skyline. This is completely acceptable. The possibility of misty conditions next survey is no reason not to record them but also do not use distant features as a substitute for measuring to nearby reference points.

When drawing new maps surveyors may include more than one plot on a map if the plots are co-located, e.g. X, B, A, M plots or H and D plots (see below for further details)

Surveyors have been provided with plot maps for all squares which have previously been surveyed. Where surveyors are repeating a plot and the map provided is adequate, this should be recorded in the Vegplots software by answering NO to the plot map entry and no further action taken. Where the surveyors considers a map to be inadequate (e.g. missing an essential feature) or where something has changed in the landscape since the previous map was drawn they may want to edit or redraw the map they have been provided with. If this is the case it should be indicated in the Vegplots software by answering Edited or Redrawn. An edited map should feature edits made in pencil (make sure the map is clear enough to appear on a photocopy), the word 'edited' with surveyors initials and date. Similarly for maps redrawn, plot location should be drawn on a map recording sheet provided, clearly showing plot position with relevant measurements and angles to nearby reference features. Surveyors should indicate that the plot map has been 'redrawn' on the recording sheet.

Where a plot has been newly positioned or in new survey squares, a sketch of the plot location should be drawn on one of the waterproof map recording sheets provided in the plastic folder. The map should clearly define plot location using measured distances and compass bearings to nearby reference features. These sketches should be clearly labelled with square and plot number. If surveyors run out of map recording sheets they should record maps on blank sheets and ensure that maps include Square number, Plot type and number, date and surveyors initials.

## PLOT TYPES

**Table 1. Plot types to be recorded in each square**

Code	Name	Other names	Where	Size	No. per square
<i>Areal plots</i>					
X <sup>1</sup>	Large	‘Wally plot’ Main	Random points in open polygons	200 m <sup>2</sup>	5
Y <sup>2+4</sup>	Small	Targeted Habitat	Uncommon vegetation types and in 2007, Priority Habitats	4 m <sup>2</sup>	Up to 5
U <sup>3</sup>	Unenclosed		Unenclosed Broad Habitats	4 m <sup>2</sup>	Up to 10
<i>Linear plots</i>					
B <sup>2</sup>	Boundary		Adjacent to field boundaries and paired with X plots	10 x 1 m	5
A <sup>3</sup>	Arable		Arable field edges	100 x 1	Up to 5

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			centred on each B plot	m	
M <sup>4+5</sup>	Margin		Field margins	2 x 2 m	Up to 15
H <sup>1</sup>	Hedgerow		Alongside hedgerows	10 x 1 m	2
D <sup>3</sup>	Hedgerow diversity		Hedgerows	30 x 1 m	Up to 10
S <sup>1</sup> /W <sub>2</sub>	Streamside		Alongside water courses	10 x 1 m	5
R <sup>1</sup> /V <sub>2</sub>	Roadside		Alongside roads and tracks	10 x 1 m	5
				MAX	67

<sup>1</sup> first recorded in 1978, <sup>2</sup> first recorded in 1990, <sup>3</sup> first recorded in 1998, <sup>4</sup> new in 2007, <sup>5</sup> if there are 5 A plots in a square and wide margins

### X PLOTS – LARGE, MAIN OR ‘WALLY’ PLOTS (X1-X5)

X plots are large (200m<sup>2</sup>) plots designed to provide a random sample of the most common vegetation types in the countryside.

#### *Locating new X plots*

Surveyors in new squares will be provided with random points for X plot locations. Surveyors should locate plots as close as possible to points marked on the ArcMap plot map. Where the random point indicates that the X plot would cross a linear feature, the plot should be located in vegetated land so that the linear feature is at least 3m from the edge of the X plot. A position on the boundary closest to the X plot and on a cardinal axis from it (i.e. N, S E or W) will be the location of the B plot (see below).

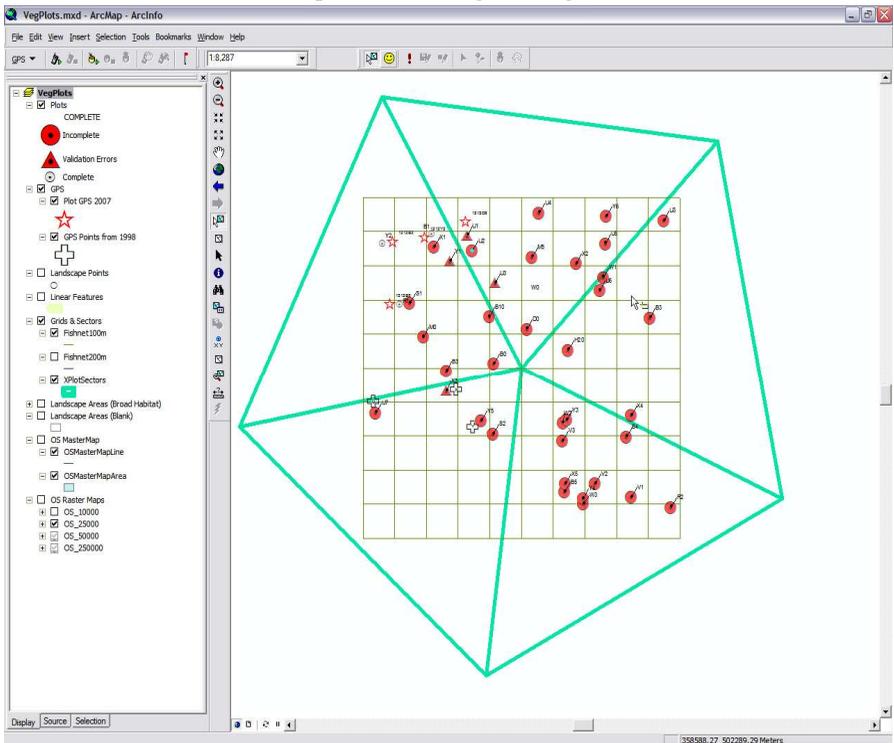
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Wherever possible, the plot should be marked with a metal plate (or wooden stake in unenclosed upland habitats) immediately adjacent to the south corner of the plot (and sloping away from the plot). This should be possible in most unenclosed land and in woodlands. Elsewhere, in cultivated land or wet habitats, plots should be marked by inserting a plate at the nearest field boundary, along a cardinal bearing line (Figure 7). The distance of the boundary from the plot should be measured from the centre of the plot to the position of the boundary plate. In semi-enclosed areas where plate burial is inappropriate and where boundaries are more than 100 metres away, there should be an attempt to mark the plot by reference to an obvious local feature, such as a boulder or tree where the plate should be buried (N.B. see Boundary Plots for definitions of field boundary).

When replacing a plot due to land-use change e.g. development, the surveyors should locate a position on vegetated land nearest to the original plot location but at least 3m away from any linear feature. Note that if, as a result of land-use change, eligible vegetated land is very scarce in a square, it may not be possible to find and record locations for all new X plots and other plot types. To determine whether a new X plot position can be feasibly recorded, the surveyors should use the five sector overlay on the ArcMap plot location map.

