

Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)

ERAMMP Document-73: Field-Survey Handbook (Procedures) Woody Features Mapping

Maskell, L.C., Wood, C.M., Alison, J., Norton, L.R. & Smart, S.M.

UK Centre for Ecology & Hydrology

Client Ref: Welsh Government / Contract C210/2016/2017

Version 2.1.0

Date: 26th April 2023



Funded by:



Canolfan Ecoleg
a Hydroleg y DU
UK Centre for
Ecology & Hydrology

Version History

| Version | Updated By | Date | Changes |
|----------------|-----------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0 | Author Team | 03/2023 | Published |
| 2.0.0 | J. Patton, L. Maskell, S. Reinsch | March/April 2023 | - Removed Appendix-5 on soil sampling as this is covered in another manual - Addition of habitat descriptions (Appendix-5) - removed descriptions of tree diseases - Added section on mapping new squares (2.2) |
| 2.1.0 | L. Maskell | 26/4/2023 | Veg key updated |
| | | | |

This report is available electronically at: www.erammp.wales/73

Or by scanning the QR code shown.



| | |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Series | Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP) |
| Title | ERAMMP Document-73: Field-Survey Handbook (Procedures) Woody Features Mapping |
| Client | Welsh Government |
| Client reference | C210/2016/2017 |
| Confidentiality, copyright and reproduction | © Crown Copyright 2023 This report is licensed under the Open Government Licence 3.0. |
| UKCEH contact details | Bronwen Williams UK Centre for Ecology & Hydrology (UKCEH) Environment Centre Wales, Deiniol Road, Bangor, Gwynedd, LL57 2UW 01248 374500 erammp@ceh.ac.uk |
| Corresponding author | Lindsay Maskell, UKCEH lcma@ceh.ac.uk |
| Authors | Maskell, L.C., Wood, C.M., Alison, J., Norton, L.R. & Smart, S.M. UK Centre for Ecology & Hydrology |
| Contributing authors & reviewers | N. Aspey, R. Seaton, J. Patton, S. Reinsch UK Centre for Ecology & Hydrology |
| How to cite (long) | Maskell, L.C., Wood, C.M., Alison, J., Norton, L.R. & Smart, S.M. (2023). <i>Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)</i> . ERAMMP Document-73: Field-Survey Handbook (Procedures) - Woody Features Mapping. Report to Welsh Government (Contract C210/2016/2017)(UK Centre for Ecology & Hydrology Projects 06297 & 06810) |
| How to cite (short) | Maskell, L.C. et al. (2023). ERAMMP Document-73: Field-Survey Handbook (Procedures) - Woody Features Mapping. Report to Welsh Government (Contract C210/2016/2017)(UKCEH 06297/06810) |
| Approved by | Bridget Emmett (UK Centre for Ecology and Hydrology) James Skates (Welsh Government) |

Abbreviations Used in this Report

| | |
|--------|------------------------------------------------------------------|
| BH | Broad Habitat |
| CS | Countryside Survey |
| DBH | Diameter at Breast Height |
| ERAMMP | Environment and Rural Affairs Modelling and Monitoring Programme |
| GIS | Geographical information system |
| GMEP | Glastir Monitoring and Evaluation Programme |
| GPS | Global positioning system |
| MMU | Minimum Mappable Unit |
| NVC | National Vegetation Classification |
| PH | Priority Habitat |
| WLF | Woody Linear Feature |

Abbreviations and some of the technical terms used in this report are expanded on in the Welsh and English programme glossaries: <https://erammp.wales/glossary>

Contents

| | | |
|----------|---------------------------------------------------------------------------------------------------------------------|-----------|
| 1 | PART A – Woody Features | 3 |
| 1.1 | Woody Mapping – Background..... | 3 |
| 1.2 | Structure of the editable layers | 3 |
| 1.3 | Field keys to habitats and woodland types/features | 5 |
| 1.4 | Setting priorities for mapping squares | 6 |
| 1.5 | Mapping change | 6 |
| 1.6 | Mapping New Areas | 7 |
| 1.7 | Areas: Broad & Priority Habitats, Primary & Secondary Attributes | 8 |
| 1.7.1 | Bare ground | 8 |
| 1.7.2 | Clearfell..... | 8 |
| 1.7.3 | Scattered Trees or New Woodland | 9 |
| 1.7.4 | Broad Habitat 1: Broadleaved Mixed and Yew Woodland | 9 |
| 1.7.5 | Broad Habitat 2: Coniferous Woodland | 15 |
| 1.7.6 | Broad Habitat 3: Boundaries and Linear Features | 16 |
| 1.8 | Point Features | 16 |
| 1.9 | Woody Linear Features - Event Attributes | 19 |
| 2 | PART B – SWEET Mapping..... | 24 |
| 2.1 | Using the Digital Mapping System..... | 24 |
| 2.1.1 | Opening Sweet | 25 |
| 2.1.2 | Syncing survey squares offline..... | 25 |
| 2.1.3 | SWEET navigation tools and buttons | 28 |
| 2.1.4 | Selecting features | 29 |
| 2.2 | Methodology for Mapping Polygons (Habitat Areas) | 31 |
| 2.2.1 | Editing Areas (AREAS)..... | 32 |
| 2.2.2 | Spatial Editing Tools - AREAS..... | 37 |
| 2.3 | Methodology for Mapping Point Features..... | 41 |
| 2.3.1 | Editing Point Features (POINTS) | 41 |
| 2.3.2 | Editing Point Attributes (Related attributes)..... | 42 |
| 2.3.3 | Spatial editing - Points | 45 |
| 2.4 | Methodology for Mapping Linear Features | 46 |
| 2.4.1 | LINEARS vs. LinearEvents..... | 46 |
| 2.4.2 | Spatial editing - LINEARS..... | 47 |
| 2.4.3 | Attributes – LinearEvents..... | 50 |
| 2.4.4 | Spatial editing - LinearEvents..... | 52 |
| 2.4.5 | Checking Visit Status on Features | 55 |
| 2.5 | Snapping..... | 56 |
| 2.6 | Undoing and Saving Edits in SWEET | 57 |
| 2.7 | Troubleshooting..... | 57 |
| | Appendix-1: Field Survey Vegetation Key and Allocation Rules to Broad and Non-Coastal Priority Habitats..... | 58 |
| 3 | Appendix-2: Key to Woodland Types/Features | 81 |
| 4 | Appendix-3: Guidance on identifying Veteran trees | 82 |
| 5 | Appendix-4: Mapping notes | 86 |
| 6 | Appendix-5: Habitat Descriptions | 88 |

| | | |
|------|------------------------------------------------------------|----|
| 6.1 | Broadleaved Mixed and Yew woodland Broad Habitat..... | 88 |
| 6.2 | Broadleaved Mixed and Yew woodland Priority Habitats | 88 |
| 6.3 | Coniferous Woodland Broad Habitat | 90 |
| 6.4 | Boundary and Linear features | 91 |
| 6.5 | Arable and Horticultural | 91 |
| 6.6 | Improved Grassland | 91 |
| 6.7 | Neutral Grassland Broad Habitat..... | 92 |
| 6.8 | Calcareous Grassland Broad Habitat | 93 |
| 6.9 | Acid Grassland Broad Habitat | 93 |
| 6.10 | Bracken Broad Habitat..... | 94 |
| 6.11 | Dwarf Shrub Heath | 94 |
| 6.12 | Fen/Marsh/Swamp Broad Habitat..... | 94 |
| 6.13 | Bog Broad Habitat | 95 |
| 6.14 | Rivers and Streams | 95 |
| 6.15 | Standing Water | 96 |
| 6.16 | Montane Broad Habitat..... | 96 |
| 6.17 | Inland Rock Broad Habitat..... | 96 |
| 6.18 | Urban Broad Habitat | 97 |
| 6.19 | Supra-Littoral Rock Broad Habitat..... | 97 |
| 6.20 | Supra-Littoral Sediment..... | 98 |
| 6.21 | Littoral rock Broad Habitat | 98 |
| 6.22 | Littoral Sediment..... | 98 |

1 PART A – WOODY FEATURES

1.1 Woody Mapping – Background

Surveyors are asked to record information on **woody habitats and landscape features** for a 1-km x 1-km square on a digital map held on a GIS system. Editing tasks will be carried out using a comprehensive range of pre-determined options which relate directly to a key to vegetation types, Broad and Priority Habitats and landscape features.

Mapping methods have been slightly modified from the original Countryside Survey (CS) and GMEP methodologies for ERAMMP. However, it is important that we maintain consistency with methods used previously to allow us to look at historical trends and maintain a time-series of detailed, disaggregated environmental surveillance data, which can provide for a wide range of scientific applications and future shifts in policy emphasis.

Reporting by ‘Broad’ and ‘Priority’ Habitats (BH) and (PH)

Although there have been changes to reporting requirements of the UK Biodiversity Action Plans, the survey will map using **Broad and Priority Habitats** (to make them compatible with other surveys, e.g. CS).

Mapping Broad Habitats in upland, unenclosed landscapes

BHs are classified into Unenclosed or Enclosed habitats thus:

Unenclosed Habitats: Calcareous grassland, Acid grassland, Bracken, Dwarf shrub heath, Bog, Fen, Marsh and Swamp, Inland rock, Montane.

Enclosed habitats: **Broadleaved and mixed yew woodland, Coniferous woodland, Boundary and linear features**, Arable and horticulture, Improved grass, Neutral grass, Rivers and streams, Standing open waters and canals, Urban, Supra-littoral sediment, Supra-littoral rock, Littoral sediment, Littoral rock.

Whilst the main habitats in question are the ‘Broadleaved and mixed yew woodland’ and ‘Coniferous woodland’ habitats, woody features such as scattered trees or newly planted woodlands may be found within other habitats. The habitat type will need to be recorded (see Appendix-5). It is acknowledged that unenclosed habitats may be more difficult to precisely delineate because they are defined by changes in species composition rather than a linear boundary feature such as a fence, hedge or wall.

1.2 Structure of the editable layers

The mapping data you will be working with are made up of **four spatial layers** and **three tables**.

The four spatial layers contain geographic data about features – i.e. the locations of features – which are displayed on the map. However, some spatial layers also contain a few attributes associated with each feature, provided in an associated table (e.g. the broad habitat of area features).

The four spatial layers and associated tables are as follows:

| | Layers | Tables |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| AREAS | Polygons representing areas that are distinct in terms of their habitat type. These include areas of broadleaved and coniferous woodland. | AREASDATA Information related to the features in the AREAS layer |
| POINTS | Point-features in the landscape. These include individual trees and veteran trees. | POINTS Information related to the features in the POINTS layer |
| LINEARS | This layer acts as a 'scaffold' for the LinearEvents spatial layer. | |
| LinearEvents | Linear features which fall along lines defined in the LINEARS spatial layer. These include woody linear features with an unnatural shape (i.e. hedgerows). | SEVENTSDATA Information related to features in the LinearEvents layer |

The three **tables** are not immediately visible and are only accessed by selecting individual features from the spatial layers.

The tables contain added information that is related to features in the spatial layers. This added information includes “primary attributes” described in this handbook and associated information. For example, an area of woodland in the AREAS spatial layer could have approximately two to four associated species, each of which would be recorded as a separate entry in the related table AREASDATA.

See Part B of the handbook for further technical information.

1.3 Field keys to habitats and woodland types/features

Two keys are provided in the handbook. These explain how to assign surveyed areas and features to habitat and feature classifications.

- **Key to Broad and Priority Habitats (Vegetation Key), Appendix-1**

Patches of discrete vegetation (polygons) are assigned primary attributes (and selected secondary attributes) based on plant species composition and are allocated to Broad and Priority Habitats by the surveyor. The key allows all vegetation stands to be keyed to a single BH and to all PHs, apart from those known as habitat complexes (i.e. those for which the final definition requires the application of an agreed GIS mask to surveyed areas).

The key shows the Broad and Priority Habitats that each habitat keys out to, along with the primary and secondary attributes that provide additional information. NVC codes are also included to help in habitat classification.

- **Key to woodland types/features, Appendix-2**

Vegetation features of woodland and scrub comprise a range of types from: scattered trees, hedges, lines of trees or patches of scrub through to large blocks of woodland. These different structures can be classified according to strict definitions relating to attributes such as width, number of trees and canopy cover. This key allows the surveyor to allocate woody vegetation to the correct feature. So why do this? At present, only certain woody features (Woodland/forest, Belt of trees and Clump of trees) can be assigned to the Broadleaved Woodland BH and constituent PHs. The key helps to clarify how to assign woodland features correctly, e.g. 'scattered trees' indicates a minor role for the woody vegetation such that the BH, primary and secondary attributes are assigned to the herbaceous vegetation and scattered trees indicated as an additional secondary attribute only (e.g. grassland with scattered trees). This key also allows features such as lines of trees or hedges to be allocated to Woody Linear Features (WLFs). A detailed section on the mapping of WLFs is included in the Linears section.

How will the two keys be used?

The first key that surveyors use when faced with a woody feature or area will be the Key to woodland types/features (Appendix II). With experience, the decision to record a woodland feature in a particular way will be made rapidly and surveyors will often only quickly refer to part of a key to confirm their mapping decision. If surveying an area of woodland or scrub, the surveyor will need to first establish that tree or shrub canopy cover is over 25%. If cover exceeds 25%, the surveyor then needs to determine whether the primary attributes Belt of trees (>5 m), Clump of trees or Woodland/forest apply and hence whether the patch could be assigned to a woodland BH (and potentially) a woodland PH. If any of these three primary attributes apply, then the patch can be keyed out using the vegetation key based on its canopy species composition.

1.4 Setting priorities for mapping squares

There is limited time to complete the square mapping and this needs to be kept in mind.

- It is quickest to simultaneously map areas, lines and points in a survey square rather than do all areas first and then go back to do linears and points.
- Don't take too long deciding how to map a feature.
- We do not expect perfection, we would rather the survey was finished on time and we had reasonable information about each square than that every single feature (e.g. individual young tree) possible was mapped.

Highest priorities

- Make sure you have a complete area map of woody habitats,
- Areas - Record Primary Attributes and 2-4 species in each woody parcel,
- Map woody linear features,
- Points - Representative individual and veteran trees,
- Check for areas of new woodland / new woody linear features.

Lower priority and time-saving tips

- Don't record more than 4 species per parcel,
- When mapping woodlands, to save on time, there is no need to split the woodland into separate clumps of woodland when there are slight differences in species cover and composition. But please continue to split woodlands if the habitat changes i.e. if wet woodland is adjacent to lowland mixed deciduous,
- Forestry *features* - less essential than above (unless 'Clearfell' or 'Newly Planted'),
- If you are running short of time do not map every single individual tree but try to include enough to represent the landscape.
- Think about overall complexity of your map, can you simplify polygon structure to capture information more quickly?

Please **DO NOT** GPS map habitats and features. Using the GPS to check your location within a square or a patch of habitat is a good thing but the mapping system was not designed to use a GPS to walk round features and habitat patches to create a GPS based map. This is because;

- Time for doing this has not been accounted for in timings for squares,
- The GPS are not consistently accurate, it is more important that you map features well in relation to each other,
- We don't need GPS precision maps - that is not how we use the data.

1.5 Mapping change

- Surveyors will be provided with data from earlier surveys and are instructed to map change in land cover and landscape features rather than mapping '*de novo*' (from scratch; although it may be necessary to map new areas if for instance permissions have changed and an area is able to be accessed where it wasn't previously).
- Surveyors will need to click on each polygon and either confirm that the polygon accurately represents what they see in the field or change accordingly. Spatial accuracy is not a key aspect of the survey and therefore surveyors are asked to concentrate on the extent to which the data accurately represents the

habitats in the survey square rather than their exact locations.

- The task that surveyors will most commonly be carrying out in the field is checking and confirming and/or changing the attributes assigned to each polygon by previous surveyors. This will involve checking the polygon level attributes, species and primary attributes.

1.6 Mapping New Areas

- It may be that surveyors are required to map areas that were previously un-surveyed - this is most likely to be due to changing permissions. You will need the editing tools described below.
- Walk round the area to be mapped first to get an idea of the extent and types of feature present.

1.7 Areas: Broad & Priority Habitats, Primary & Secondary Attributes

General rules for mapping areas

1. If a polygon contains woodland with a continuous cover it always goes to a woodland Broad/Priority habitat regardless of other components.
2. The minimum mappable area is 1/25th ha (400 m²) 20 m x 20 m, the feature measures at least 5 m in all directions e.g. 5 m x 80 m (otherwise it is a length and marked with a line). No vegetation should be mapped as a separate unit unless it comprises this area.
3. Only map features above a minimum mappable unit (MMU) in size (i.e. exceeding 1/25th ha)
4. The ONLY case in which an area <MMU should be mapped is where part of a much larger bigger polygon e.g. a corner of woodland protrudes into the edge of a square.
5. A separate polygon should be made when a new habitat occurs i.e. if a primary attribute/habitat type changes. If there is a change in species composition but this does not lead to a change in habitat type then a new polygon should not necessarily be created but surveyors should use their judgement.
6. For each Habitat type you should record at least two characteristic species even if they are of low cover, the maximum number of species to be recorded is 4.

In the next section, detailed descriptions of the Broad and Priority Habitats, to which the key leads, are given. Within each Broad Habitat, primary and secondary attributes relevant to that Broad Habitat are listed by the theme under which they appear on the tablet. [N.B. after each attribute below, the permitted recording unit. (Area, Line or Point) is indicated by the letters, A, L and P].

1.7.1 Bare ground

Bare ground can be recorded as a primary attribute within a habitat type e.g. within woodland.