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Since the original X plot positions were stratified by these five sectors, a new X plot will not be possible if there is no eligible land present in the sector containing the X plot that cannot be recorded. The five sector stratification is a layer (XPlotSectors) available in ArcMap. If there is eligible land available in that sector then apply the rule above for finding a new X plot location. More information on this will be provided during training.



**Figure 5. The five sector stratification for X plots**

Where land use for the X plot location has changed to arable surveyors will need to locate a new plot position. Similarly a new X plot may need to be recorded due to the adoption of margin options under ELS by the farmer. In either case, the plot should be placed at the edge of the crop nearest to its

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original position Where an X plot location has been moved because of arable cultivation or margin instatement, the surveyor will enter **Plot Recorded** 'Not Found' against the previous plot and **Plot Recorded** 'New Plot (New feature/Land cover)' against the New plot and will be able to use the notes section to enter 'new margin'

### *Finding previous X plot locations*

Metal plates for X plots were placed at the south-most corner of the plot (or in the field boundary). Check the plot map and photographs provided.

### *Laying out X plots*

The vegetation plot is 200 m<sup>2</sup> (14.14 x 14.14m) and is set up by using the survey poles provided with the strings forming the diagonals of the square (Figure 6). The diagonals should be orientated carefully at right angles and the plot should be orientated with the strings on the North/South, East/West axes. In arable fields the plot should be taken as being a 14m square (estimated, not measured), starting 3 metres into the crop (to avoid any edge effect). Access should be made using drill lines where possible and causing minimum disturbance to the crop (or where the crop may be on a future visit). The species list should be compiled from what can be seen in the crop - accuracy is difficult to achieve but samples must be taken from arable crops however possible. The different nested plots shown in Figure 6 are marked by different coloured strings on the appropriate position of the diagonal. The 1m<sup>2</sup> nest is not marked and comprises the northernmost corner of the inner 4 m<sup>2</sup> nest (see Figure 6).

## ***Recording X plots***

### HEADER

The only header information required specifically for X plots is:

- **Soil sample taken** : Yes, No, Some (may occur if soil is particularly difficult to sample)
- **Date**: a calendar is provided which defaults to today's date, click to select.

### LISTED SPECIES

Firstly, all species are recorded from the 1m<sup>2</sup> nest, which forms the northern quarter of the inner 4m<sup>2</sup> nest [nest 0](see Figure 6), by clicking each species name on the species group tabs or selecting an additional species from the scrollable drop-down BRC list found at the right of the species name field in the Selected Species tab. The cover, in 5% bands, should then be selected using the drop-down in the second column [zero cover]of the Selected Species tab. Secondly, all species are recorded from the central nested 4m<sup>2</sup> plot [nest 1]. The cover, in 5% bands, should then be selected in the [1<sup>st</sup> cover] column.

When the inner 4m<sup>2</sup> plot has been completed, the other outer nests are completed in sequence only recording presence of additional species not recorded in a previous nest. Each additional nested plot (labelled 2 – 5) is examined in this way until all sizes of plots have been recorded. After a final check for any missed species an overall cover estimate should be made for all species with a cover of 5% or more in the whole 200m<sup>2</sup> plot (i.e. including the inner 4m<sup>2</sup>) in the [Total Cover] column.

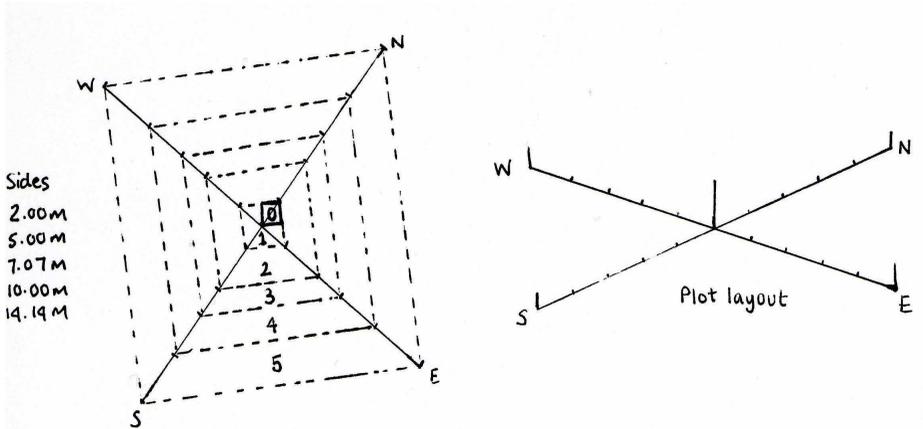


Figure 6. Design of X (Wally) Plot

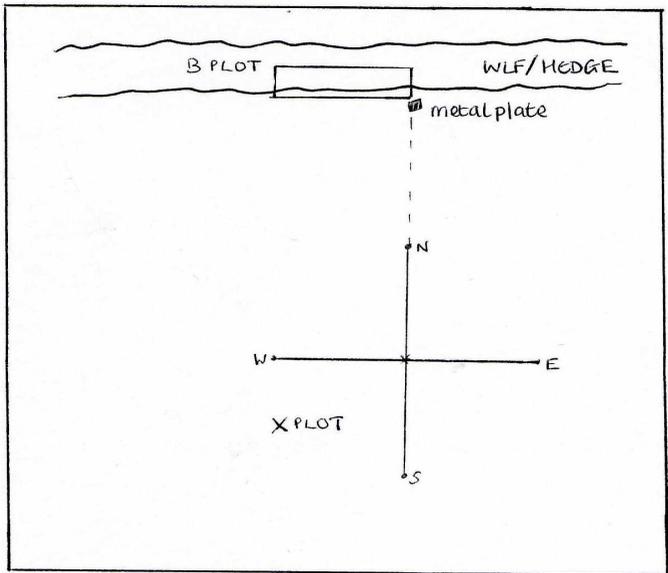


Figure 7. Marking X and B plots

## Y PLOTS – SMALL, TARGETED OR HABITAT PLOTS (Y1-Y5)

These are small (2m x 2m) plots located in interesting habitat types not necessarily well sampled by other plot types. In CS2007 new Y plots also need to be placed in Priority Habitat patches that have not been sampled by any other plot in the square. Hence, the need for new Y plots and their locations can only be determined after the whole square has been mapped and Priority Habitat patches assigned using the key to habitat types.

### *Positioning new Y plots*

In new squares up to 5 Y plots should be placed in semi-natural habitat types not sampled by the other plots in the square. In CS2007 new Y plots should also be placed in any un-sampled areas mapped as Priority Habitat even if the number of plots then exceeds 5 (N.B. It is anticipated that most areas of PH will already have been sampled by existing Y plots even though in the previous surveys the PH classification was not applied). Where more than one area of a particular Priority Habitat is present in a square, a representative location should be selected at random from the number of patches available. To do this, the surveyor needs to draw up a list of areas of the *same* PH and then arbitrarily code them 1 to *n*. The surveyor should then select a patch by drawing a random number between 1 and *n*. A random number generator is provided on the tablet (C:CEH\SquareNumber\Random number).

Replacement plots for plots which can not be found, should be placed centrally within the same area of interesting habitat where possible or in an alternative patch if available.

### ***Finding previous Y plot locations***

In general the metal plates were placed immediately adjacent to the survey pole at the south point of the plot, but just outside (15cm) the plot boundary or somewhere else on the plot perimeter. Check sketch map and plot photos provided.

### ***Laying out Y plots***

The plot should be placed to best represent the habitat patch – there is a large element of judgement involved but efforts should be made to avoid bias in positioning of the plot. If the centre is not representative of the habitat type (e.g. rock boulder in middle of flush), then re-position the plot. If the plot is put into a linear feature within which a 2x2 m plot will not fit then the area should be made up to 4m<sup>2</sup> by extending the length - this should be clearly depicted with measurements made on the new plot map.

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

***Recording Y plots***

HEADER

Surveyors will be asked to record the specific Priority Habitat which the plot represents (or 'none' if the habitat is not a PH). Priority Habitat names or 'None' should be selected from the drop-down list.

- **Priority Habitat:** 22 PH options or None

LISTED SPECIES

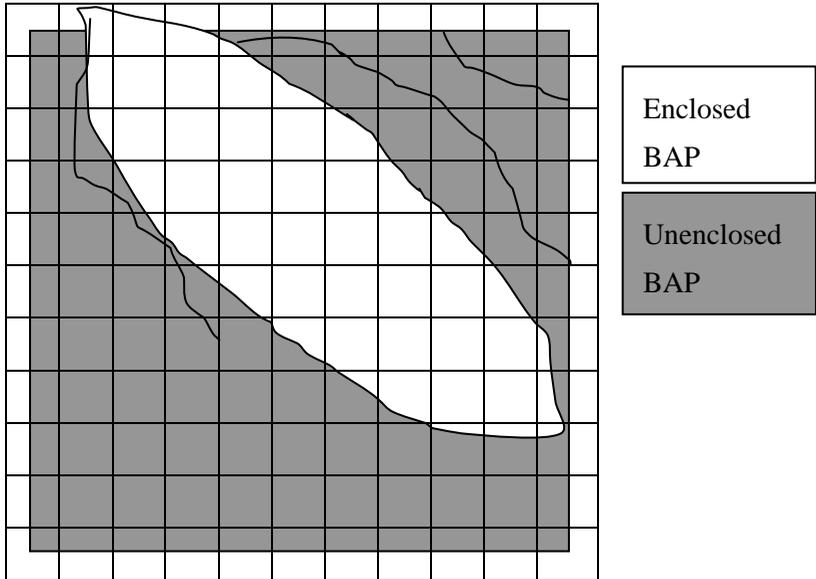
The species present in the square should be recorded in the same way as for nest 1 of the large X plots (i.e. 2 x 2m) and a cover estimate made.

**U PLOTS – UNENCLOSED PLOTS (U1-U10)**

These plots were introduced into the CS methodology for the first time in 1998. Up to 10 plots were established in any unenclosed Broad Habitat types that occurred within the square so this is the first time that they will be repeated. The plots are 2 x 2 m in all instances, irrespective of the habitat in which they are located.

***Location of U plots***

In order to assign U plots in the last survey all Broad Habitats were first mapped. The number of plots assigned depended on the proportion of the square that was occupied by unenclosed Broad Habitats. If the whole square comprised unenclosed Broad Habitats 10 U plots were established; if half the square was made up of these habitats, then 5 U plots were placed, etc. A grid was provided to allow estimation of the proportion of the square which was made up of unenclosed habitat types i.e. the number of intersects occurring in enclosed versus unenclosed habitats were counted (and thence the number of plots to be established). Thus, in the example below (Fig 8), about 63% of the square is in the Unenclosed Broad Habitat area and therefore 6 plots would be allocated.



**Figure 8. Grid used in the previous allocation of U plots**

### ***Locating new U plots***

Surveyors should carry out a check on the extent of unenclosed Broad Habitats in the square to ensure that the U plots continue to accurately represent the extent and types of Broad Habitat present. In Scottish squares this is particularly important as in the last survey in some squares a maximum of 5 U plots were done (rather than the 10 maximum for other squares). For these squares, if relevant 5 more U plots should be located. It is important to maintain the time series and plots should be repeated if they can be re-found. Where there has been a change in either the extent or type of unenclosed Broad

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Habitats in a square new plots may be required (but not exceeding a total of 10 as the sum of new and old U plots). These should be allocated according to the rules under which plots were originally placed. Once the number of plots has been determined, then the plots are distributed among the different Broad Habitats, as follows:

If there are more plots available than there are different Broad Habitats, then:

- (i) At least one plot is placed in each Broad Habitat (to ensure representation of all unenclosed Broad Habitats present within the square).
- (ii) The remaining plots are then allocated to the habitats in proportion to their area, as shown in the following example where 6 plots are available for placement:

**Table 2. Example plot allocation for U plots**

Unenclosed BAP type	% of unenclosed BAP area	Compulsory plots	Allocation of remaining 3 plots	Total plot allocation
8	63	1	63% of 3 = 2	3
9	30	1	30% of 3 = 1	2
10	3	1	3% of 3 = <1 (=0)	1

If there are more Broad Habitat types present than there are plots available, then the plots are allocated randomly to the habitat types but, not more than one per type. **N.B.** all mosaics are treated as one single Broad Habitat category, irrespective of their component parts.

Once it is known how many plots are to be placed in each habitat type, then plots should be placed at random points, within each habitat, where each point is an intersection of the 100m fishnet (Figure 9).



**Figure 9. Fishnet overlay on Broad Habitat map on the tablet**

The best way to do this is simply to count up the number of fishnet intersections that coincide with each unenclosed Broad Habitat. Then, if you need 3 plot locations, select three random numbers from the random number generator provided on the tablet. In order to scale the random numbers, which are between 0 and 1, to the number of intersections for the Broad Habitat, simply multiply each random number by the total number of intersections and

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 round to the nearest integer. Where a Broad Habitat type is not 'hit' by any  
 grid point because it is too small yet still >MMU, then one plot should be  
 located in the centre of gravity of the largest parcel of that Broad Habitat type.  
 Note that the Broad Habitat types that should be sampled with U plots are  
 defined in the table below and *not* by their occurrence in unenclosed  
 landscapes. Hence, small areas of lowland heath, bog or calcareous grassland  
 should all be U plot sampled despite being embedded in an enclosed landscape  
 (although not where they are already sampled by Y plots).

**Table 3. List of unenclosed Broad Habitat types eligible for U plot sampling. See key for definition and identity of constituent Priority Habitats.**

<b>Code number</b>	<b>Name</b>
7	Calcareous grassland
8	Acid grassland
9	Bracken
10	Dwarf shrub heath
11	Fen, marsh & swamp
12	Bog
15	Montane
18	Supralittoral rock
19	Supralittoral sediment
26	Inland rock

**N.B.** No plot should be placed within 10 m of an existing Y plot.

The protocol for replacement plots should be on the same basis as the original allocation (as above)

### ***Finding previous U plot locations***

U plots were often marked with either a metal plate or a wooden stake immediately adjacent to the south corner of the plot but just outside (15cm) the plot boundary. The pilot survey revealed that U plots were particularly difficult to relocate. A degree of judgement is needed. If for example, the vegetation being sampled is reasonably homogenous bog or upland heath then a greater amount of relocation error might be allowed i.e. you believe you are in roughly the right location but 10-20 metres either way might not bring the plot into a different habitat type then the plot may be considered as a valid replicate. In cases like this it is not worth spending much more than 10 minutes searching for the specific plot location. In all cases check plot map and photos provided for any further detailed info.