In the related attributes, bare ground should be recorded under the:

Theme 'Inland Physiography'

Primary Attribute Bare Ground/Disturbance/Bare soil

Phys cover - % bare ground, % soil, % litter, % rock, % peat

1.7.2 Clearfell

This survey records land cover rather than land use *i.e. we want surveyors to record the habitats they find when they survey rather than trying to describe what might be there in the future, or the way that land is used e.g. part of a forestry cycle.* This means that in areas of felled conifer plantations the surveyor should describe the habitats that

they see. For example, heathland vegetation may have developed/survived under the canopy and now that the trees have been felled, has sufficient continuous cover for the area to be described as Broad Habitat *Dwarf Shrub Heath*, alternatively the area may have been recently felled and there is no continuous cover of vegetation, in which case record:

Broad Habitat as *Coniferous Woodland*

Attributes: **Forestry Theme**, 'Dead lying trees', from **Forestry Feature Theme**: 'Felling/stumps', from **Forestry Feature Theme**: 'Clearfell', **Inland Physiography Theme**: bare ground (as described above), and **Forestry Use Theme**: 'Timber production'.

1.7.3 Scattered Trees or New Woodland

Where there are scattered trees or trees have been recently planted to form a new woodland but canopies are not yet touching, then record as the underlying Broad/priority habitat (see Appendix-5) at the Properties polygon layer.

In Related, update the Theme agriculture/natural vegetation with 2-4 dominant species

Record the planted tree species under Theme forestry, Primary attribute: scattered trees (2-5 or >6),

Theme: Forestry

Scattered trees (>6) (A): 6 or more trees which do not make a wood or clump (see definitions) because their crowns are not contributing 20% cover of the mapped unit and the trees are not more than 50 m from other trees (in which case they are mapped as individuals).

Scattered trees – 2-5 (A, P): 2-5 trees which do not make a wood or clump (see definitions) because their crowns are not contributing 20% cover of the mapped unit and the trees are not more than 50 m from other trees (in which case they are mapped as individuals).

Scattered scrub (A, P): scattered as for trees.

If the area is new woodland then make sure that you add in a component with Theme Forestry feature, Primary attribute: Newly planted trees.

1.7.4 Broad Habitat 1: Broadleaved Mixed and Yew Woodland

Woodland Broad and Priority Habitats

Areas of woodland (polygons) should be assigned to the following Broad or Priority Habitats. Woodland is different to other habitat types because as well as being assigned a habitat type it can also be described as a woodland **feature or 'type'** of woodland e.g. belt of trees, scattered trees etc. (see key above). Broad or Priority Habitat can be assigned at both the polygon and component levels. At the component level the **feature or 'type'** of woodland is the primary attribute and the habitat type can be a primary qualifier (see below). This is particularly useful where a mosaic of woodland types within one Broad Habitat is recorded.

This Broad Habitat is used for broadleaf woodland which does not fall into PH. The Broadleaved Mixed and Yew Woodland BH includes *Ulex europaeus* scrub but not *U. gallii* or *U. minor* scrub, also woodlands dominated by *Acer pseudoplatanus* where the cover of native broadleaf is too low to qualify for PH status. Since the Broad Habitat

can have up to 80% conifer cover it also includes mixed woodland that may appear largely coniferous.

Note that if any one area of trees includes distinct variation in age or species composition, then the unit should ONLY be sub-divided into blocks and coded separately if there is a change in habitat type. For example, simply going from an elm to sycamore dominated patch would not warrant a new polygon boundary but if it was from sycamore to beech-dominated, this would key out as a patch of Broadleaved Woodland BH plus a patch of Lowland Beech PH hence the two polygons would need to be identified as separate units.

While it is important to differentiate such areas within an existing wider woodland unit, do not waste time deliberately contriving an MMU of a woodland Priority Habitat by including some trees and excluding others in order to make up the required canopy cover.

Priority Habitats

Lowland beech and yew woodland

Beech can grow on both acidic and calcareous soils, although its association with yew tends to be most abundant on the calcareous sites. In the UK beech is considered native only in southern England and southern Wales. Beech is dominant in the canopy (greater than 30%), but the canopy can include mixtures of beech, ash, sycamore (non-native), oak, yew and whitebeam. In some areas, this woodland type occurs as intricate mosaics with lowland mixed deciduous woods. Bramble (*Rubus fruticosus*) forms a characteristic ground layer on neutral-slightly acidic soils. Holly is the main understorey species, less often yew, on acidic soils. The main corresponding National Vegetation Classification (NVC) plant communities associated with this habitat type are W12 *Fagus sylvatica* - *Mercurialis perennis* woodland (base-rich soils), W14 *Fagus sylvatica* - *Rubus fruticosus* woodland (mesotrophic soils), W15 *Fagus sylvatica* - *Deschampsia flexuosa* woodland (acidic soils). Yew stands fall into W13 *Taxus baccata* woodland.

Lowland wood-pasture and parkland

Wood pasture/parkland is indicated by mature trees scattered across typically grazed grasslands in an extensive managed estate setting. There is a primary qualifier Wood pasture and parkland which can be applied to this habitat. **This code will not have been used by previous surveyors.**

Northern birchwood

This Habitat is only found in Scotland, so do not record.

Upland mixed ashwoods

The term upland 'mixed ashwoods' is used for woods on base-rich soils, in most of which ash is a major species, although locally oak, birch, elm, small-leaved lime and even hazel may be the most abundant species. Yew may form small groves in intimate mosaics with the other major tree species and alder may occur where there are transitions to wet woodland. Upland in the name reflects the abundance of this type of woodland on base-rich soils in upland Britain rather than to the altitude at which individual sites occur indeed some are only just above sea level. The ground flora is rich, and characteristic species include *Mercurialis perennis*, *Phyllitis scolopendrium*, *Rubus*, *Geranium robertianum* and *Allium ursinum*.

In terms of National Vegetation Classification (NVC) plant communities this habitat is characterised by W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland, sub communities d. *Hedera helix*, e. *Geranium robertianum*, f. *Allium ursinum* and g. *Teucrium scorodonia*, and W9 *Fraxinus excelsior* - *Sorbus aucuparia* - *Mercurialis perennis* woodland, together with W13 *Taxus baccata* woodland for the yew groves on the Carboniferous and Magnesian limestones.

Upland oakwood

Upland oakwoods occur on acidic soils in areas of high rainfall and are typically found on steep valley sides. The word 'upland' is used from a UK perspective, and they occur almost down to sea level in the west of the British Isles. Upland oakwoods are characterised by a predominance of oak (most commonly sessile, but locally pedunculate) and birch in the canopy, with varying amounts of holly, rowan and hazel as the main understorey species. Most oakwoods also contain areas of more alkaline soils, often along streams or towards the base of slopes where much richer communities occur, with ash and elm in the canopy. Classically, upland oakwoods have a ground flora of *Calluna vulgaris* and *Vaccinium myrtillus* with few flowering plants, but with abundant and luxuriant mosses, liverworts and epiphytic ferns.

Wet woodland

Wet woodland occurs on poorly drained or seasonally wet soils, usually with alder, birch and willows as the predominant tree species, but sometimes including ash, oak, pine and beech on the drier riparian areas. They occur throughout Wales on floodplains, lake edges, as successional habitats on fens, mires and bogs, and in peaty hollows and hill-side flushes within other woodland types. Wet woods frequently occur in mosaic with other woodland key habitat types and with open key habitats such as fens. In terms of National Vegetation Classification (NVC) plant communities this habitat is characterised by W1 *Salix cinerea* - *Galium palustre* woodland, W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland, W3 *Salix pentandra* - *Carex rostrata* woodland, W4c *Betula pubescens* - *Molinia caerulea* woodland: *Sphagnum* sub-community, W5 *Alnus glutinosa* - *Carex paniculata* woodland, W6 *Alnus glutinosa* - *Urtica dioica* woodland, and W7 *Alnus glutinosa* - *Fraxinus excelsior* - *Lysimachia nemorum* woodland. Some birch stands classified as W4 are relatively dry and in management terms better treated alongside other extensive birch stands. The ground flora is diverse, and within different types the dominant species include *Phragmites*, *Molinia*, *Sphagnum*, *Urtica* and large sedges. Wet woodlands frequently intergrade with other woodland types, notably upland oakwoods and mixed ashwoods. Habitats with canopies composed of *Salix* spp. should be classed as wet woodland even if the trees are low and 'scrubby' in appearance (these will usually be stands of W1 *Salix cinerea* - *Galium palustre* woodland, or W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland).

Lowland mixed deciduous

Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. It thus complements the ranges of upland oak and upland ash types. It occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining feature. Many are ancient woods. The woods tend to be small, less than 20 ha. Often there is evidence of past coppicing, particularly on moderately acid to base-rich soils; on very acid sands the type may be represented by former wood-pastures of oak and birch.

There is great variety in the species composition of the canopy layer and the ground flora, and this is reflected in the range of associated NVC and Stand Types. *Quercus robur* is generally the commoner oak (although *Quercus petraea* may be abundant locally) and may occur with virtually all combinations of other locally native tree species.

In terms of the National Vegetation Classification the bulk of this type falls into W8 (*Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland), (mainly sub-communities a - c in ancient or recent woods; in the lowlands W8d mostly occurs in secondary woodland) and W10 (sub-communities a to d) with lesser amounts of W16 (mainly W16a). Locally, it may form a mosaic with other types, including patches of

beech woodland, small wet areas, and types more commonly found in western Britain. Rides and edges may grade into grassland and scrub types.

Broad and Priority Habitats are selected at the polygon level. At the component (related) level all woodland attributes should be recorded under the Forestry theme in the following fields:

Theme: Forestry

Primary attribute: (one from)

Woodland/Forest (A): an area of trees of more than 0.25 ha (but see Belt) and a crown cover of more than 20%.

Belt of scrub (A, L): 2 to 4 bushes wide with a width to length ratio of at least 1:4, parallel-sided and with a maximum width of 50m. Linear feature if <5m wide.

Belt of trees (A, L): 2 to 4 trees wide with a width to length ratio of at least 1:4, parallel-sided and with a maximum width of 50m. Linear feature if <5m wide.

Belt of trees width > 20m (A): 2 to 4 trees wide with a width to length ratio of at least 1:4, parallel-sided and with a maximum width of 50m. Width of belt >20m.

Clump of trees: a small woodland or group of trees (6 or more) and of less than 0.25 ha.

Dead lying trees (A, L, P)

Dead standing tree(s) (A, L, P): recorded either singly or as a description for an area of woodland.

Patch of scrub (A, P): an area of continuous scrub (canopy >25%) of any size consisting exclusively of shrubby species or trees in shrubby form, often with tree regeneration. Individual trees of more than twice the average height of the scrub should be separately marked as individuals or scattered.

Ploughed: to be used where land has been ploughed (or scarified) and fenced in advance of forestry planting. Should not be used once planting has taken place.

Ride/firebreak

Scattered scrub

Scattered trees (2-5)

Scattered trees (>6)

Primary qualifier: All of the above Broad and Priority Habitats and:

Parkland: a series of isolated mature trees over usually grazed grassland, often associated with large country houses or recreational areas.

Null

Modal DBH: should be used in conjunction with any of the species attributes describing either individuals or areas of shrubs or trees and, in the case of areas refers to the average DBH of the species making up the top canopy. This should be recorded in the following categories: <3cm, 3-20cm, 21-50cm, 51-75cm, 75cm-1m, 1m-2m, >2m.

Try to always measure diameter at Breast height even though sometimes with shrubs this may be very low.

Recording DBH of multi-stemmed trees (and deciding whether or not it is a veteran tree)

It can be difficult deciding where the best place to measure a multi-stemmed tree is. The picture below was taken from the Forestry Commission and gives advice on aging trees. We think that because the DBH measurement is going to be used directly to indicate age of tree that surveyors should measure the thickest part of the stem (i.e. below multi-stems) even if that isn't at breast height.

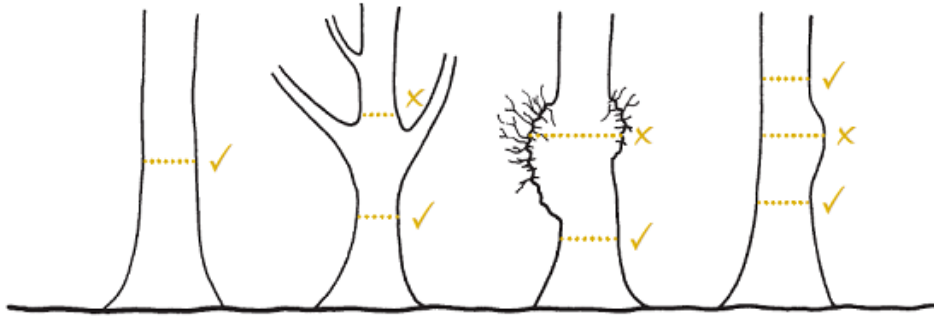


Figure 1.6.4.1: where to measure on a multi-stemmed tree

Vegetation type: Trees

Species:

- | | | | |
|---------|-------------|----------|-------------|
| Alder | Elder | Hornbeam | S. Chestnut |
| Ash | Elm | Lime | Sycamore |
| Beech | Field maple | Oak | Willow |
| Birch | Gorse | Poplar | |
| Bramble | Hawthorn | Rowan | |

Mixed Broadleaved: Try not to use this code, give 2-4 species that are the most dominant

Unspecified Broadleaf: Try not to use this code unless you really don't know the species

Species Cover: this is for use with the tree species attributes and should refer to the percentage cover of the dominant canopy layer, as if viewed from above. No more than three attributes should be used to describe the canopy of any one polygon. This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Associated features of woodland which should be added as additional components where relevant under the themes, Forestry Features and Forestry Use are listed below.

Theme: Forestry Features

Primary attribute(s): (one from)

Felling/Stumps: (coppice should be recorded here)

Grazing/browsing (non-stock): to be used if there is any evidence of grazing

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.

Planted: Planted may be used with any of the cover types where it is obvious that planting has taken place, rather than self-seeding.

Newly planted- to be used to record new woodlands

Signs of recent management

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.

Theme: Forest Use

Primary attribute(s): (one from)

Landscape

Nature conservation

Public recreation

Sporting

Shelterbelt

Timber production

Guidance notes for Orchards

Surveyors need to be aware that there is an emphasis on recording orchards, as traditional orchards are a PH. This will require adding information to existing attribute data in an attempt to locate traditional orchards, **usually adding Orchard (found under Theme: Agricultural Crops) to an existing polygon mapped as scrub, woodland or scattered trees.**

Traditional orchards are defined, for priority habitat purposes, as groups of fruit and nut trees planted on vigorous rootstocks at low densities in permanent grassland and managed in a low intensity way. There are many regional variations on this theme, including apple, pear, cherry, plum, damson, and walnut orchards. They are a composite habitat (similar to wood-pasture and parkland), defined by their structure rather than vegetation type, which can include trees, scrub, grassland, ponds, walls, hedgerows and hedgerow trees.

Prime traditional orchard habitat consists of grazed grassland with fruit trees of varying age structure, with an abundance of standing and fallen dead and decaying wood. Young trees and newly planted orchards that are managed in a low intensity way are also included in the definition. Low intensity management refers to orchards that are managed extensively, with little or no use of chemicals such as pesticides, herbicides and inorganic fertilisers, with relatively long-lived trees that are allowed to reach the veteran stage, and with a permanent grass sward that is usually grazed by cattle or sheep or cut for hay. In intensive orchards where bare herbicide-cleared soil is present between trees, the BH should be 'Arable and Horticulture' and the primary attribute should be 'Orchard'.

Where orchards occur as part of curtilage around houses and farm buildings, use 'Gardens/ground with trees' as the habitat descriptor and 'orchard' as an additional attribute.

1.7.5 Broad Habitat 2: Coniferous Woodland

This Broad Habitat includes all coniferous woodland that is not native pine woodland PH.

Conifer cover needs to exceed 80% for a woodland polygon to be allocated to Coniferous rather than Broadleaved. Mixed and Yew Woodland.

Priority Habitat

Native pine woodland

This does not occur in Wales, and should not be recorded.

Broad and Priority Habitats are selected at the polygon level. At the component level all woodland attributes should be recorded under the Forestry theme in the following fields:

Theme: Forestry

Primary attribute: as for BH 1

Primary Qualifier: Broad and Priority Habitat as above

Modal DBH: as for BH 1

Vegetation Type: Trees

Species:

| | |
|---------------------|-----------------|
| Fir - Douglas | Pine - Scots |
| Larch | Spruce - Norway |
| Pine - Corsican | Spruce - Sitka |
| Pine - Lodgepole | |
| Unspecified conifer | |

Mixed conifers: This attribute indicates that the stand was not associated with a woody dominant that covered >25% of the canopy. Try not to use this code, give 2-4 species that are the most dominant.

Species Cover: as for BH 1

See also associated features of woodland under the themes, Forestry Features and Forestry Use as listed under BH 1 (above).

1.7.6 Broad Habitat 3: Boundaries and Linear Features

Where a combination of linear features is wide enough to form an area e.g. ditch, line of trees, fence, wall, then these should be mapped as areas and assigned to this Broad Habitat. The Broad Habitat is selected at the polygon level.

Theme: Wide Linear feature

Primary attribute:

Wide linear feature: this should be used either where a single event (see Mapping linear features section) on a linear feature is greater than 5 m wide and so should be recorded as an area or where there are multiple events on a linear feature which when combined are greater than 5 m in width (see below). The events will be recorded in the linear mapping.