### ***Laying out U plots***

The survey poles should be used to mark out the corners of the plot by reference to the first set of marker strings (equivalent to the inner nested plot of the large plots). As with large plots, the poles should be orientated along north/south, east/west axes. However, in a linear feature, this may not be possible and the main axis of the plot should be measured and recorded. If the plot is put into a linear feature within which a 2x2 m plot will not fit then the area should be made up to 4m<sup>2</sup> by extending the length - this should be clearly depicted with measurements in the sketch map.

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***Recording U plots***

HEADER

There is no specific header information for U plots.

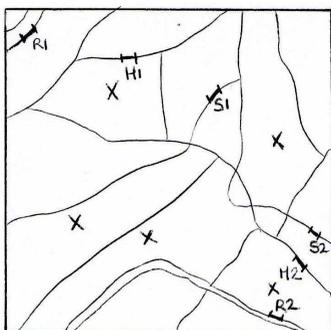
LISTED SPECIES

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

**LINEAR PLOTS**

***Linear plot locations***

In repeat squares, surveyors will find the locations of previously recorded plots or establish new locations where features have changed or disappeared. Specific rules apply to each plot type. Some linear plot types were first recorded in 1978. These are hedgerows (H plots), streamsides (S plots) and roadsides (R plots). When first recorded the plot positions were located as close as possible to the two X plots (200m<sup>2</sup>) which were furthest apart (see Figure 10). There positions were then marked on the map provided. The same process will be used in CS2007 when locating plots in new 1km squares. Other rules apply to the other types of linear plot.



**Figure 10. Locating linear plots (as in 1978)**

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

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

**B PLOTS – BOUNDARY PLOTS (B1-B5)**

Boundary linear plots are recorded at the boundary marker of each of the 5 x 200m plots in enclosed land (see Figure 7).

***Locating new B plots***

B plots in new squares should be located at a position on the boundary closest to the X plot and on a cardinal axis from it (i.e. N, S, E or W). Similarly for replacement X plots.

If the boundary feature with which a plot is associated is no longer present in any form (due to complete removal) then a new plot should be placed at the new nearest boundary to the X plot, in line with the following rules:

A boundary is taken to be any physical feature that has a length and which is an interface between the land cover of the 200m<sup>2</sup> plot and any other land cover type. This might include a hedge, wall, fence, ditch, embankment etc. It will not include land cover which is associated with the management practice of the field e.g. headlands.

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

### ***Finding previous B plot locations***

The marker plate for the 200m<sup>2</sup> plot may have been positioned at the boundary nearest to the plot and should be lying on one of the cardinal points of the compass, as measured from the centre of the X plot. The metal plate should be to the left of the plot when viewed from the field.

### ***Laying out B plots***

The linear plot should be laid out with the marker plate on the right side of the plot when you are facing it from the field. In most cases the feature recorded will be vertical, i.e. a hedge, wall or fence - in the case of a hedge, the plot should occupy the 1m strip running outwards from the centre of the feature. In other cases the 1m width will run out from the base of the feature (eg. wall or fence) . In some cases where there is no vertical feature, but a grass strip, the plate should be buried 1m in from the edge of the field (crop), and the linear plot should be recorded in the 1m adjacent to the edge (see Figure 11).

Where the boundary is composed of several different elements e.g. hedge with ditch, then the laying out procedure should be decided by reference to the

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dominant vertical feature e.g. hedges/walls/fences are dominant to ditches which are dominant to grass strips. Once the dominant feature has been identified and the plot laid out accordingly, then recording takes place in the 1m strip, irrespective of whether it includes part of another linear feature. (N.B. different rules apply in the case of H, S/W, R/V plots - see below).

Boundary plots which are adjacent to large ditches or dykes should be located at the water's edge, and not at the top of the bank. (**N.B.** no plots should be located below the Mean High Water (MHW) mark). Where a field is immediately adjacent to curtilage (land intimately associated with buildings), then the boundary plot should run from the curtilage into the field.

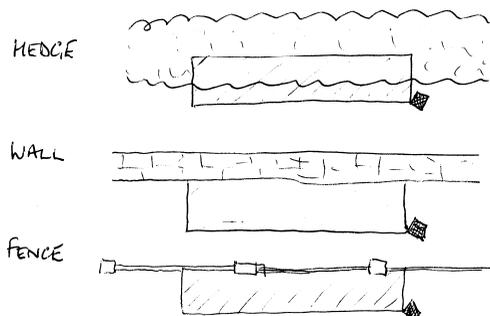
### *Recording B plots*

#### HEADER

- **Distance of ploughed edge from centre of boundary feature** : Not Applicable, <2m, 2-4m, 4-6m, 6-12m , 12-20m
- **Boundary type** : Fence, Hedge, Wall, Ditch, Grass Strip, Earth Bank, Stone Bank, Earth & Stone Bank, Other (should be noted on plot map)

#### LISTED SPECIES

All species within the plot are recorded using the recording tablet and cover imates made.



**A PLOTS – ARABLE FIELD MARGIN PLOTS (A1-15)**

**Figure 11. Laying out a boundary plot in different circumstances**

Arable field margin plots were recorded for the first time in 1998. The purpose of establishing the plots was to record changes in the arable weed population at the edge of cultivated fields. It is established that non-crop plant diversity increases towards the edge of a field and the field edge contributes an important source of biodiversity. The uptake of ‘conservation headland’ options for arable field management under ELS may further enhance species diversity in A plots. The plots are 100m long by 1m wide.

***Locating new A plots***

The A plots were and will continue to be located only adjacent to those Boundary plots (see above) which border arable fields, up to a maximum of 5 A plots per square. If a field with a B plot has changed use to arable then it will be necessary to place a new A plot in the field. The A plots are 100 x 1 m where the 1 m is the outermost cultivated metre of the field and the 100 m is centred on the B plot. The plot should always extend 50 m outwards from the B plot even if this means continuing along a second side of the field. ‘A’ plots may not have been recorded in some squares in Scotland in 1998, where relevant please place new plots for this survey.

### ***Finding previous A plot locations***

The plots are not marked with metal plates or photographed due to their relationship with B plots. Thus the B plot photos may prove helpful. **N.B.** It is possible that the position of the A plot may be different from that in 1998 because of the adoption of margin options under ELS by the farmer since 1998 which would result in a change in the distance to the start of cultivated land. In such a case the A plot would need to be recorded as a new plot.

### ***Laying out A plots***

It is unrealistic to mark out the exact dimensions of A plots. Instead, the rangefinder should be used to measure 50m in each direction from the centre of the B plot (Figure 11). A plot pole or cane, with a 1 metre mark, should then be used to check the width of the plot as it is walked and recorded.

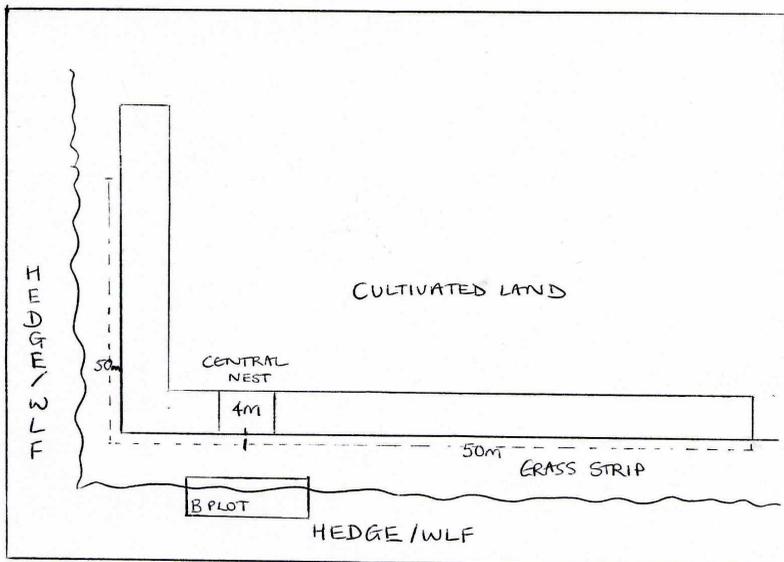
### ***Recording A plots***

#### HEADER

- **Distance of ploughed edge from centre of boundary feature** : Not Applicable, <2m, 2-4m, 4-6m, 6-12m , 12-20m

#### LISTED SPECIES

Species cover and presence should be recorded in the central 4x1m section (nest 0). In the rest of the plot (nest 1) only species presence should be recorded



**Figure. 12 Laying out an arable field margin plot**

**DM PLOTS –MARGIN PLOTS (M1-Mx)**

M plots are small (2m x 2m) plots and are new to Countryside Survey in 2007. They are designed to record the quality of new arable field margins that form part of the agri-environment agreements on farms and other margins put in without agri-environment support. These margins will be additional to the cross compliance margin (N.B. not required in Wales) which is a 2m margin measured from the centre of the hedge. The most common types of margin likely to be encountered are perennial grass margins, with or without supplementary wildflowers. Other rarer types (which it is hoped will increase over time) include:

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- Uncropped strips, usually cultivated each year (regenerating from the seedbank)
- Wild bird seed cover e.g. kale, quinoa
- Pollen and nectar mixes, usually with a high proportion of legumes

The most popular margin options are likely to be 6m in width and these may be additive, i.e. you may get one type of 6m margin immediately adjacent to another type.

### ***Locating new M plots***

M plots are associated with B plots where an A plot is present, i.e. in an arable field, which is bounded by margins. The number of M plots per square will depend on the widths of margins present, with up to 3 per field.

### ***Laying out M plots***

M plots will be placed appropriately to ensure that the margin beyond the cross-compliance strip is being measured and not the cross compliance margin and to avoid recording right at the edge of the margin. Where a margin or margins are present at the edge of the field the first M plot will be placed at 3m from the centre of the hedge (where a hedge is the boundary feature). Where the boundary feature is a wall or fence the M plot will be placed at 2m from the boundary in order to avoid overlap with the B plot and to avoid recording at the edge of the margin. If margins extend beyond 6m into the cropped area further quadrats will be recorded at intervals of 6m. Thus if the first M plot is at 3m from the hedge centre, the 2<sup>nd</sup> is at 9m, the 3<sup>rd</sup> at 15m etc (Figure 13).

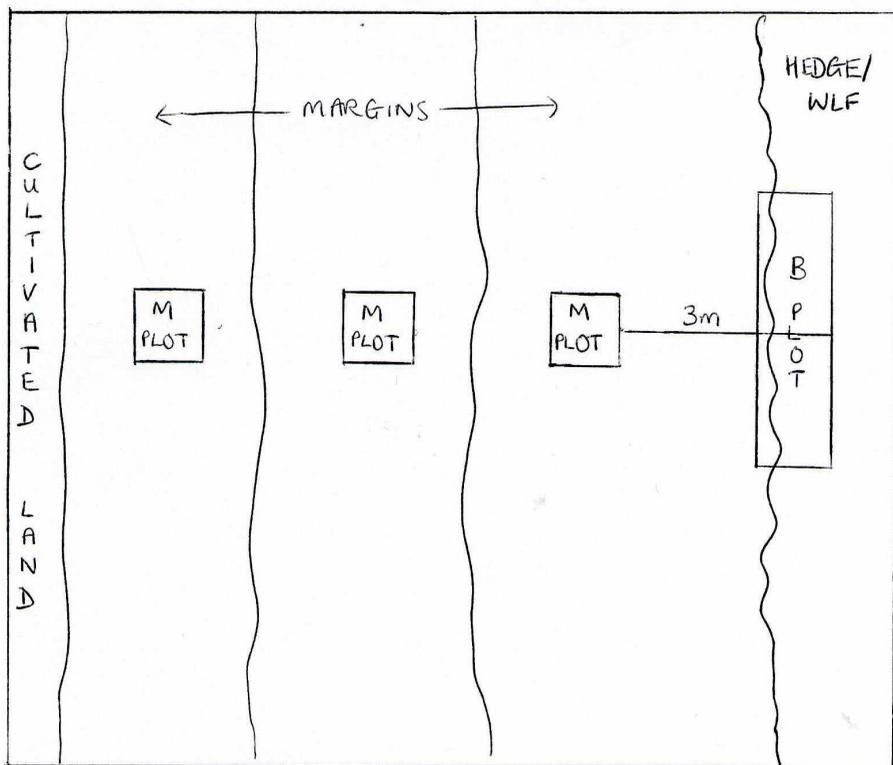


Figure 13. Laying out a margin plot

### *Recording M plots*

#### HEADER

- **Distance of plot from centre of boundary feature:** Not Applicable, <2m, 2-4m, 4-6m, 6-12m , 12-20m
- **Vegetation forming tussocks? :** Yes, No

#### LISTED SPECIES

Species presence and cover will be recorded.

## H PLOTS – HEDGEROW PLOTS (H1-H2)

H plots are linear 10 x 1m plots.

### *Locating new H plots*

If the hedge with which a plot was associated has disappeared since 1998 the plot should still be recorded as far as is possible **and** a new plot located on a hedgerow nearest to the previous H plot and to the nearest X plot (from which the previous, original H plot location would have been projected). This new plot should be renamed (H3, H4 etc) and marked on the ArcMap plot map to enable plot recording.

To locate a new plot the surveyors should locate the hedge nearest to the X plot. The 10m x 1m H plot is laid out to the left and the 1m width extends out towards the field from the centre of the hedge. The H and B plots should not be nearer than 10m to each other, so if there is not more than 30m of continuous hedge in the square, only one plot (the B) should be recorded.

Where the nearest feature is ineligible (because it is not wide enough, or is confused by the presence of a different type of linear within its width – see below) then a new location should be chosen at the nearest permissible position. The position of a new plot will be marked on the GIS tablet and clearly marked on a sketch map.