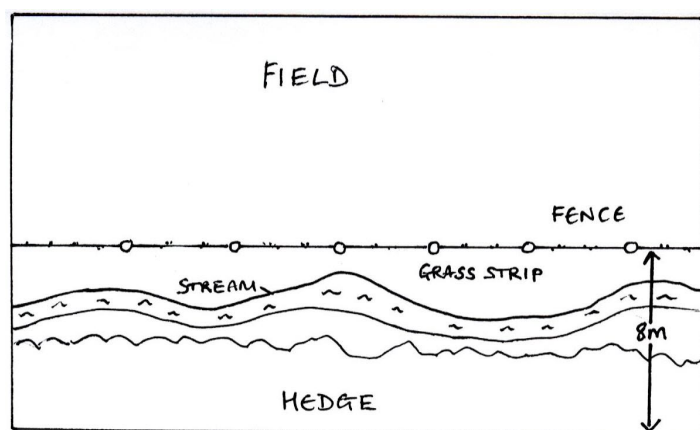


Figure 1.6.6.1 Wide linear feature

1.8 Point Features

Definitions of tree/shrub features (Forestry theme) to be recorded as points:

Trees/scrub can be recorded in any situation except inside the curtilages of buildings or communication routes (e.g. roads, railways) or as individuals immediately adjacent to non-agricultural curtilages.

Individual trees should be recorded as points from all recreation land such as golf courses and playing fields (except in urban situations). Where large numbers of individual trees are present the surveyor should use their judgement to ensure that this is adequately reflected in the dataset without spending inordinate amounts of time making a detailed map of each individual tree location. You will primarily be mapping change so focus on re-surveying what was done previously.

Tree species (with apical dominance leading to the formation of recognised trunks) of all sizes should be recorded, as should shrubby species (comprising scrub). Veteran trees (maximum 2 of each species) should be recorded as outlined below.

Theme: Forestry**Primary attribute:**

Individual trees (P) If greater than 50m apart trees should be recorded as individual trees. Similarly, lines of trees of less than 20m in length, trees standing singly in hedges and isolated coppice stools should be recorded as individual trees. Groups of 2-5 and ≥ 6 trees closer than 50m to one another should be recorded as scattered trees.

Individual scrub (P): an individual of a shrubby species or a tree in shrubby form more than 50m from another individual.

Clump of trees (A, P): a small woodland or group of trees (6 or more) and of less than 0.25 ha.

Scattered trees 2-5 (A, P): 2-5 trees which do not make a wood or clump (see definitions) because their crowns are not contributing 20% cover of the mapped unit and the trees are not more than 50 m from other trees (in which case they are mapped as individuals).

Scattered scrub (A, P): scattered as for trees.

Patch of scrub (A, P): an area of continuous scrub (canopy >25%) of any size consisting exclusively of shrubby species or trees in shrubby form, often with tree regeneration. Individual trees of more than twice the average height of the scrub should be separately marked as individuals or scattered.

Dead standing trees (P)**Dead lying trees**

Signs of disease: Chalara (Ash dieback), Sudden Oak death, Phytophthora, Dutch Elm disease, none.

Vegetation type: (choose **Woody**).

Species: Access to BRC list of trees and shrub species.

Species proportion: Individual tree, <10%, 10-25%, 25-50% , 50-75% , 75-95% , 95-100%.

Modal DBH: Modal diameter at breast height should be recorded in the following categories; <3cm, 3-20cm, 21-50cm, 50cm-75cm, <75cm (change), 75-1m, 1m-2m, >2m. (N.B. DBH should be recorded where trunk is undamaged/not lumpy). For trees with multi-stems DBH will be measured at the highest point below where the tree forks, even if this is very close to the ground. If this is not possible, DBH of individual stems should be recorded.

Theme: Veteran tree

In each square you are also asked to record up to 10 veteran trees (maximum 2 per species). Use the Rule of Thumb column in **Appendix-3** to decide whether a tree should be recorded as a veteran. Record the following details for (up to) the first two veteran trees of each species which you encounter in the square. Veteran trees can be part of a line of trees and should be marked with a point against which the following details are recorded on the tablet.

| | |
|----------------------------------------|---------------------------------------------------------------------|
| Primary attribute | Individual trees |
| Signs of disease | None, Chalara, sudden Oak death, Phytophthora, Dutch elm disease |
| Vegetation type | Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody |
| Species | Access to BRC list of trees and shrub species |
| Modal DBH | <3cm, 3-20cm, 21-50cm, 50cm-75cm, <75cm (change), 75-1m, 1m-2m, >2m |
| Veteran Tree type | Standard, Pollard or Lay |
| Epiphytic species cover | Rare, Present, Abundant |
| % canopy live | <25%, 25-49%, 50-89%, 90-100% |
| Tree dead | Yes/No |
| Missing limbs | Yes/No |
| Dead wood attached | Yes/No |
| Tears, scars, lightning strikes | Yes/No |
| Hollow trunk or major rot sites | Yes/No |

Theme: Forestry Features

Staked trees: to be used for isolated trees only.

Tree protectors: light-weight plastic tubes (about 1 m high), which provide protection as well as a favourable micro-climate for planted trees.

1.9 Woody Linear Features - Event Attributes

The following lists linear events and their available attributes alphabetically under the themes in which they occur.

Theme: Forestry

Primary attribute: Belt of trees (A, L): 2 to 4 trees wide with a width to length ratio of at least 1:4, parallel-sided and with a maximum width of 50m. Linear feature if <5m wide.

Belt of scrub (A, L): as above but consisting of scrub species

Dead standing trees (L): Line of dead standing trees

Ride/Firebreak (L):

Introduction to woody linear features

In most landscapes the linear features that are most important for biodiversity are the woody linear features. The term 'woody linear features' (WLFs) has been coined to account for the tremendous diversity of WLFs to be found in the countryside including everything from a traditionally managed hedge to a planted avenue of trees or a line of old scrub which may at one time have been a managed hedge. WLFs fall into two broad categories based on the extent to which the trees within them take their natural shape.

- 'Natural shape' means unhindered/unmanaged growth for at least a decade. Where trees take their natural shape the feature will essentially be a line of trees or scrub.
- Where trees/scrub has been managed relatively recently the WLF will fall into the hedge category.

When coding a WLF, surveyors will be asked to decide primarily whether trees take their natural shape and will then provide relevant information (as below) against each of these feature types in order to enable us to group and assess the data appropriately.

Recording Woody Linear Features

Where gaps of 20 m or over exist in these features, they should be mapped either in individual sections of minimum length 20 m (including gaps <20 m) or as individual trees/scrub, as appropriate. Where woody linear features are greater than 5 m wide at their base or more than one tree wide they should be mapped as a belt of trees or scrub (as appropriate). There is a field for belts of trees >5 m in width.

When coding a WLF, attributes will be recorded in the following fields alongside the length and position of the feature as represented by the line drawn in the GIS data.

The primary question for surveyors mapping Woody Linear Features is then:

'Do individual trees within the feature take their natural shape?'

Yes (WLF natural shape)

No (WLF unnatural shape).

Theme: WLF Natural shape**Primary attribute: WLF Natural shape**

| | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Base height - Height of base of canopy | <2m or >2m |
| Height | <1m, 1-2m, 2-3m, >3m (change to different category), 3-4m, 4-6m, >6m |
| Modal DBH - diameter at breast height (DBH) for most trees along the length of the feature. | <3cm, 3-20cm, 21-50cm, 50cm-75cm, 75-1m, 1-2m, >2m |
| Historic Management - are there signs of historic management? | Yes or No (e.g. layered base, old coppice stools, slanting main stems with large vertical branches) |
| Vegetation Type | Trees/Woody |
| Species | Access to BRC list of trees and shrub species |
| Proportion | <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100% |

Theme: WLF Unnatural shape**Primary attribute: WLF Unnatural shape**

| | |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Height | <1m, 1-2m, 2-3m, >3m (change to different category), 3-4m, 4-6m, >6m |
| Base height - Height of base of canopy* | <2m or >2m |
| Species composition | mixed species, >50% hawthorn, >50% other |
| Evidence Man - Evidence of recent management | no recent management, newly planted, cutting e.g. flail or saw [<3yrs], laying or coppicing [<5yrs], both of the preceding |
| Line of stumps - Is the WLF a line of stumps? | Yes or No |
| Vertical gappiness (% of breaks which extend from canopy to ground) along the WLF. | <10%, 10-<25%, 25-<50%, 50-<75% |

* N.B. If >2 m check that component woody species are cut or trimmed in shape, so are **not** in their natural shape. If they are in a natural shape record features for **WLF natural shape**.

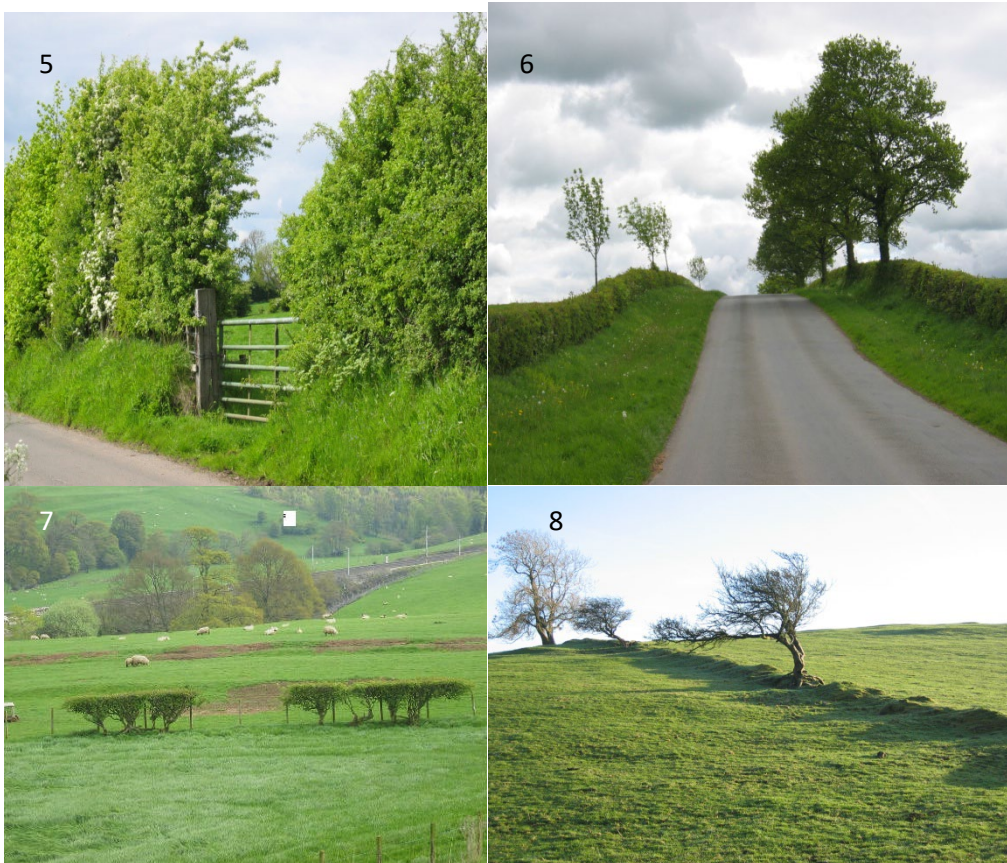
A set of images illustrate the kinds of features you will encounter. They should be coded as follows (numbering follows from left to right top to bottom)

1. **WLF unnatural shape/line of stumps –yes.**
2. **WLF unnatural shape x 2 –** for the section closest in the picture /Base height <2m/Line of stumps –no/Height <1m/ Horizontal gappiness- <10%/Species composition->50% hawthorn/ Evidence of management-cutting e.g. flail or saw [<3yrs & margin widths (not possible to assess from this photo) for the section furthest away in the photo//Base height

<2m/Line of stumps –no/Height -1-2m/ Horizontal gappiness- <10%/Species composition- >50% hawthorn/ Evidence of management-cutting e.g flail or saw [<3yrs & Margin widths (not possible to assess from this photo).

- 3. **WLF unnatural shape** /Base height <2m/Line of stumps –no/Height -, >2m-3m / Horizontal gappiness- <10%/Species composition->50% hawthorn/ Evidence of management- laying or coppicing [<5yrs] & Margin widths (not possible to assess from this photo).
- 4. **WLF natural shape** /Base height <2m/Species composition->50% hawthorn/ Signs of historic management -yes (Modal DBH)- 3-20cm & Margins –not present.





(images courtesy of Colin Barr)

5. **WLF unnatural shape** /Base height <2m/Line of stumps –no/Height -, >2m-3m / Horizontal gappiness- <10%/Species composition->50% hawthorn/ Evidence of management- cutting e.g. flail or saw [<3yrs] & Margin not present near side, impossible to assess from this photo for far side. An earth bank linear feature (see Figure 1.8.1) would also be recorded as part of this linear feature.
6. **WLF unnatural shape & WLF natural shape** (Feature on right of road).
WLF unnatural shape / Base height <2m/Line of stumps –no/Height - <1m / Horizontal gappiness <10%/Species composition->50% hawthorn/ Evidence of management-cutting e.g. flail or saw [<3yrs] & Margin not present near side, impossible to assess from this photo for far side. **WLF natural shape** (recorded from the first tree)/Base height >2m/Species composition – *Fraxinus excelsior* (possibly!)/ Signs of historic management-no/ Modal DBH-21-50cm & Margin not present near side, impossible to assess from this photo for far side.
7. **WLF unnatural shape** /Base height <2m/Line of stumps –no/Height - <1m / Horizontal gappiness- 25-<50%/Species composition->50% hawthorn/ Evidence of management-cutting e.g. flail or saw [<3yrs] & Margin not present either side.
8. **Individual trees** (gaps >20m)

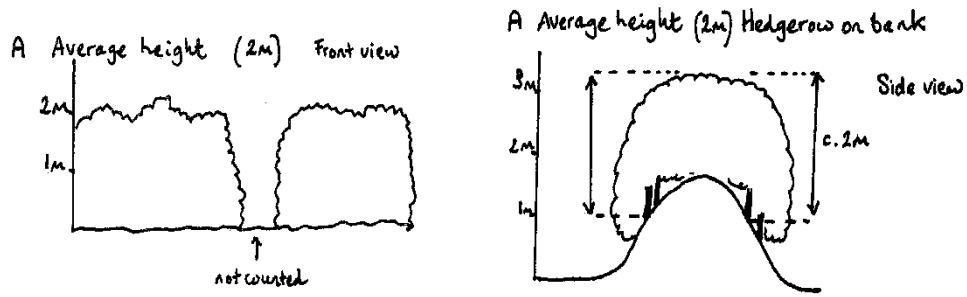


Figure. 1.8.1 Illustrations to help in the assessment of modal height (referred to here as average) in different circumstances. N.B Modal differs from average as described above (i.e. it is NOT the heights of different features added together and then divided by the number of features).

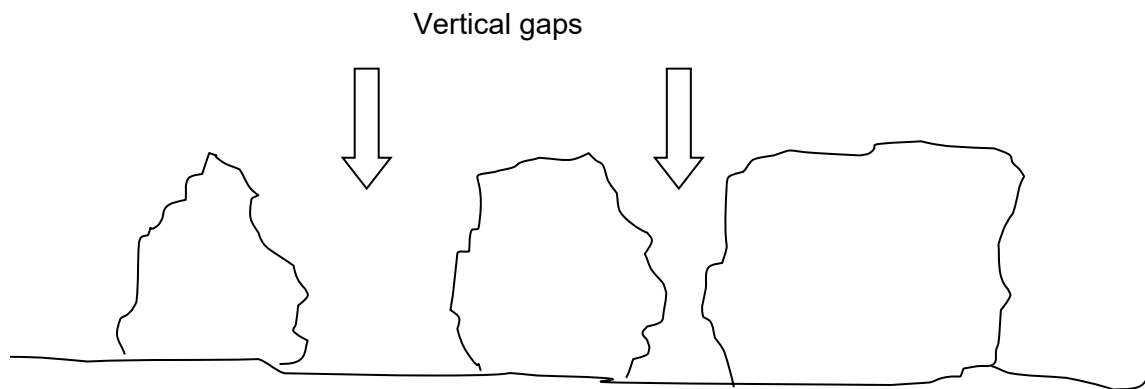


Figure. 1.8.2. Illustration of what is meant by vertical gappiness in WLFs.

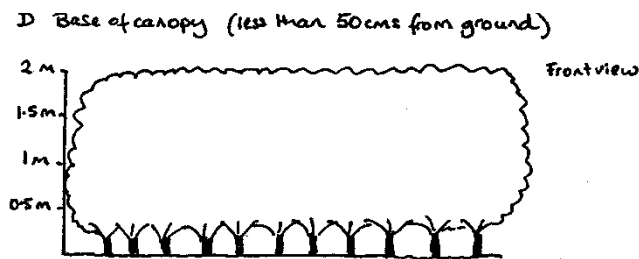


Figure. 1.8.3. Illustration showing Height of base of canopy (Base height)

2 PART B – SWEET MAPPING

2.1 Using the Digital Mapping System

A digital mapping system called SWEET will be used for mapping in the field. SWEET is an app produced by ESRI UK and has been configured for use for UKCEH habitat mapping. Please telephone the helpdesk to discuss any queries or problems you have with the system.