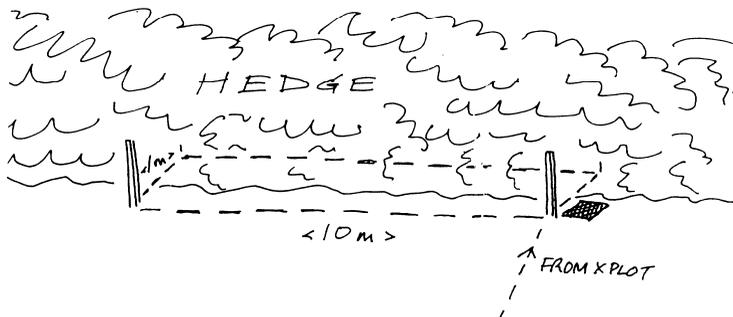
***Finding previous H plot locations***

Each plot should have been marked with a metal plate at the right hand end of the plot when you are facing it from the field. Check the plot map and photographs provided.

***Laying out H plots***

H plots are each 10 x 1 m. The position of the plots should be temporarily marked with a survey pole at each end, one metre out from the centre of the hedge (see Figure 13). A measuring tape can be used to mark the outer edge of the plot.

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



**Figure 14. Laying out a hedgerow plot**

***Recording H plots***

HEADER

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- **Distance of crop from centre of hedge** : Not Applicable, <2m, 2-4m, 4-6m, 6-12m , 12-20m

## LISTED SPECIES

Species presence and cover will be recorded

### D PLOTS –HEDGEROW DIVERSITY PLOTS (D1-D10)

Hedgerow diversity plots were recorded for the first time in 1998. The overall purpose was to set up a baseline of plots to monitor woody species diversity in woody linear features (**WLF's**) and the presence of rarer woody species. In the 1998 survey, there was a tendency to locate plots on traditional hedges rather than on the broad range of woody linear features present in the countryside. Where appropriate, it is hoped that any re-allocation of plots (see below) will be used as an opportunity to sample a wider selection of woody linear features in the squares i.e. lines of trees and shrubs as well as traditional hedges. As well as providing information on woody species diversity the data collected in D plots will also help to provide an assessment of the condition of hedgerows and other woody linear features by providing vital information about the size of the woody linear features, gappiness, levels of disturbance and species composition.

#### *Locating new D plots*

In some squares last time a number of D plots were placed on the same feature due to limited numbers of what were perceived as appropriate features (i.e. traditional hedges) in the square and the requirement to record 10 plots. As this resulted in problems with pseudo-replication (and unnecessary effort), for this survey, surveyors are asked to record **only one D plot per WLF**. D plots

CS Technical Report No. 2/07: Vegetation Plots Handbook v1.0 associated with H plots should be retained and where more than one D plot occurs on the same **WLF** one should be chosen at random to represent that feature. Extra D plots on the same feature from the previous survey should not be recorded. On the recording tablet there is a box under each D plot to be checked if a plot is not being recorded for this reason. Plots should retain the same number as used previously and any new plots should be re-numbered from D11 onwards. New D plots should only be placed on **WLF**'s with a length >20m (which can include gaps).

Where there are new **WLF**'s in a square **one new** D plot should be recorded, this should be located by using the 100m grid overlaid on the ArcMap plot map. Where a point on the grid, is nearest to a point on a mapped new **WLF** this should form the centre point of the new plot.

'D' plots may not have been recorded in some squares in Scotland in 1998, where relevant please place new plots for this survey.

If gaps within a repeat D plot exceed 20m, the D plot should still be recorded for this survey. However, this is likely to be the last recording, a replacement plot should be located for the next survey as described above.

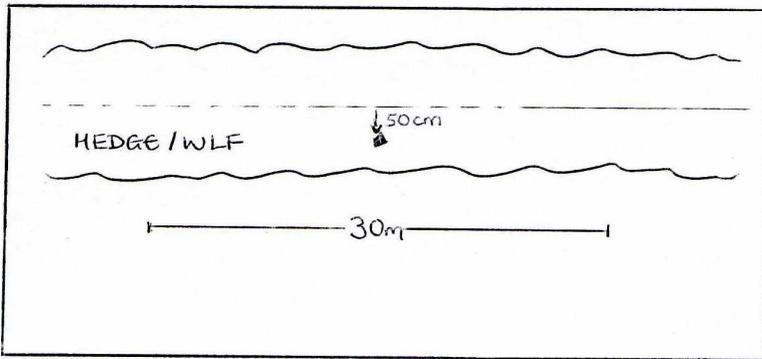
### ***Finding previous D plot locations***

Except for plots co-located with H plots which are marked as for H plots, D plots were marked at the centre point along the 30 m length. The plate was buried 50 cms out from the centre line of the **WLF**. Please check plot map.

### ***Laying out D plots***

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Each plot is 30 m long and includes the full width of the **WLF**. The plot does not need to be fully marked out but, rather, the rangefinder should be used to check the length of the plot (15 m in each direction from the centre point) (see Figure 15).



**Figure 15. Laying out a hedgerow diversity plot**

### ***Recording D plots***

D plots may be placed on either of the types of WLF described in the Mapping handbook or on linear features which comprise of both. Where a D plot contains **both** recording should be carried out on the WLF in which trees do NOT take their natural shape.

### HEADER

There is a **LOT** of D plot information. These plots provide a lot of information on which condition of **WLF**'s is assessed:

- **Modal Feature height** (excluding earth banks, see illustrations for measuring asymmetric **WLF** heights) (modal height is the average for most of the length of the feature rather than an average between the tallest and shortest part of a feature): <1m, 1-1.5m, 1.5-2m, 2-2.5,

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2.5-3m, 3-4m, 4-6m, 6-15m, >15m

- **Feature width** : <1m, 1-1.5m, 1.5-2m, 2-2.5, 2.5-3m, 3-4m, 4-5m, 5-10m, >10m
- **Vertical Gappiness** % gappiness: none, <10%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%
- **Are there gaps >5m:** Yes, No
- **Distance of adjacent managed or ploughed land from centre of WLF ):** Not Applicable, <2m, 2-4m, 4-6m, 6-12m , 12-20m
- **Are there trees that take their natural shape?** : Yes (forming a separate layer above a shrubby WLF), Yes (but there is no separate shrubby layer), No
- **Are trees and shrubs?**- Uniform in height, Different heights
- **Height of base of canopy** : <0.5m, 0.5-1m, 1-2m, >2m
- **Width perennial vegetation** : <1m, >1m, Not Applicable
- **If trees present are the tree or shrub canopies touching?** : Not at all, Partially, Mostly, Completely, Not applicable
- **Are there any signs of historic management? (e.g. layered base, old coppice stools, slanting main stems with large vertical branches.** Yes, No

**D Plot: Invasive Species Presence/Cover**

- *Leylandii*: <10% , >10%
- *Fallopia japonica*: <10% , >10%
- *Crocsmia aurea* hybrid (Montbretia): <10% , >10%

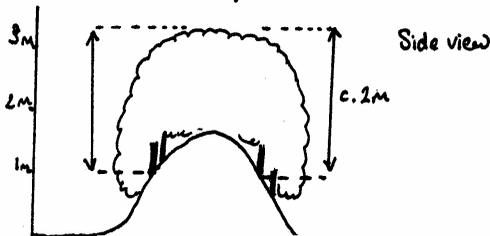
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- *Fallopia sachalinensis*: <10% , >10%
- *Fallopia x bohemica*: <10% , >10%
- *Fallopia baldschunica*: <10% , >10%
- *Heracleum mantegazzianum*: <10% , >10%
- *Impatiens glandulifera*: <10% , >10%
- *Petasites albus*: <10% , >10%
- *Petasites fragrans*: <10% , >10%

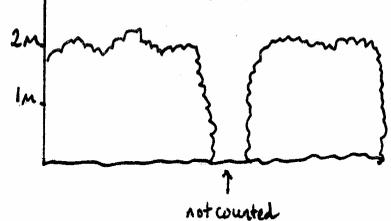
LISTED SPECIES

Woody species presence and cover only (not including gaps) are recorded. This includes woody climbing species such as *Rosa canina*, *Rubus fruticosus* and *Clematis vitalba*.