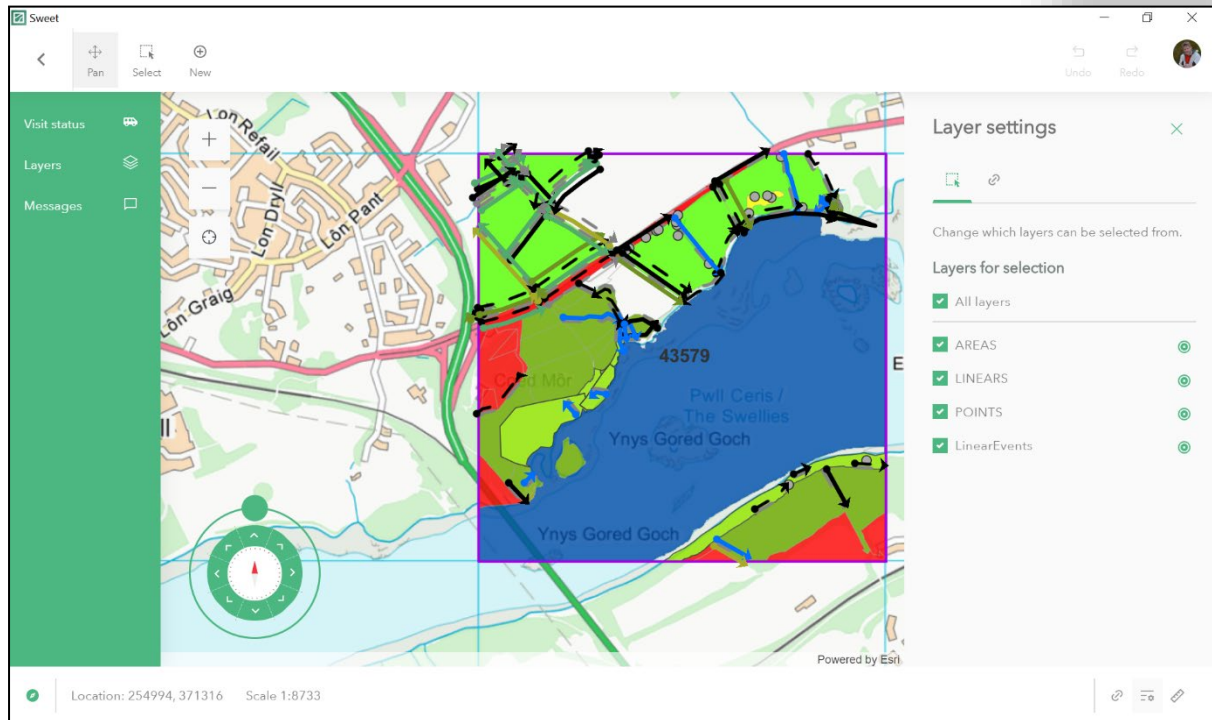
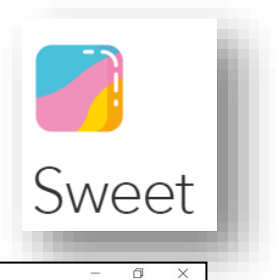


Figure 2.1.1: The SWEET Interface

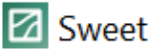
The Map Display shows the geographical representation of the data for the survey square. When SWEET is started, it loads in the data required to allow the surveyor to view and edit the location and attributes of point features, linear features, and polygon features within the chosen square.

A data frame holds the various data layers with their symbology pre-set to ensure their visibility, and usability.

Whilst standard workflows are described throughout the handbook, you may find better ways of achieving the same results.

SWEET uses ‘emergent behaviour’ for various tools and buttons, hence you will find some options only appear on the toolbars in certain circumstances.

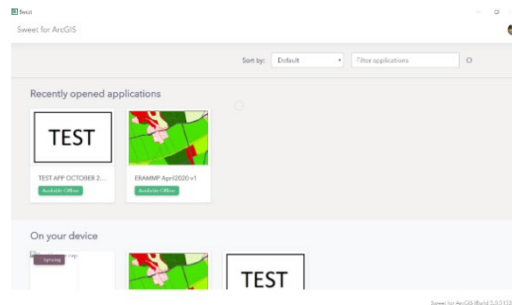
2.1.1 Opening Sweet

Once you have logged on to your tablet (password provided), SWEET is available on the desktop or the bottom taskbar. 

You need to be online in order to log in with your password (*provided at training*).

You can use Wi-Fi or SIM data to get online.

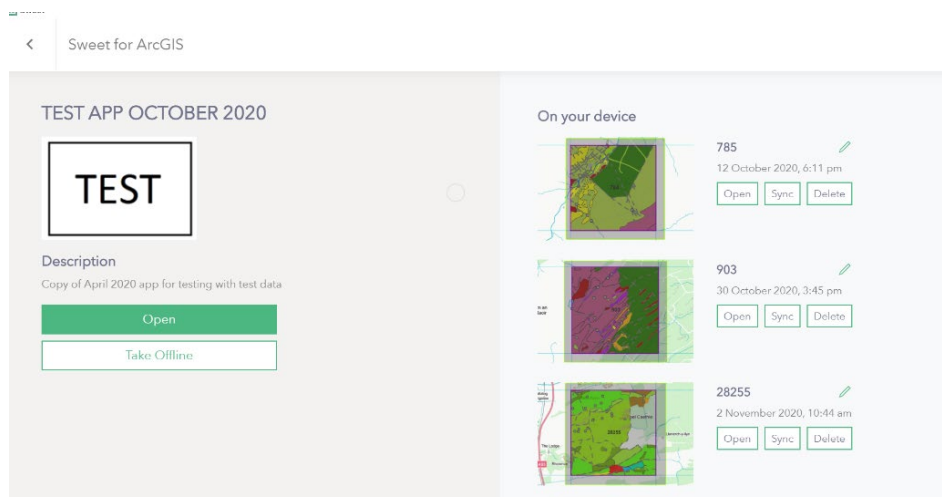
Once logged in, DO NOT LOG OUT, especially if you go offline. You will be locked out and unable to carry on working.



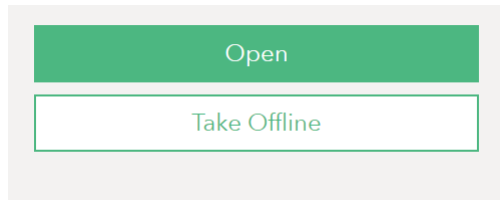
Once SWEET is open, click on the correct survey (survey name tbc during training). Training and QA surveys may also be available.

2.1.2 Syncing survey squares offline

- You need to sync data for each 1km square to get the data onto your tablet to work with
- Sync several squares (enough for 2-3 weeks) **when you have a good signal**
- When surveying, sync data back as often as you can, but **only if you have a good signal**.
- Back up your data using the backup dashboard. This will back up all synced squares on the tablet.
- Delete synced squares from your tablet once confirmed with the office by text or email they have synced back.

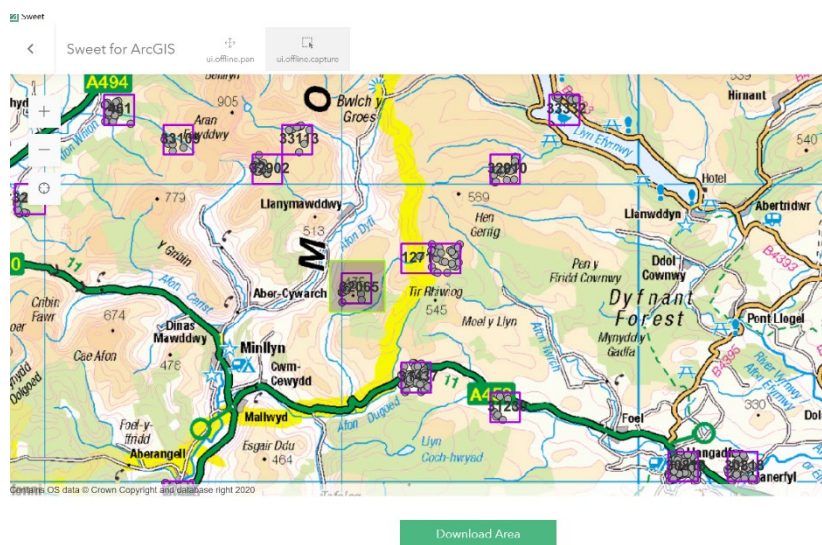


You have 2 options: Open or Take Offline. To sync a square, choose 'Take offline':



Draw a square around the required survey square with the 'select' tool.

Choose 'Download Area'.

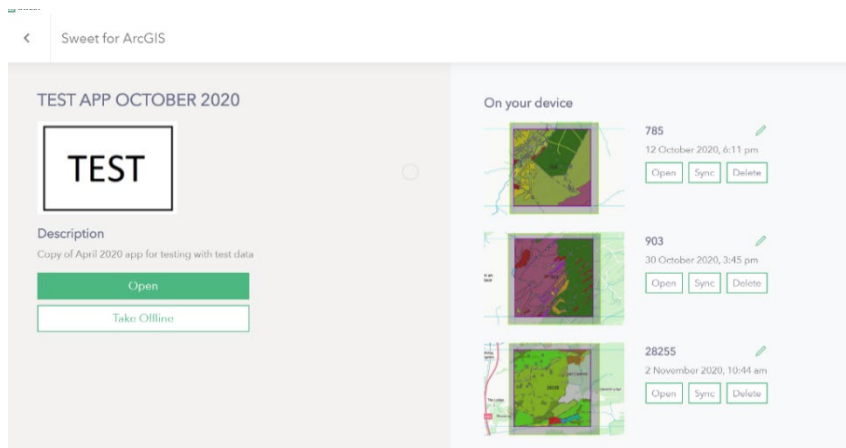
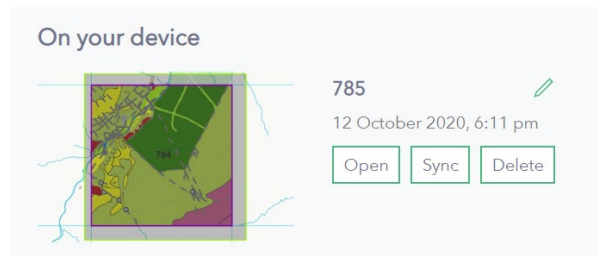


The area will show as 'Downloading'

This will take several minutes depending on your signal (often ~ 30 mins, be patient).



- Once synced, the screen will look like this.
- You can rename the download with the square number.



Synced squares

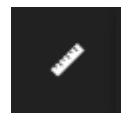
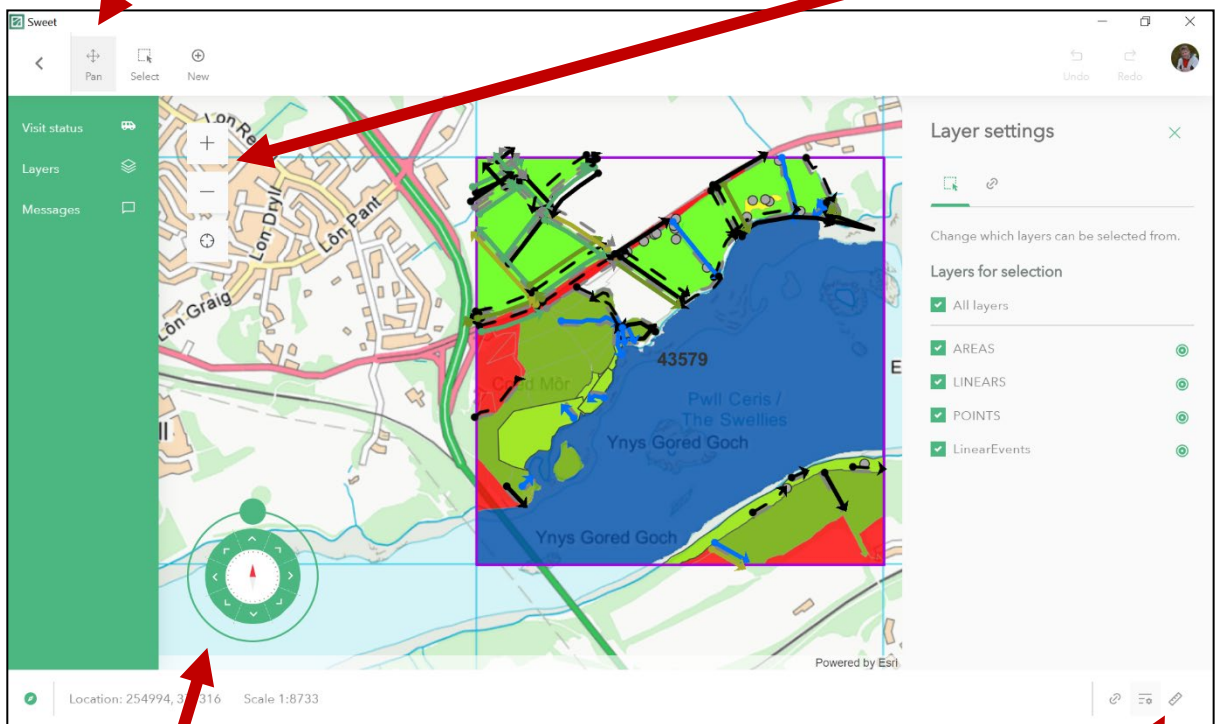
- **Once data is synced, you can work offline**
- **'Open'** square to edit
- **'Sync'** to send data back to the office (online)
- **'Delete'** once a square is finished and data is confirmed as being synced successfully

2.1.3 SWEET navigation tools and buttons

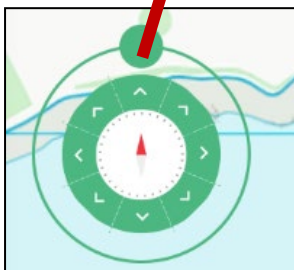
Navigating the map



The Pan tool allows the user to pan the map in any chosen direction over the map display. It is used together with the Zoom in/out/Locate buttons. **Locate turns the GPS on/off**



The Ruler tool adds a measurement grid to the map



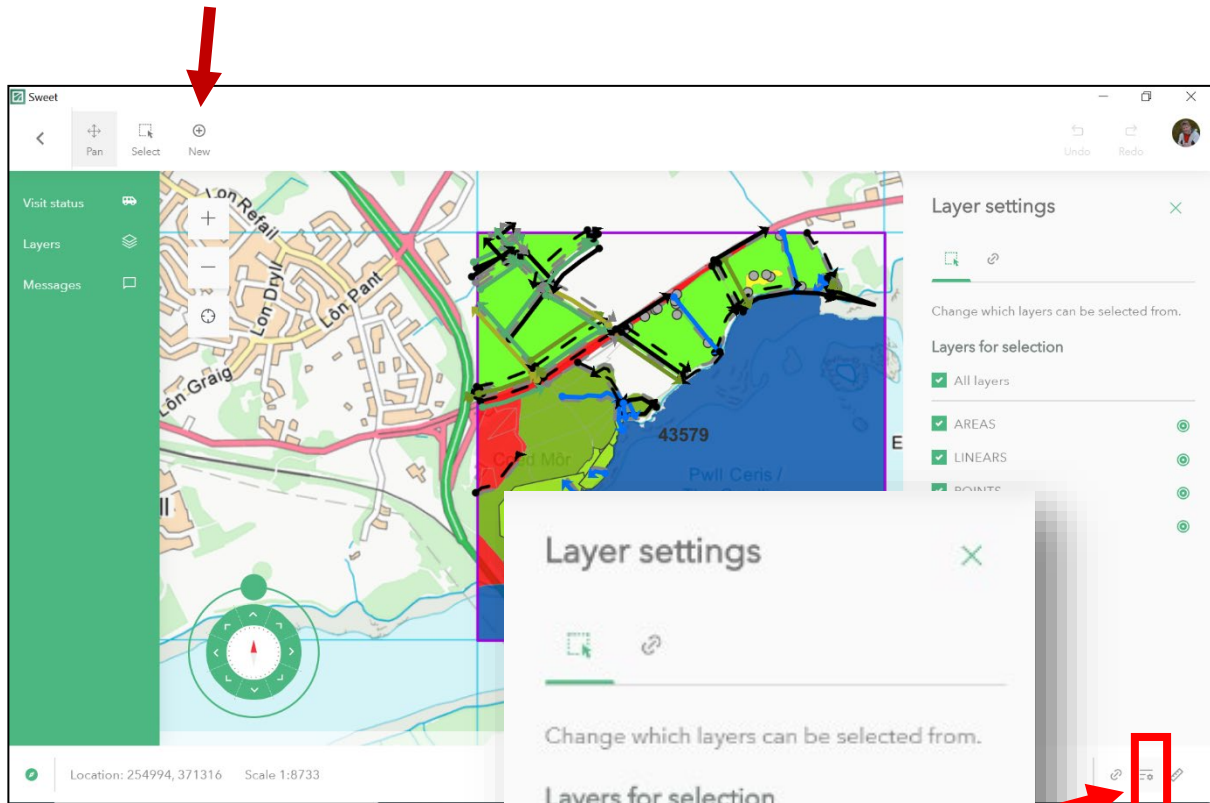
The navigation wheel can be used to re-orientate the map, or move in a certain direction.

2.1.4 Selecting features



The Select tool allows the user to select a feature, or features, from one or more layers of data in the map display.

You must also select the relevant layer from the options in the bottom bar



LAYER CHOICE OPTIONS


Either choose layers to select from the boxes on the left, or the button to the right of the layer will select that layer and deselect all others.