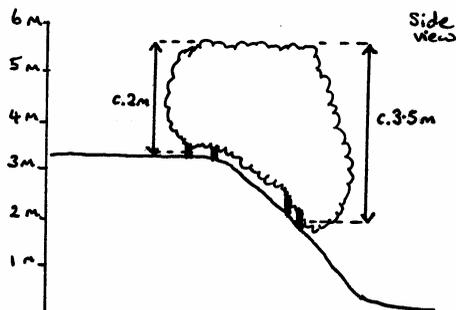
A Average height (2m) Hedgerow on bank



A Average height (2m) Front view



A Average height (c. 2m) Hedgerow on asymmetric bank



**Fig. 16. Illustrations to help in the assessment of modal height (referred to here as average) in different circumstances** N.B Modal differs from average as described above (i.e. it is NOT the heights of different features added together and then divided by the number of features).

**S/W PLOTS –STREAMSIDE PLOTS (S1-2, W1-3)**

“Streamside plots” is a convenient name given to those linear plots which lie alongside running water features (mainly rivers and streams but also canals and ditches). The S and W prefixes refer to the different origins of the plots:

**S plot**     two Streamside plots were established in 256 1 km squares in 1978, using a random allocation procedure (and were re-recorded in 1990) – two S plots were also recorded in all new squares in 1990,

**W plots**     three additional Waterside plots were placed in all squares in 1990 to increase representation of other waterside types.

***Locating new S/W plots***

*S plots*

The two linear S plots should be located on watercourses such that they are as close as possible to the two X plots (200m<sup>2</sup>) which are furthest apart (see Figure 10). They must then be marked on the map provided. Once reached the 10m plot is laid out to the left and the 1m width extends landwards from the point where it appears that water reaches when the watercourse is full (surveyors should use photos from previous surveys to judge this – placing the plot as close as possible to the plot in the old photo) (but not flooded). Only

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permanent water courses should be included; ditches may be included if they appear to be normally wet. Replacement plots should be located as close as possible to the location of the previous plot using the protocol used to site the plot initially above.

### *W plots*

The plots should be located in the centre of that part of the 'waterway' type which lies within the square. Where plots lie on the same feature they should not be put within 10m of each other. Where the nearest feature is ineligible (because it is not wide enough, or is confused by the presence of a different type of linear feature within its width) then a new location should be chosen at the nearest permissible position.

If the water feature with which a plot was associated is no longer present (e.g. has been filled in or diverted) a new plot will need to be placed. However, if the watercourse is seasonally dry then the plot should still be recorded but extra care should be taken to avoid shifting the vertical position of the plot up or down-slope compared to the previous survey. This should be prevented, as far as possible, by close attention to plot photographs, where available. In any event, surveyors should indicate if in their opinion the plot photo comparison suggests a marked difference in water depth between surveys. They should also take particular care when making a judgement as to whether the plot can be analysed as a valid repeat based on recording in a sufficiently similar position to the previous survey.

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. If the plot coincides with a Boundary plot, then it should be moved to the nearest

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permissible length of stream/river/ditch so that no part of the plot is within 10 metres of the Boundary plot.

### ***Finding previous S/W plot locations***

Plots were marked with a metal plate to the left (right hand end) of the plot when looking at the water feature from the field. Use the plot sketch map and photographs provided.

### ***Laying out S/W plots***

S and W plots are each 10 x 1 m. The waterside edge of the plot should be along what appears to be the normal highest point that water reaches (i.e. excepting flood situations).

### ***Recording S/W plots***

#### HEADER

- **Stream type:** River, Canal, Stream, Ditch, Road ditch
- **Watercourse condition:** Dry, Wet, In flood
- **Stream Width :** <1m, 1-2.5m, >2.5m
- **Freeboard** Distance between current water level and level at which waters will overtop the bank or break of slope. <0.5m, 0.5-1m, 1-2m, >2m

#### LISTED SPECIES

Species should be recorded on the recording tablet and cover estimates made.

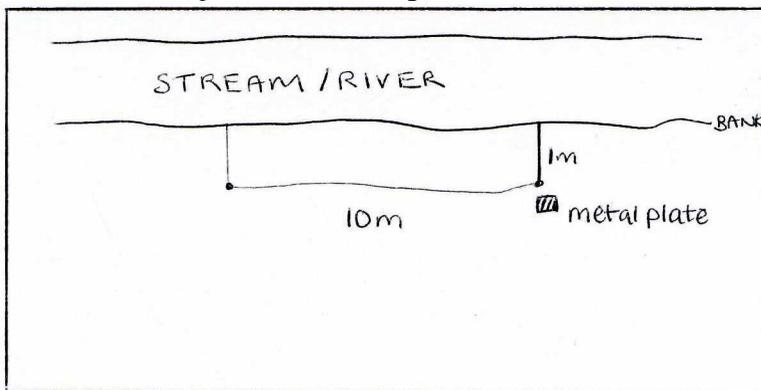


Figure 17. Laying out a streamside plot

#### R/V PLOTS –ROADSIDE AND VERGE PLOTS (R1-2, V1-3)

“Roadside plot” is a convenient name given to those linear plots which lie alongside transport routes (mainly roads and tracks). The R and V prefixes refer to the different origins of the plots:

**R plots** two Roadside plots were established in 256 1 km squares in 1978, using a random allocation procedure (and were re-recorded in 1990 and 1998)

**V plots** three additional Verge plots were placed in the 256 1 km squares in 1990 and were re-recorded in 1988 to increase representation of other transport types

#### *Locating new R/V plots*

##### R plots

The two linear R plots should be located on roadsides such that they are as close as possible to the two X plots (200m<sup>2</sup>) which are furthest apart (see Figure 10). They must then be marked on the map provided. On reaching the

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nearest linear feature, from the 200m<sup>2</sup> (X) plot, the 10m plot is laid out to the left and the 1m width extends from the road edge, away from the carriageway. Where the nearest feature is ineligible (because it is not wide enough, or is confused by the presence of a different type of linear within its width) then a new location should be chosen at the nearest permissible position. If it is 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 on the sketch map. (In such cases, the plate is still on the right hand side of the plot when viewed from the X plot).

### *V plots*

The plots should be located in the centre of that part of the verge type which lies within the square. Where plots lie on the same feature they should not be put within 10m of each other. 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.