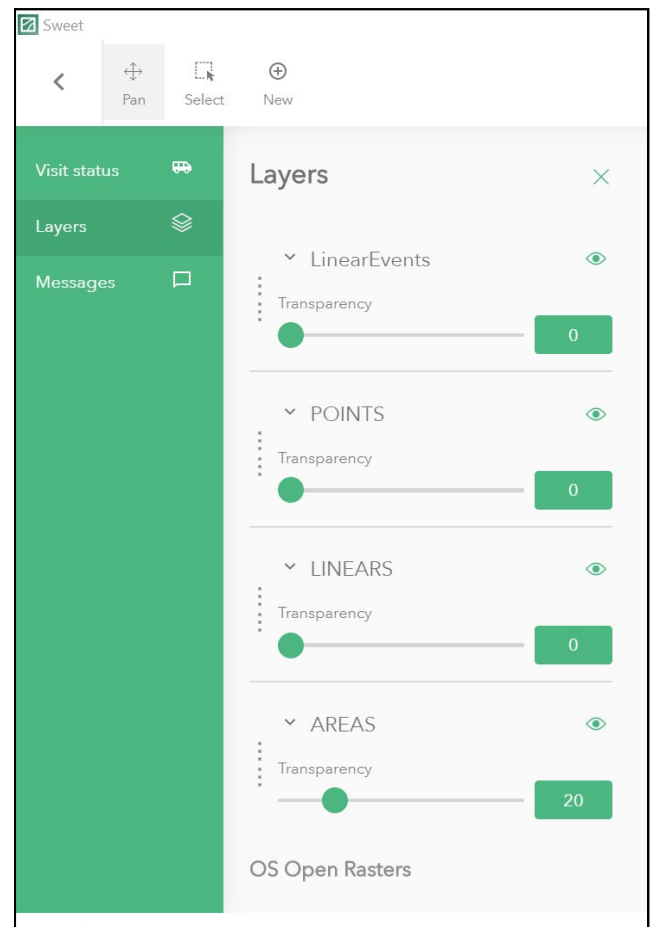


Map layers The Map contains the following features:

- Landscape points (POINTS)
- Landscape Linears (LINEARS) & (LinearEvents)
- Landscape Areas (AREAS)
- A basemap

There are various things that the surveyor can do to customise their set-up:

- You can change the transparency of a layer by adjusting the % transparency on the slider bars
- You can change the drawing order by dragging layers up or down - move the layers up and down according to which you want at the front using the dots to the left of each layer
- You can turn a layer on or off with the 'eye' to the right of each layer 



2.2 Methodology for Mapping Polygons (Habitat Areas)

Mapping change in squares

Unless a square is being mapped for the first time, or permissions have changed, surveyors will be provided with data from previous surveys. See section 1.6 for tips on mapping new areas.

Surveyors will need to select each polygon and either confirm that the polygon and attributes (Related table) accurately represent what they see in the field or change accordingly. Spatial accuracy is not a key aspect of the survey and therefore surveyors are asked to concentrate on the extent to which the data accurately represents the habitats in the survey square rather than their exact locations. Where necessary, surveyors can indicate errors in spatial accuracy by changing the attributes and or shapes and sizes of polygons.

The task that surveyors will most commonly be carrying out in the field is checking and confirming and /or changing the attributes assigned to each polygon by previous surveyors.

The main difference between repeat and new squares is that surveyors will need to pay close attention to the polygon level attributes.

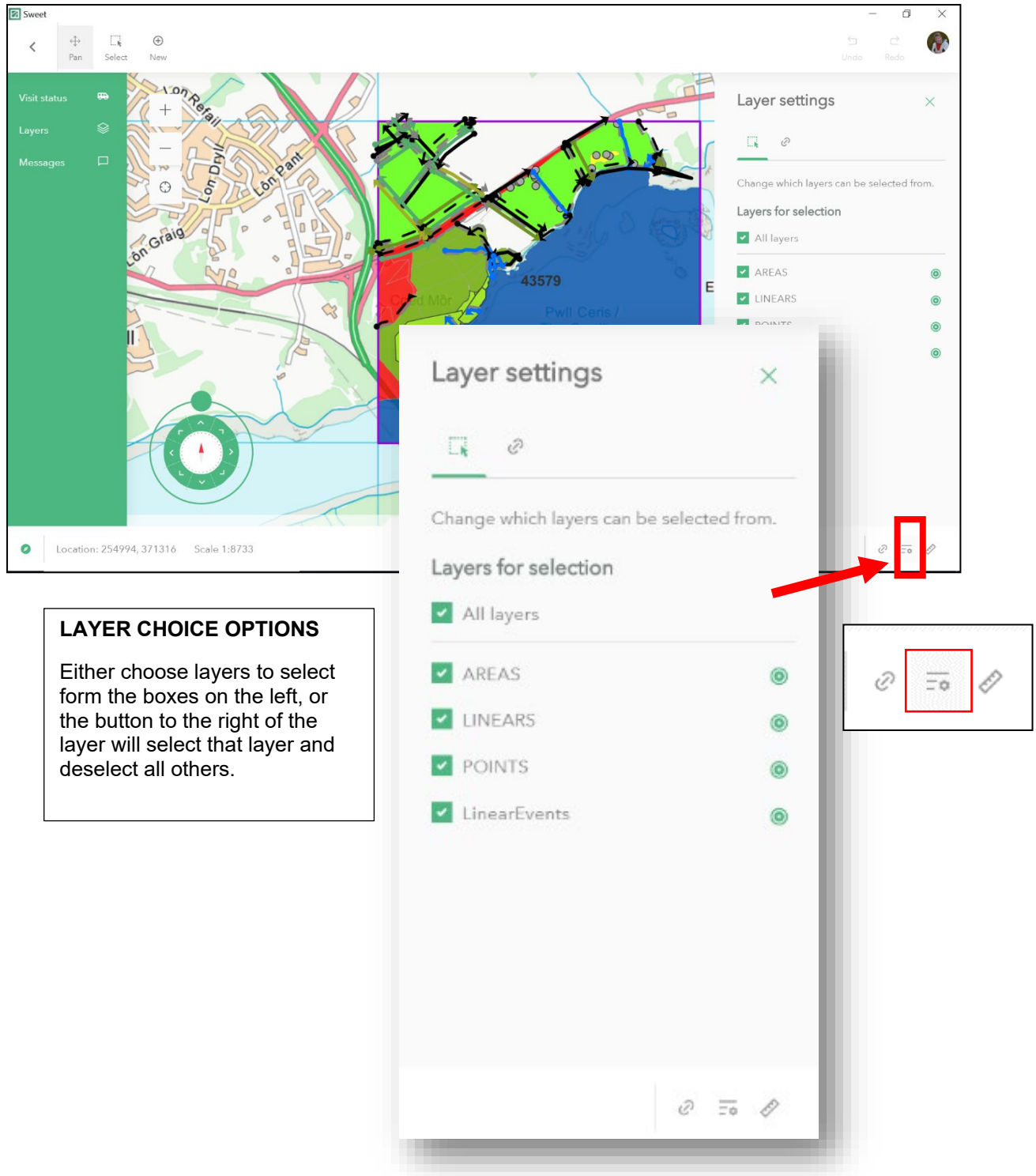
Broad (Priority) habitat: Surveyors will be provided with previous Broad or Priority habitat data. This survey is focused on woodlands and woody features but this may also include scattered trees or planted trees within other habitats. Using the vegetation key and the additional information on Broad and Priority habitats, surveyors need to decide whether the habitat classification has changed. Please also look at the data provided by the previous surveyors on species and attributes to decide whether you think it is really necessary to record a change.

Then think carefully about the attributes, species and habitat recorded previously, along with what you can see in the field. Then either amend the fields or leave the fields as they are, and mark the feature as 'Complete'.

2.2.1 Editing Areas (AREAS)

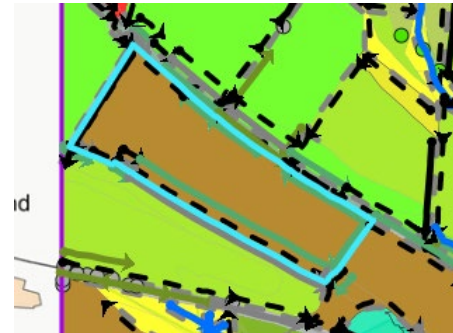
To edit (or review) an area feature, you must first ensure the area features are selectable by:

1. Click on Select (top button)
2. Choose AREAS features from the Layer Settings menu (bottom right)



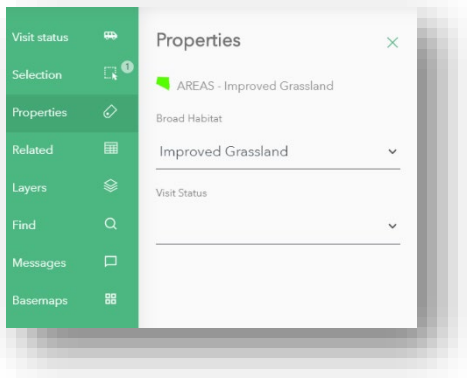
Editing an area

Once area features are selectable, click on the area you wish to edit. It will become highlighted thus:



2.2.1.1 Polygon Level Attributes (AREAS)

- The attributes of an area or feature are the possible descriptors for that feature including: Broad or Priority Habitat, Visit Status.
- The keys provided offer detailed guidance on how to assign areas to particular vegetation types (on the basis of indicator species physiography and other factors).
- The listed Broad and Priority Habitats in the main text provide more detailed habitat descriptions and also indicate the relevant attributes for each habitat.



To edit the Broad/Priority Habitat of an area, click on **'Properties'** on the left. This will bring up a dropdown menu where you can edit the Habitat and Visit Status of the area.

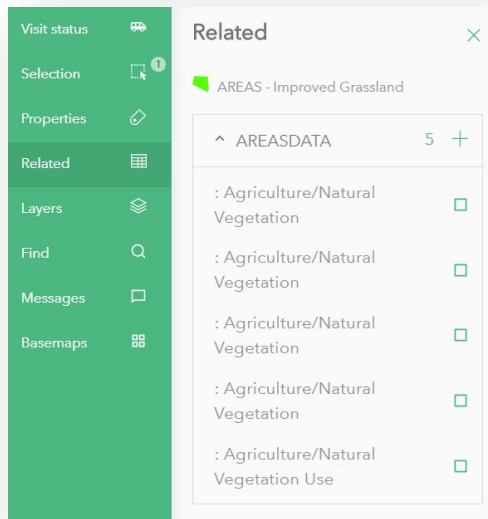
Broad (Priority) habitat: Surveyors should choose the appropriate Broad or Priority habitat using the vegetation key and the additional information on Broad and Priority habitats.

Visit status:

- **In progress**
- **Completed**
- **Refused access**

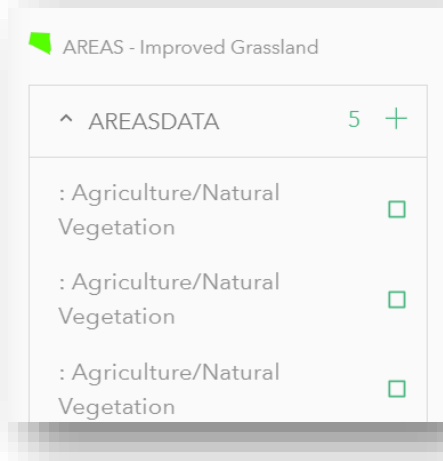
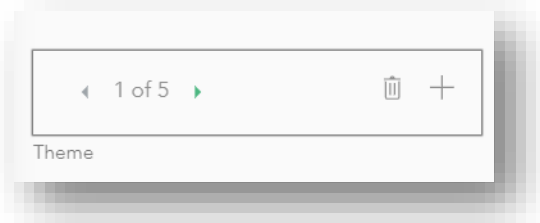
2.2.1.2 Component Level Attributes (Related attributes)

An area will have more than one component (or 'related attribute') containing the information such as Theme (see below), habitat type, species and physiography. Components can be added or deleted, and attributes of components can be edited. These edits are all undertaken in the **Related** option.



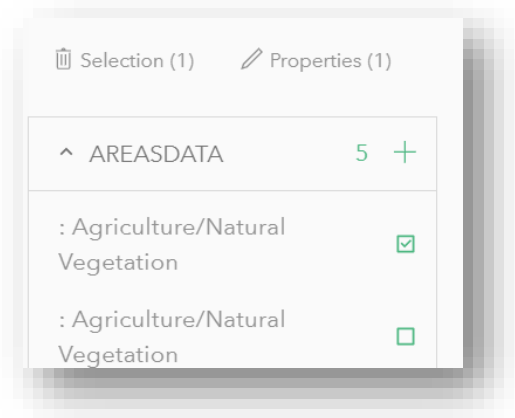
To edit the attributes of the polygon, click the **'Related'** button.

You can scroll through the components using the arrows (click on one of the components first):

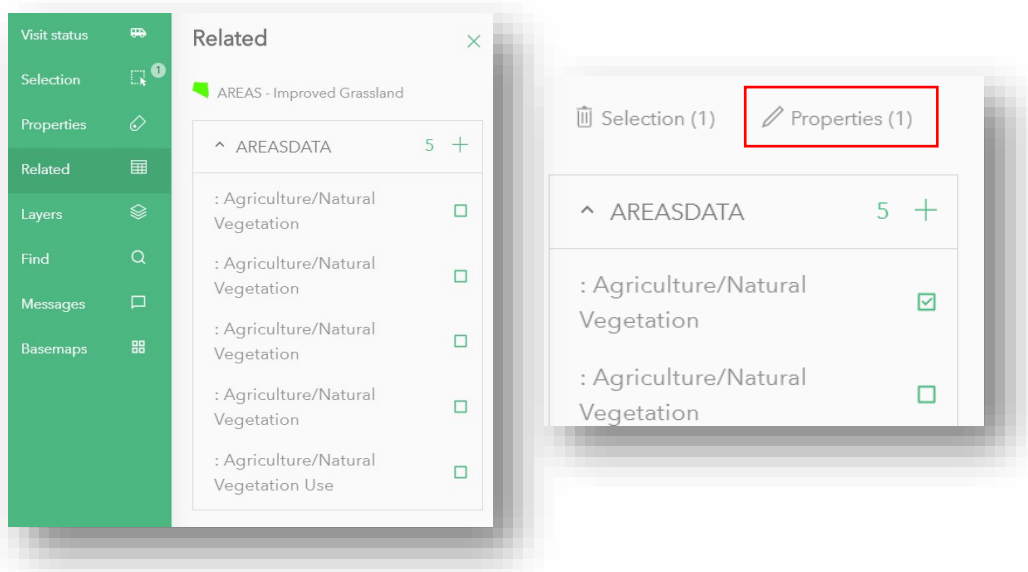


To add a new component, click the **New +** button in the related tables pane, or using the + button from the menu above.

To **delete** a component, click on the component to select it (tick the box), and click the Delete button (at the top).



When two or more components have the same primary attribute (e.g. 'moorland grass'), then you can change the primary attribute and related attributes if you select all of the same components with the same attribute, then click on Properties (top of pane):



- **Areas can have their attributes updated by bulk update – e.g. it is easy to select several polygons and mark them as 'Refused Access'**
- **Each area should contain at least one component.**

Habitat Attributes (refer to Part A of handbook)

Theme – organises primary and secondary attributes into intuitive groups (e.g. physiography, agriculture/natural vegetation) to make selection easier and control dependent attributes. On the tablet, surveyors will choose the appropriate attributes from the complete list of attributes under each theme. For this survey, the woodland related Themes are primarily relevant (although other use themes may also occur in a woodland environment and it may be necessary to use other themes such as agriculture/natural vegetation for underlying habitat when there are scattered trees):

AGRICULTURAL CROPS: associated fields include Primary attribute (these will be agriculturally related i.e. mostly crops), Primary qualifier (optional), vegetation type, Species and Species cover

AGRICULTURE/NATURAL VEGETATION: associated fields include Primary attribute, Primary qualifier (optional), Vegetation Type, Species, Species cover, Sward <7cm, Sward Height, Variation in Sward,

AGRICULTURE/NATURAL VEGETATION USE: Primary attribute

COASTAL FEATURE: Primary attribute

FORESTRY: associated fields include Primary attribute, Primary qualifier (optional), Modal DBH, vegetation type, Species and Species cover

FORESTRY FEATURE: Primary attribute only

FORESTRY USE: Primary attribute only

INLAND PHYSIOGRAPHY: Primary attribute and Physiographic feature cover

INLAND WATER: Primary attribute

RECREATION: Primary attribute only

STRUCTURES: Primary attribute only

TRANSPORT: Primary attribute, road verge a and b.

WIDE LINEAR FEATURE: Primary attribute only

UNSURVEYED/MISSING DATA: No fields

Other Options:

Vegetation type – organises species into groups (e.g. grasses) to aid selection.

Species – as described.

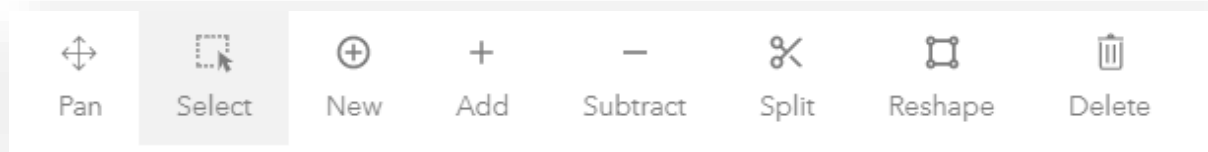
Cover/proportion – choose from <10%, 10-25%, 25-50%, 50-75%, 75-100%

Primary qualifier – relates to specific terms which support the primary attribute

e.g. ley, amenity grass, parkland

2.2.2 Spatial Editing Tools - AREAS

There is a range of editing tools you can use to edit the size and shape of the landscape areas. The surveyor can split an area, merge areas together, modify the boundaries of areas, and update areas.



2.2.2.1 Split

If an area has never been surveyed before, you will need to begin by creating polygons from a single 1-km x 1-km square polygon. This can be done freehand by looking at what is on the ground and drawing your own shape (simple split). You can also split an existing polygon in half using the split tool.

Simple split



- Select the polygon to be split, click 'Split' on the upper toolbar
- A split options menu will appear on the right:



The top 'scissor' option offers:

(note the zig zag button allows you to choose a drawing method - standard, freehand, curves, follow)

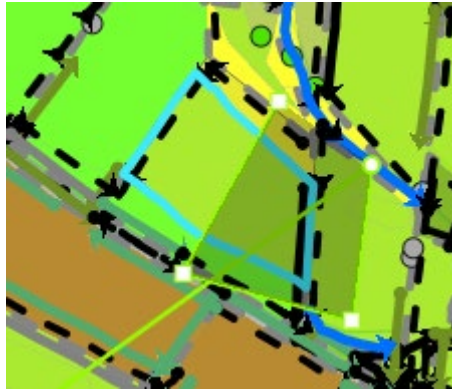
Split by line

Using the sketch tool, draw a line across the selected polygon to be split. Double tap to finish, or click on the tick (bottom right).

Split by polygon

Using the sketch tool, digitise the split polygon, ensuring the split line is in the correct location. Using a series of join-the-dots type editing with the stylus, start just outside the polygon and touch the screen, lift the stylus off the screen and move to where you want the next 'dot' to be, carry on across the polygon until you are out the other side, then carry on until you can complete a polygon that will include all the bit you want to split out. If the area is at the edge of the square just tap outside of it. Double tap to finish or click on the green tick (bottom right). The area which will be split is shown highlighted.

If the part to split is too small (i.e. below the minimum mappable unit) the split will not work. A doughnut polygon may be created by digitising a shape inside the selected area.



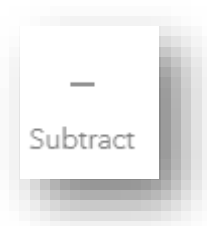
- **Areas can only be split one at a time.**
- **A Split can be digitised across and around a polygon to create a simple split or within a polygon creating a doughnut polygon.**
- **Related attributes will be deleted in one half of the split polygons. You may be better served by the Subtract tool...**

2.2.2.2 *Subtract*

- Select the polygon to have an area subtracted:

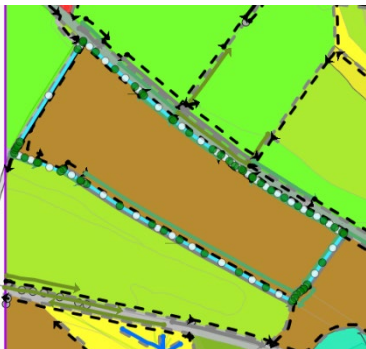
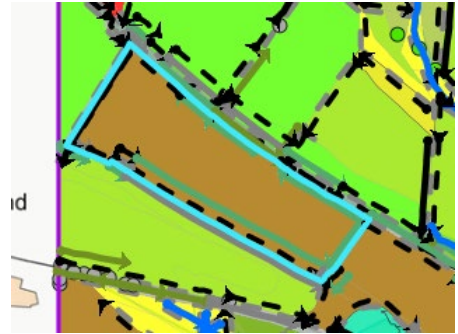


- Choose the Subtract button
- Draw a shape which will cut out a section of the selected area
- A new polygon will be created with no attributes, which can then be edited (keeping the attributes of the original polygon) **(Properties, Related)**.



2.2.2.3 *Reshape*

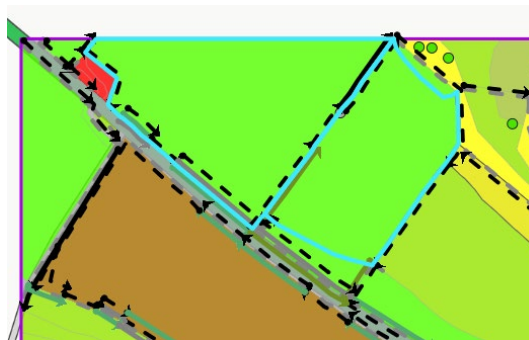
- Zoom or pan to the location on the map display where the area is to be modified
- Select the polygon to be reshaped (don't forget to tap the "layer settings" button and tick the relevant layer beforehand)
- Click Reshape



The selected boundary is shown with a series of dots (vertices). These dots may be dragged/moved in order to reshape the boundary of the polygon, until the surveyor is satisfied that the edit sketch reflects how the boundary is on the ground.

2.2.2.4 *Merge*

- Zoom or pan to the location on the map display where the areas are to be merged
- Click or drag a selection box to select the areas to be merged. The selected areas are shown highlighted in blue

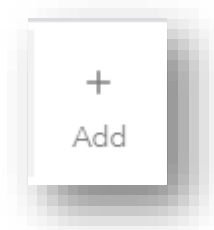


Click the Merge button at the top (only appears when 1 or more areas are selected) to complete the spatial edit.

Many areas can be merged together, but attributes will be deleted.
The Add tool may better serve your purpose...

2.2.2.5 *Add*

Select the polygon to have an area added:



Draw a shape which extends the polygon:

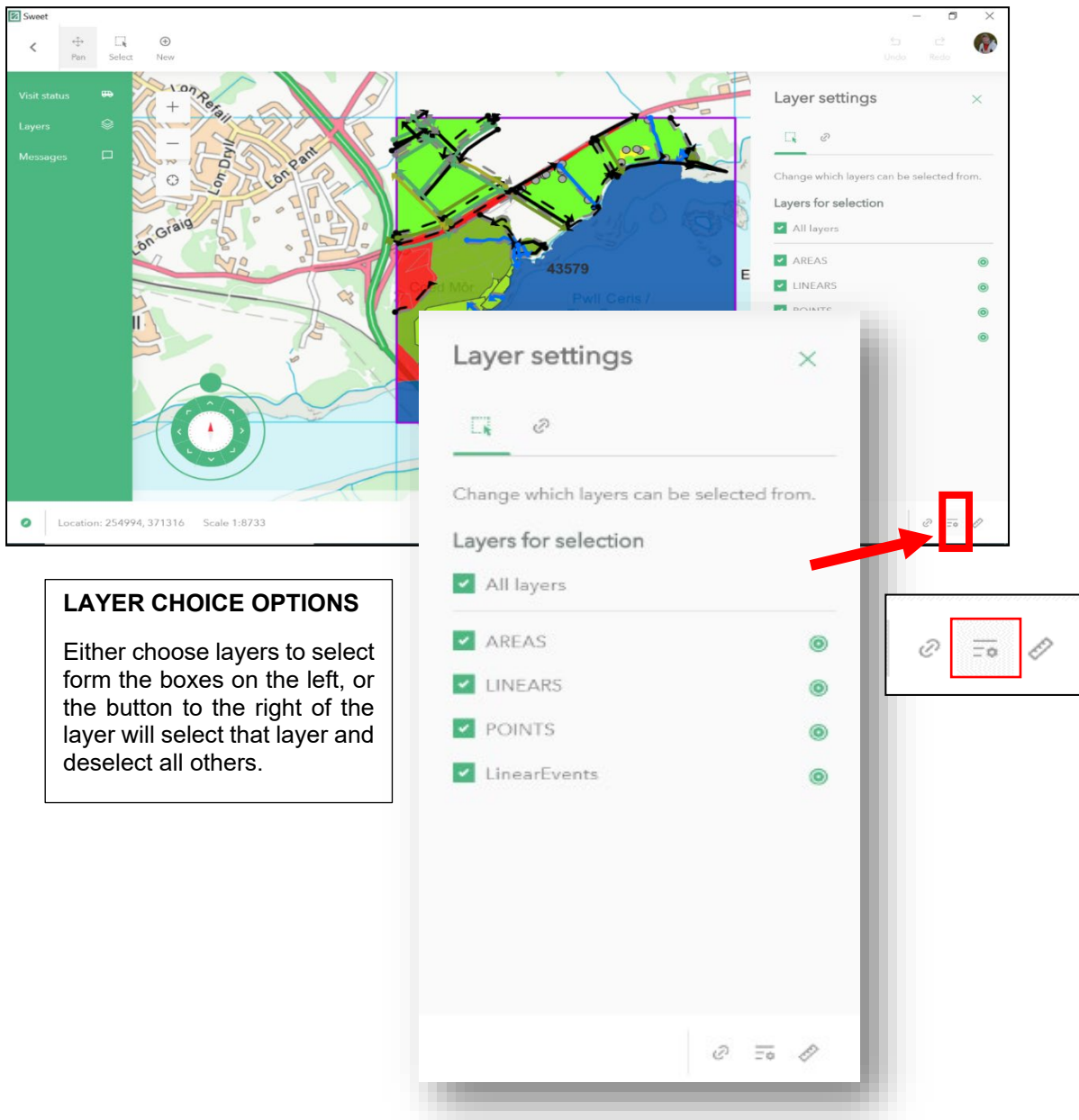


2.3 Methodology for Mapping Point Features

Point features are individual landscape elements that occupy an area less than 20 m x 20 m. Features which will be recorded as points on the map are listed below (POINTS). For this survey they include individual trees, clumps of trees or scrub and veteran trees. Spatial accuracy is not a key aspect of the survey but where necessary, surveyors can also move points. Points can also be added to indicate new features. You may need to hide area and linear features in the 'Layers' options to see the points clearly on the map.

2.3.1 Editing Point Features (POINTS)

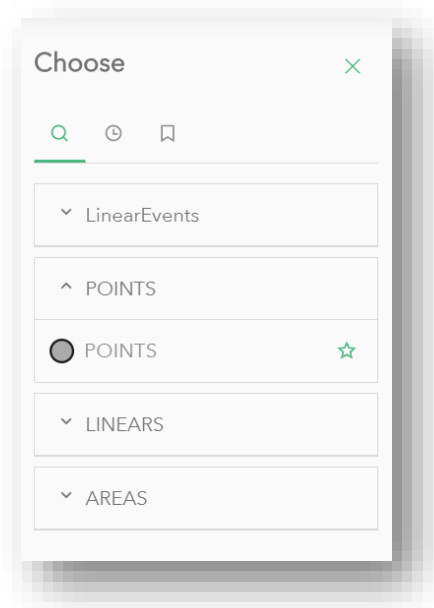
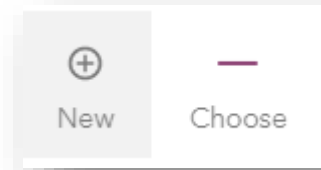
For all point editing tasks, surveyors will need to select Points in the Layer Choice options:



2.3.1.1 *New Points*

- Click on the Create button, then click on the Choose button.

Options will appear on the right-hand side. Select a point option, then click to place your new point on the map.



- The new point appears
- Click on Properties (left hand side) and the attribute editor will open, and details should be entered for the new point (Visit status only). Ensure you also add the **Related** attributes.

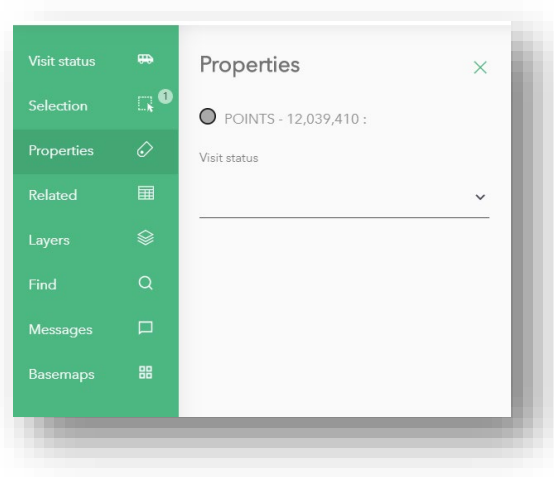
Points can only be added one at a time.

A point cannot be added within 10 m of an existing point.

2.3.2 *Editing Point Attributes (Related attributes)*

Points can be selected by dragging a box around them as an alternative to trying to click on the point. The selected point is shown highlighted in a blue box.

- Click on Properties and details should be checked and/or changed for the point:

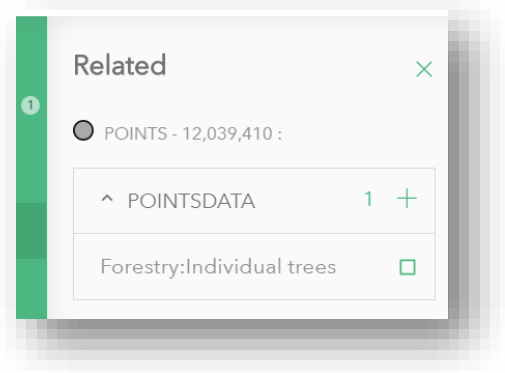


- Remember to check components in the **Related** options:

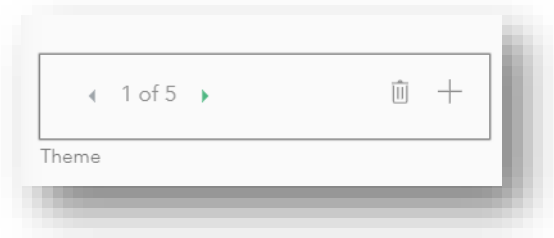
A point may have more than one component. Components can be added or deleted, and attributes of components can be edited.

These edits are all undertaken in the **Related** option.

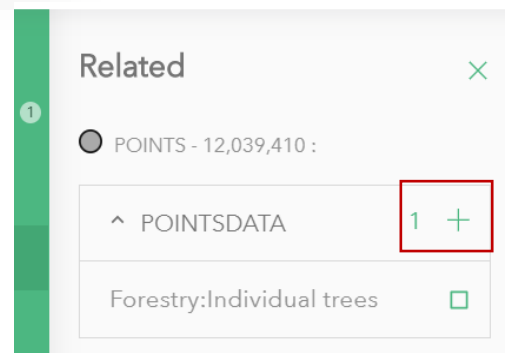
- To edit the attributes of the point, click the 'Related' button'.



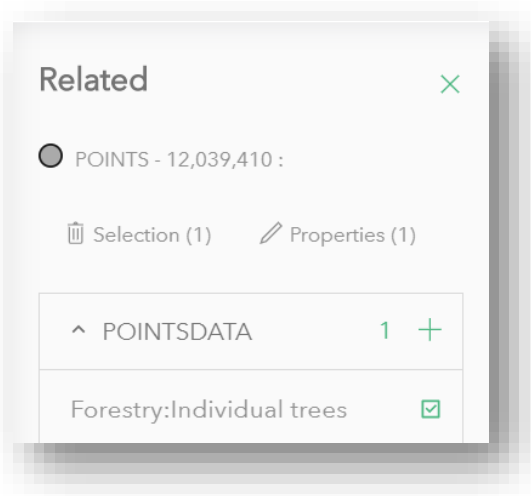
You can scroll through the components using the arrows:



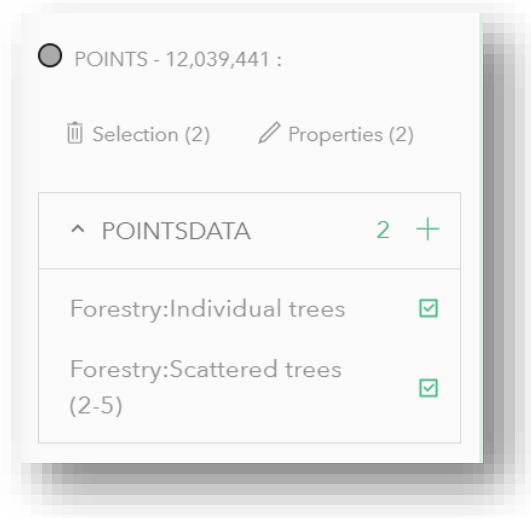
To **add a new** component, click the **New +** button in the related tables pane.



To **delete** a component, click on the component to select it (tick the box), and click the Delete button (at the top).



When two or more components have the same attribute (e.g. DBH), then you can change all at once if you select all of the same components with the same attribute, then click on Properties (top of pane):



***Remember to update the Visit Status on the Point once complete**

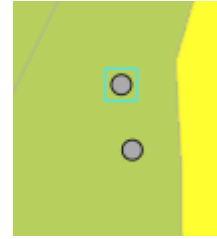
Points can only have their attributes updated one at a time (apart from Visit Status).

Each point should contain at least one component.

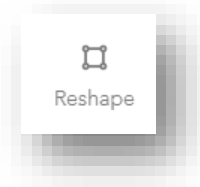
2.3.3 Spatial editing - Points

2.3.3.1 Reshape (move)

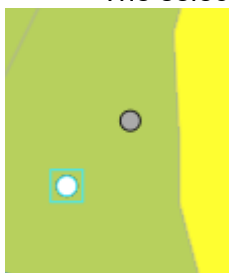
- Select the point to be moved on the map (as above).



- Click the Reshape button



- The selected point will go white.

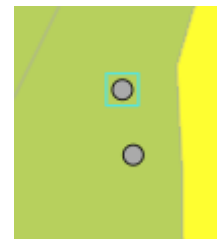


- You can then drag the point to an alternative location on the map in order to move the point.

***Points can only be moved one at a time.
A point cannot be moved to within 10 m of an existing point.***

2.3.3.2 Delete

- Select the point to be deleted on the map (as above).



- Click the Delete button (top toolbar), the feature will be deleted.



2.4 Methodology for Mapping Linear Features

Linear features are landscape elements less than 5 m wide that form lines in the landscape. Surveyors will record length and condition (and changes in these over time) of a range of woody linear features. Linear features have a minimum length of 20 m and may include gaps of up to 20 m.