Whilst it seems unlikely that transport routes will have disappeared in the time between surveys, if this is the case, new plots will need to be established on the above basis.

### ***Finding previous R/V plot locations***

R/V plots were marked with a plate at the right end of the plot when you are facing it from the field. Use the plot sketch map and photographs provided.

### ***Laying out R/V plots***

R and V plots are each 10 x 1 m.. The roadside edge of the plot should start at the interface between soil and tarmac, not where overhanging vegetation starts.

### ***Recording R/V plots***

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HEADER

- **Road type:** A Road, B Road, Single Track Tarmac, Unmade Road
- 2nd nest no longer required

LISTED SPECIES

Species should be recorded on the recording tablet and cover estimates made.

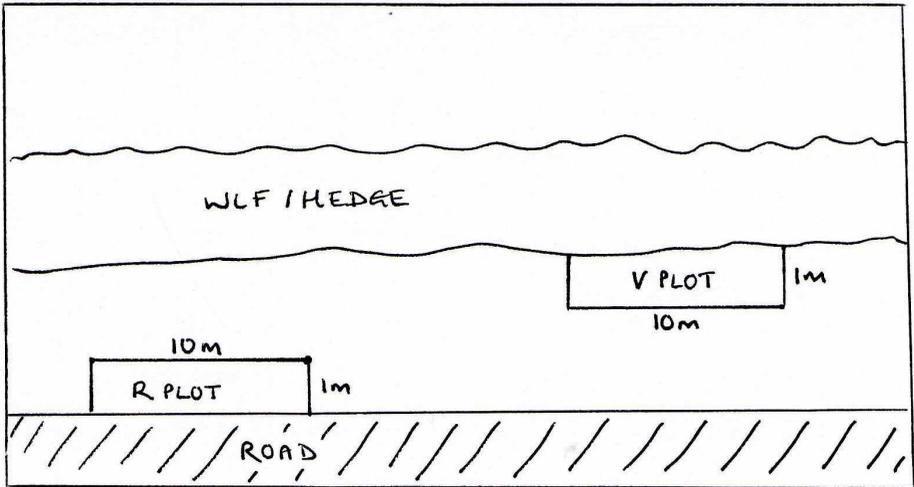
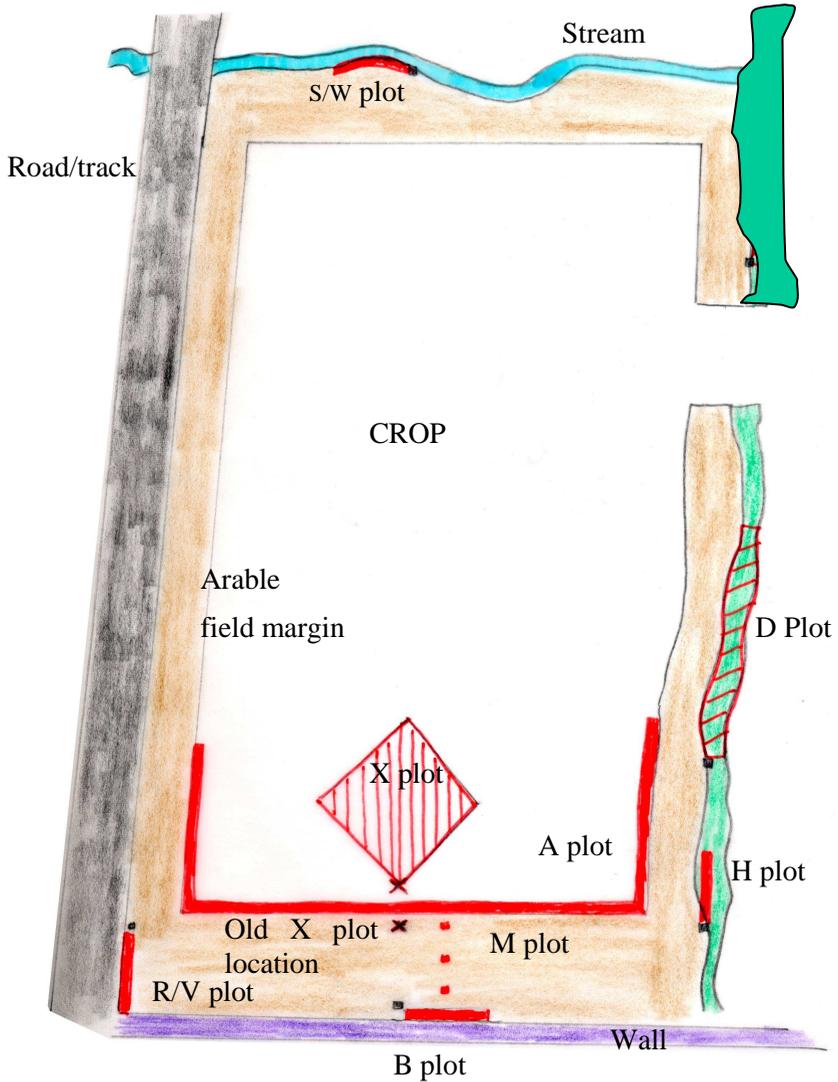


Figure 18. Laying out roadside and verge plots

*Other Information*

The layout of plots in an arable field is summarised in Figure 19. This figure demonstrates how the different plots relate to one another.

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**Figure 19. The relationship between different plots in an arable field.**



## GUIDELINES ON SPECIES IDENTIFICATION

### **Aggregations/Combinations**

Surveyors are expected to record to the species level. However, there are certain species which are notoriously difficult to separate. In order to remain consistent with previous surveys, certain amalgamated taxa should be recorded.

The combinations were determined on the basis of experience, where it is considered that unless good specimens are available it is not possible to identify the species accurately. A number of the species combinations have similar ecological amplitudes e.g. *Cardamine hirsuta/flexuosa*. Where the separate species name is known unequivocally, then it should be used; otherwise, the combination name should be used, as provided in the BRC list on the tablet

### **Bryophytes and Lichens**

Only the bryophytes and lichens in the species list should be recorded (with their individual cover values). No other bryophytes or lichens should be recorded.

### **Sphagna**

*Sphagnum* (green/fat)\*

*Sphagnum* (green/thin)\*

*Sphagnum* (red/fat) \*

*Sphagnum* (red/thin)\*

*Sphagnum* (green/fat)\*

*Sphagnum* (green/thin)\*

*Sphagnum (red/fat)* \*

*Sphagnum (red/thin)*\*

The simple classification above includes the following species (following AJE Smith, *The moss flora of Britain and Ireland* (1978)

**Green/Fat**

*S. compactum*

*S. molle*

*S. palustre*

*S. papillosum*

*S. squarrosum*

*S. strictum*

*S. subsecundum* (Sect.)

*S. teres*

**Green/Thin**

sect. *Cuspidata*\*

*S. fimbriatum*

*S. fuscum*

*S. girgensohnii*

*S. recurvum*

*S. russowii* (green form)

*S. quinquefarium*

(\* includes *S. recurvum*  
and *S. cuspidatum*)

**Red/Fat**

*S. magellanicum*

*S. subnitens*

**Red/Thin**

*S. capillifolium*

*S. russowii* (red form)

*S. warnstorffi*



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