Background

All woody linear features (minimum length 20 m, maximum width 5 m) should be recorded **unless** they form part of a curtilage or they are within the woodland canopy. However, linear features running along the edge of woodlands must be recorded. Linear features which form part of curtilage, (i.e. land intimately associated with buildings) at the boundary of urban and rural land should not be recorded.

Where the linear features (although individually each less than 5m wide) take up an area larger than the minimum mappable unit, a polygon should be created and assigned the BH 'Boundary and Linear features' described as a **wide linear feature** (see BH 3 Boundaries and Linear features). Each linear feature should continue to be collectively represented by a single line when multiple events are present e.g. two woody linear features (one a line of trees, the other a managed hedge). (This is to avoid the necessity of trying to accurately draw each component and assess its area).

New lines should be drawn as accurately as possible, using existing features for reference, as well as making full use of range finders, measuring tapes and compasses to position and measure them.

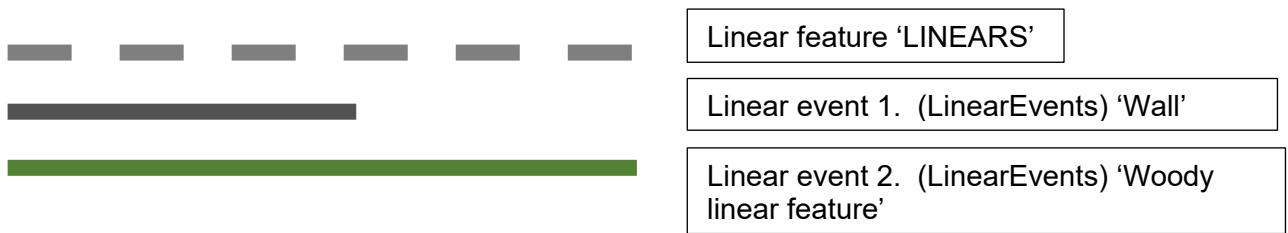
Where there is a step change in the events along a linear feature they should be coded and recorded as different events with their own set of attributes e.g. where the management of a WLF changes along its length resulting in a difference in height or where a section of hedge has a totally different species composition.

2.4.1 LINEARS vs. LinearEvents

- Linear features on the map will appear as continuous lines (LINEARS)
- Each continuous line represents a linear feature which may carry a number of different parts named 'LinearEvents' (or events) in SWEET
- The attributes of an event are all the possible descriptors for that event. Features which will be recorded as events on the map are listed below (LinearEvents). They include fences, walls, woody linear features etc. and are listed under all the available themes.

A LINEAR must be in place before a LinearEvent (feature) may be placed along it.

Relationship between LINEARS and LinearEvents



In summary:

LINEARS have no attributes and can be:

- Created
- Deleted
- Reshaped
- Cut

LinearEvents hold attributes and can be:

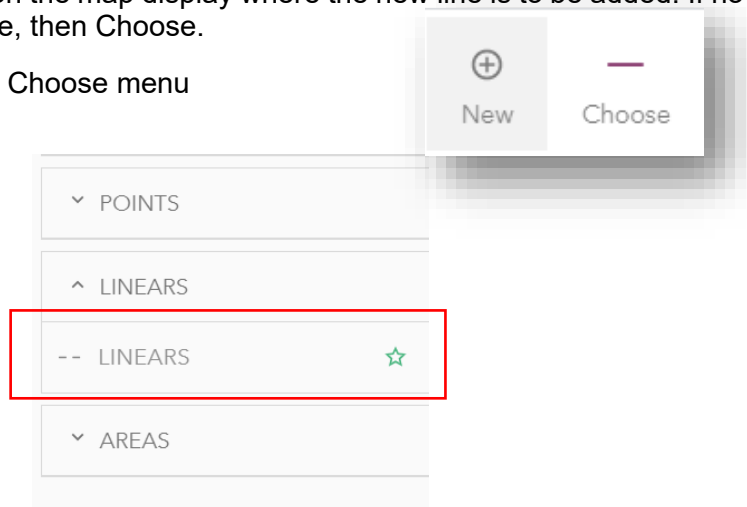
- Created (must be on a LINEAR)
- Length adjusted
- Cut
- Deleted

2.4.2 Spatial editing - LINEARS

2.4.2.1 New Linear Feature

Zoom or pan to the location on the map display where the new line is to be added. If no Linear feature exists, click on Create, then Choose.

- Select LINEARS from the Choose menu



Draw a new line on the map by clicking and digitising a new linear feature. Finish by double clicking or click the tick (bottom right). Again, the zigzag button allows you to choose the type of drawing (standard, curves, follow, freehand).

In order to record an event on the linear feature, repeat the steps above, choosing the appropriate LinearEvent, placing it along the created LINEAR for the appropriate length.



Lines do not have attributes – these are on the LinearEvents

Lines cannot be added outside the survey square.

Lines can only be added one at a time.

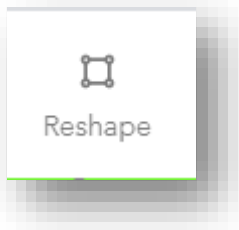
Lines must be 5.0 m long minimum.

A line cannot cross over itself.

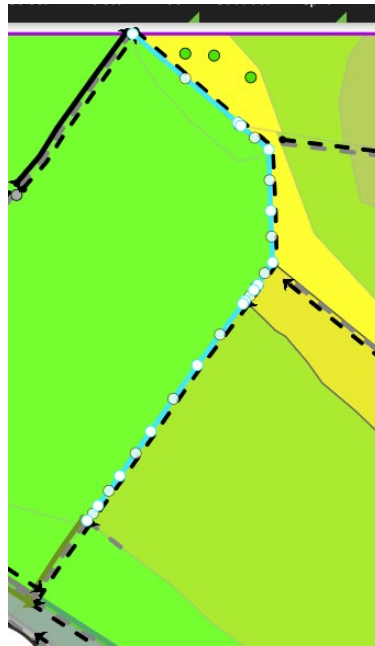
2.4.2.2 *Reshape*

Zoom or pan to the location on the map display where the line is to be modified.

- Click on or drag a selection box over the line which is to be modified
- The selected line is shown highlighted in blue
- Click on the Reshape button



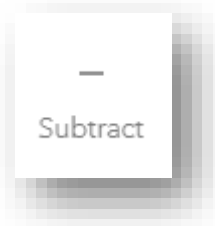
Vertices which can be used to edit the shape of the line are shown along its length. Using the pen, the sketch can now be modified, with vertices added, deleted (by selecting a vertex and dragging it to the 'bin' (bottom right), and moved (by dragging) until the surveyor is satisfied that the line reflects how the feature looks in the field.



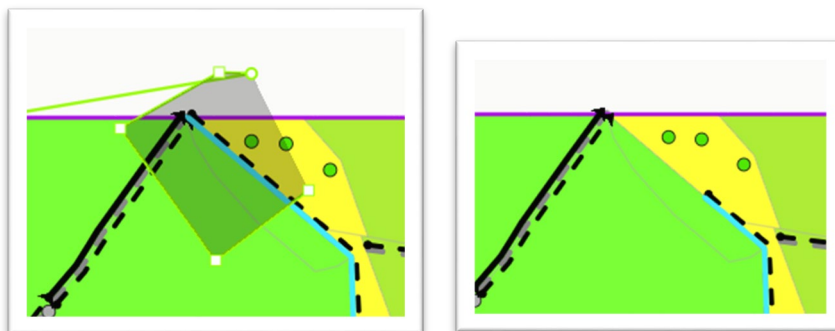
If a modify edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.

2.4.2.3 *Cut (Subtract)*

- Zoom or pan to the location on the map display where the line is to be modified
- Click on or drag a selection box over the line which is to be modified
- The selected line is shown highlighted in blue.



- Click the subtract button:
Draw a polygon which covers the section of line to be cut. Double click or click the tick button (bottom right) to finish.



The line will be cut as specified.

Only one line can be cut with a subtract edit.

If a cut edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.

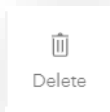
A line cannot be deleted by a cut edit.

2.4.2.4 Delete

Zoom or pan to the location on the map display where the line is to be modified.

- Click on or drag a selection box over the line which is to be modified
- The selected line is shown highlighted in blue

- Click the delete button:



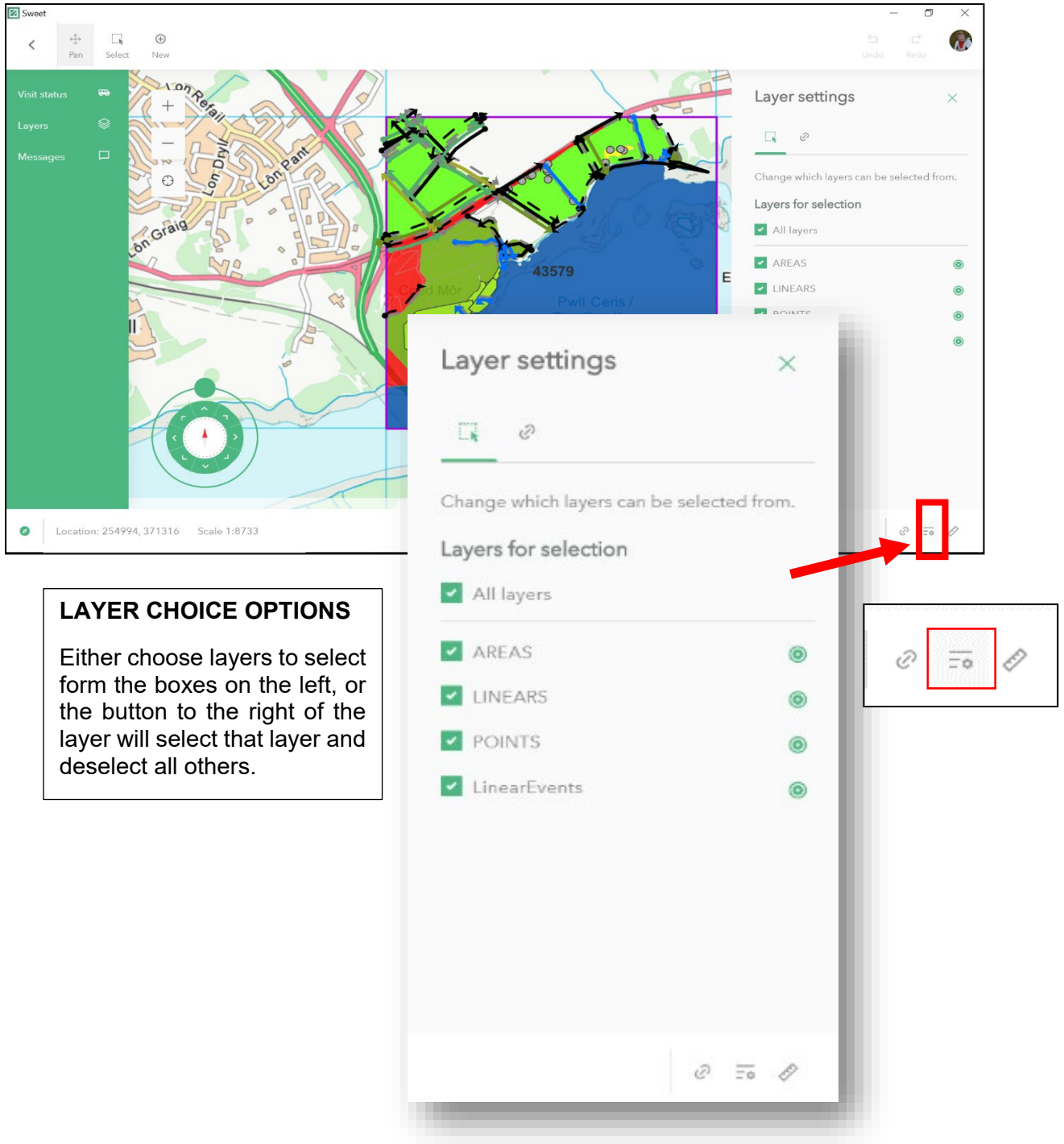
- The feature will be deleted.



2.4.3 Attributes – LinearEvents

To edit (or review) a linear event feature, you must first ensure the LinearEvent features are selectable by:

1. Click on Select (top button)
2. Select a Linear Event by choosing LinearEvents in the bottom Layer Settings menu.

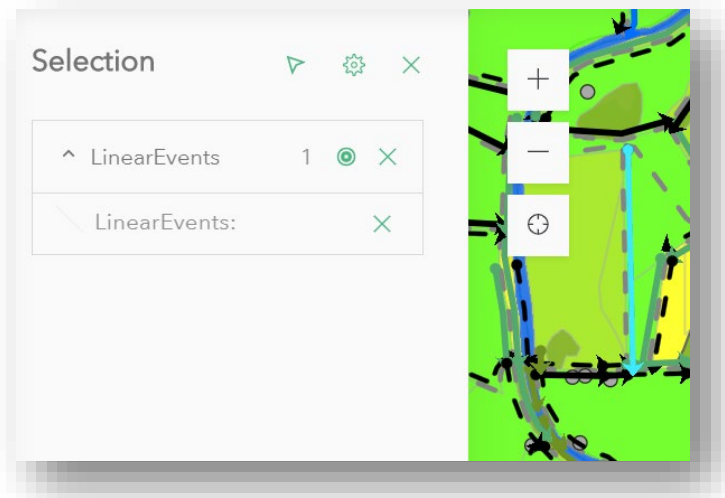


LAYER CHOICE OPTIONS

Either choose layers to select from the boxes on the left, or the button to the right of the layer will select that layer and deselect all others.

- Zoom or pan to the location on the map display to select a line for event attribute update
- Events can be selected by dragging a box across them and the selected line/s is shown highlighted in blue.

Tip: To select only one LinearEvent, you can click on the 'Selected' button and choose the LinearEvent you want to edit from the menu.



- Click on **Properties** and the attribute editor will open, and details should be checked and/or changed for the linear feature.

If the feature is a Woody Linear Feature (WLF), Natural Shape, you need to click on the Related button to add/edit species.

Lines can only have their event attributes updated one at a time.

Each line should contain at least one event.

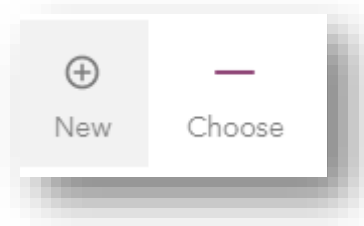
Events must be a minimum of 5.0 m long.

2.4.4 Spatial editing - LinearEvents

2.4.4.1 Create new Event

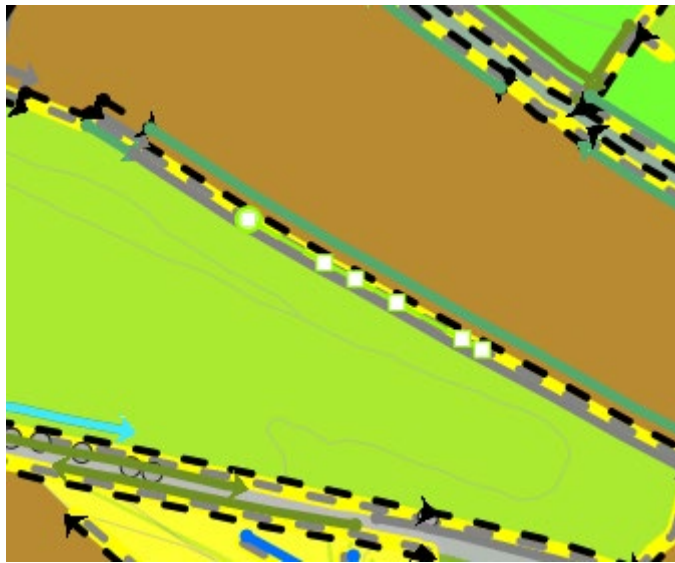
To add a new Event, a LINEAR feature must already be in place in the location of the feature (see above). You can then add as many events as you like along the LINEAR.

- Ensure LinearEvents are selected in the Layer Settings, then click on the **'Create'** button

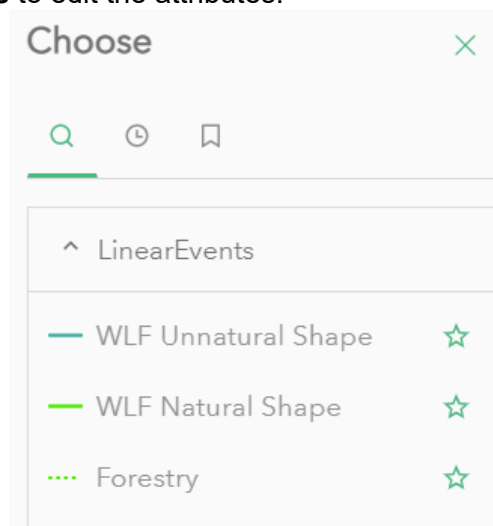


- Select the feature of your choice from the menu

- Draw the event on the LINEAR as below. Double click or click on the tick button (bottom right) to finish.



- Click on **Properties** to edit the attributes.

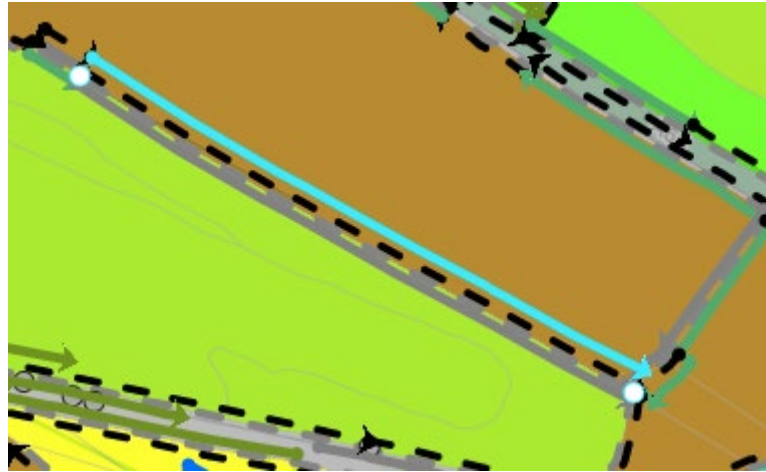


2.4.4.2 *Reshape Event (adjust length)*

- Ensure LinearEvents are selected in the Layer Settings.
- Select event as described above.

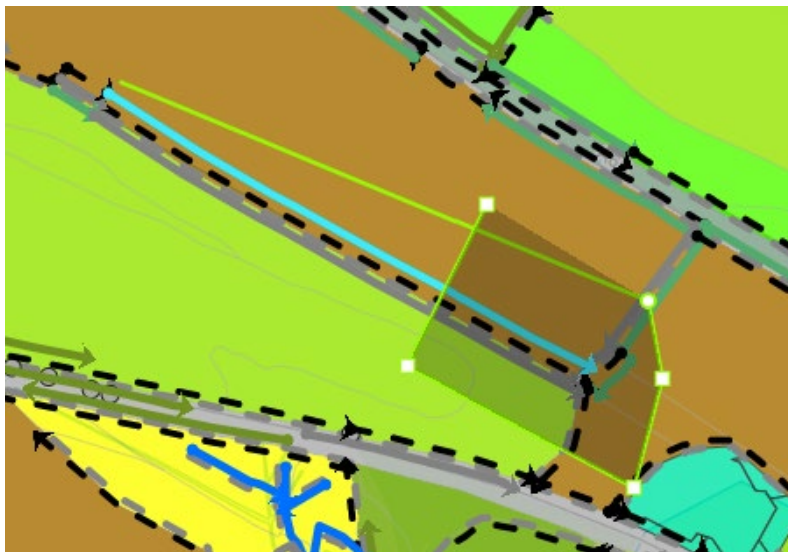


- Click on the **Reshape** button
- The length of the event may be adjusted by dragging the white dots to the appropriate position.



2.4.4.3 *Cut (Subtract) Event (adjust length)*

- Ensure LinearEvents are selected in the Layer Settings
- Select event as described above
- Click on the **Subtract** button
- Draw a shape around the portion of the event to be cut

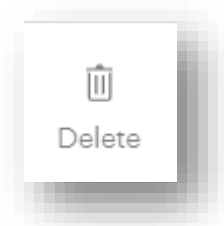


- Double click or click on the tick button (bottom right) to finish.
- The event will be cut to the chosen length.



2.4.4.4 *Delete Event*

- Ensure LinearEvents are selected in the Layer Choices.
- Select event as described above.
- Click on the Delete button
- The event will be deleted



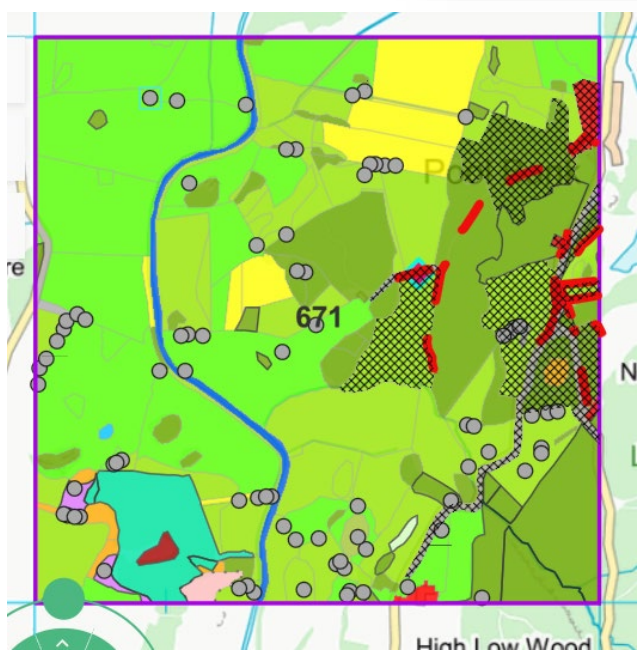
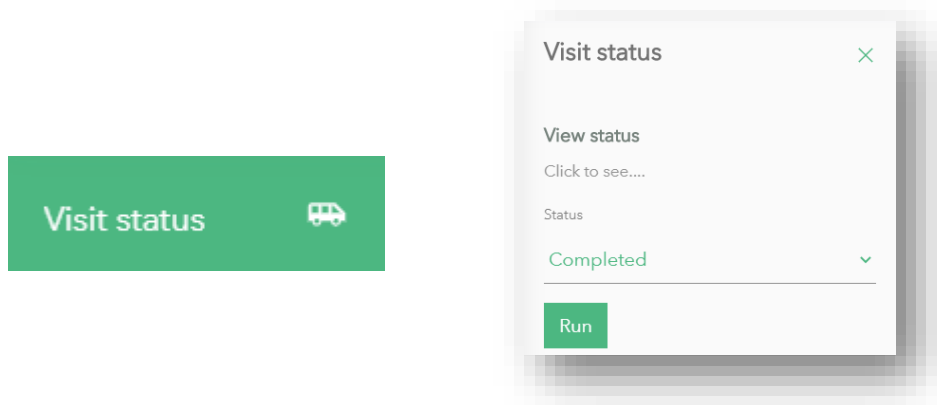
2.4.5 Checking Visit Status on Features

Once you have surveyed a few features, you might want to see how you are progressing.

You can click on the button on the left marked with a **little bus**.

This will give you options which will highlight features according to their Visit Status.

This will work for AREAS, POINTS and LINES.

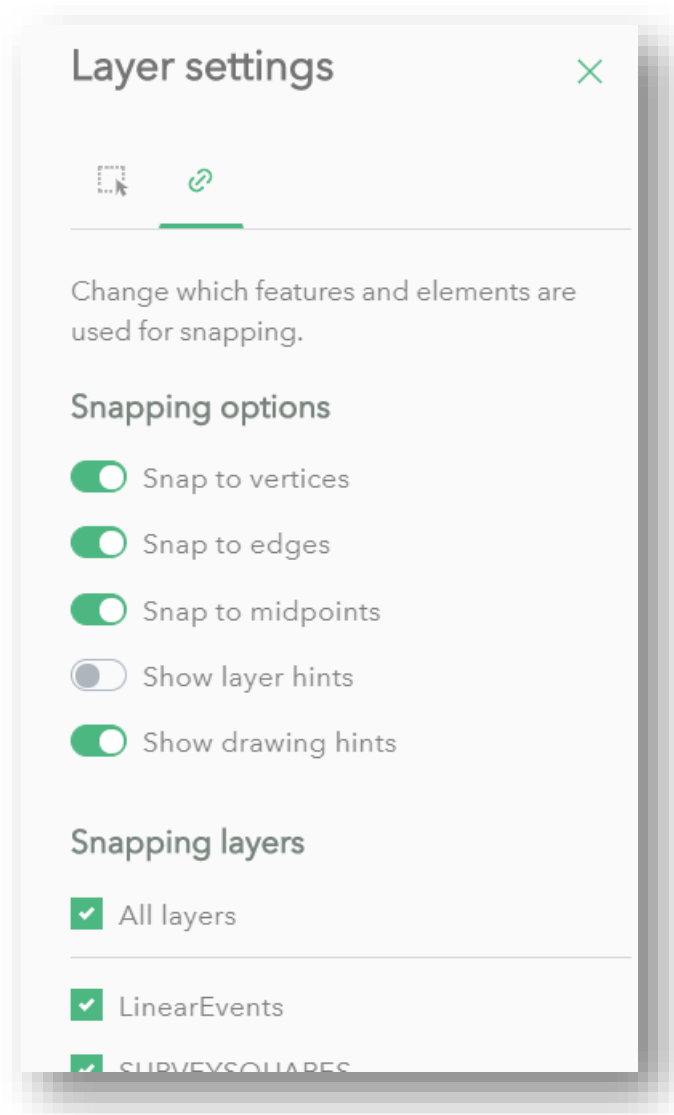


2.5 Snapping

Sometimes when editing, you may want your edits to follow the boundary, edge or location of another feature.

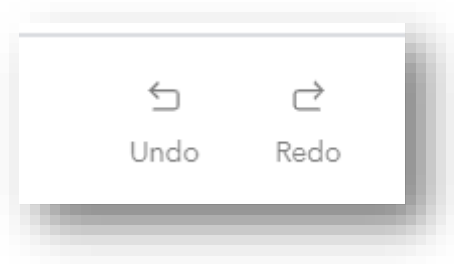
- to achieve this, you can turn on the 'snapping' feature.
- This is located in the bottom right:

Clicking on the Layer settings next to the snapping on/off button provides a menu allowing you to adjust the snapping options as follows:



2.6 Undoing and Saving Edits in SWEET

Edits are saved as you go along in SWEET. You also have the option to undo or redo edits.



Once you have exited SWEET, undo/redo are not available from your previous session.

DO NOT LOG OFF FROM SWEET when offline

2.7 Troubleshooting

- **Back up procedures.** *You have a 'UKSCAPE' backup dashboard on your desktop. Use this regularly to back up data. It will copy all squares currently synced to the tablet to a Micro SD card in the tablet. If you insert a USB stick, it will also copy the backup to this.*
- **I've accidentally logged out and have no signal.** *The only way to solve this is to find somewhere with a Wi-Fi or Mobile signal. Be careful not to log out when you are offline, as you will not be able to carry on working.*

Appendix-1: Field Survey Vegetation Key and Allocation Rules to Broad and Non-Coastal Priority Habitats

(adapted for ERAMMP, non-woody parts of the key are greyed out but may be required for habitats with woody features in them)

Simon Smart, Bob Bunce, Rob Large, Pete Carey, Dave Howard, Keith Kirby, Lindsay Maskell

(Incorporating Suggestions from Stuart Smith, Jim Latham, Clare Burrows, Mark Crick, Ian Strachan, Keith Kirby, Alex Turner and Heather Robertson)

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------|----------------------------------|---------|
| 1a | Total vegetation cover may be variable but where present consists of over 75% herbaceous species. | 2 | | | |
| 1b | Vegetation cover consisting of over 25% canopy cover of trees or shrubs over 1m high. | 16 | | | |
| 1c | Vegetation with over 25% cover of all woody species that are not trees as in 1b. Includes dwarf shrubs, less than 1 m. Includes dwarf shrubs <i>Ulex europaeus</i> , <i>Ulex galii</i> and <i>U. minor</i> , <i>Calluna</i> , <i>Erica</i> spp., <i>Vaccinium</i> spp. <i>Empetrum</i> and <i>Arctostaphylos</i> . Includes shrub and hedgerow species. Does not include <i>Salix repens</i> in dune slacks. | 20 | | | |
| 1d | Saxicolous (on rock) and chasmophytic (in crevices), non-coastal vegetation cover less than 50% with residual cover being <u>rock</u> . Includes species such as <i>Cryptogamma crispa</i> , <i>Cystopteris fragilis</i> , <i>Gymnocarpium robertianum</i> and <i>Asplenium trichomanes</i> . Includes scree, mine spoil and other unvegetated rock surfaces that may be sparsely vegetated- see attribute descriptions. | Inland Rock (BH 16) Go to 25 for breakdown to PH | Rock vegetation | OV38-40, U16, U17, U21 | |
| 1e | Unvegetated e.g. sea/other water bodies, bare rock or peat, artificial surfaces/built land. See 2c for ploughed land. See guidance notes for post-clearfell vegetation | Exit key -not vegetation, see note on bare ground | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------|----------------|
| 2a | Vegetation consisting of Bracken at $\geq 95\%$ cover with or without a sparse herbaceous understorey. Stands that have not yet peaked in seasonal biomass should still be recorded as dense Bracken if you believe peak cover is likely to be at least 95%. Note that bracken can occur in amongst boulders and scree. Consideration should be made to map as mosaic with inland rock habitats in this situation. | Dense Bracken (BH 9) | <i>Bracken at 95-100% cover</i> | U20, W25 | |
| 2b | Bracken <95% cover or absent – the species code for Bracken plus cover intervals should be used in conjunction with any other primary and secondary attributes and relevant BH e.g. Acid grassland. Hence, the underlying species assemblage requires further keying. | 3 | | U20, W25, other grasslands and heaths | |
| 2c | Vegetation consisting of crops (including grass leys in arable rotation). Note that ploughed land should be indicated as such but a primary attribute used to reflect the previous crop where this can be identified. If not possible, use 'ploughed land' as a primary attribute (also see guidance notes for Orchards). | Arable and Horticultural (BH 4) | <i>Theme: Agricultural crop. crops listed in drop-down box</i> | | |
| 3a | Vegetation containing halophytic species | 4 | | | |
| 3b | Vegetation not as above. | 5 | | | |
| 4a | Vegetation consisting of frequent to dominant halophytes, usually on mud often much bare ground. | 26 | | | |
| 4b | Vegetation with halophytes prominent. On sea cliffs. | Maritime cliffs and slopes vegetation Priority Habitat PH (BH Supra-littoral Rock) | <i>Maritime vegetation</i> | | |
| 4c | Vegetation growing on sand dunes including yellow dunes, grey dunes and slacks. | Sand dune Priority Habitat | <i>Sand dune vegetated</i> | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------|-----------------------------------------|----------------------------------------------------|
| | | (BH 19 Supra-littoral sediment) | | | |
| 4d | Generally linear vegetation, just above the high-tide mark, consisting of halophytes such as <i>Cakile maritima</i> , <i>Agropyron junceiforme</i> and <i>Honkenya peploides</i> . Sometimes with generalist ruderals such as <i>Stellaria media</i> and <i>Rumex obtusifolius</i> . | Strandline/Coastal vegetated shingle Priority Habitat (BH 19 Supra-littoral sediment) | <i>Strandline vegetation</i> | | Annex 1 1210 – Annual vegetation of drift lines. |
| 4e | Sparsely vegetated shingle with halophytes such as <i>Rumex crispus</i> , <i>Crambe maritima</i> , <i>Glaucium flavum</i> , <i>Silene uniflora</i> , <i>Beta vulgaris maritima</i> , <i>Lathyrus japonicus</i> , <i>Picris echioides</i> | Strandline/Coastal vegetated shingle Priority Habitat (BH 19) | <i>Strandline vegetation</i> | | Annex 1 1220 – Perennial vegetation of stony banks |
| 4f | <i>Phragmites australis</i> is dominant but with halophytic species in underlayer | Reedbeds Priority Habitat (BH 11 Fen, Marsh, Swamp) | | | S4, S24, S25, S26 |
| 5a | Pulse-disturbance vegetation. Includes assemblages whose species composition suggests disturbance in the past but with no evidence of being subject to recent sustained management cycles that involve grazing with or without mowing. Two specific groups of plant assemblage are included here. Firstly, wetland tall-herb including reedbeds, sedge swamps and tall-herb dominated gaps in wet woodland plus emergent aquatic vegetation that is often zoned and on the fringes of waterbodies. The second group includes very diverse 'clearance' communities of dry soils assembling in response to previous unpredictable disturbance. Often found in urban situations, in woodland gaps and clearfell or on linear features but including setaside – see guidance notes for further details. | 6 | | | |
| 5b | Press-disturbance vegetation. Includes all grazed upland and lowland grasslands along with meadows and silage fields . Also included are those | 8 | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------|------------------------------------|---------|
| | amenity grasslands which maybe rabbit grazed but are generally managed by frequent repeated mowing. Also included are areas of monocot rather than dwarf shrub dominated bogs and heaths – see guidance notes for further details. Plant assemblages may reflect wet to dry, acid to calc conditions but the common feature is that they experience a relatively stable, cyclic disturbance regime where biomass is removed by annual cutting or/and continuous grazing at varying intensities. | | | | |
| 6a | Wetland tall herbs or sedges frequent to dominant. | 6c-g | | | |
| 6b | Wetland tall herbs occasional to absent. | 7a-c | | | |
| 6c | Terrestrial vegetation growing on lowland peat soils often with or without scattered Alder or Willow. Species include <i>Carex paniculata</i> , <i>C. acutiformis</i> , <i>C. rostrata</i> , <i>C. elata</i> , <i>C. riparia</i> , <i>Iris pseudacorus</i> , <i>Filipendula ulmaria</i> , <i>Phragmites australis</i> (but not virtually pure stands), <i>Equisetum fluviatile</i> , <i>Eupatorium cannabinum</i> , <i>Lythrum salicaria</i> . See guidance notes. | Fen Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Fen</i> | S1-S28 (but not S4) M27, M28, OV26 | |
| 6d | Aquatic vegetation where macrophytes persist as emergents within standing water. Species include <i>Typha</i> spp., <i>Schoenoplectus</i> , <i>Ranunculus fluitans</i> , <i>Sparganium</i> spp, <i>Sagittaria</i> , <i>Hippuris</i> and others. Does not include beds of floating and submerged aquatics e.g. <i>Chara</i> spp., <i>Potamogeton</i> spp., <i>Ceratophyllum</i> spp. | Aquatic macrophytes (BH Rivers and streams) | <i>Aquatic macrophytes</i> | | |
| 6e | Stands dominated by <i>Phragmites australis</i> in standing saline or freshwater. | Reedbeds Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Reedbed</i> | S4, S24, S25, S26 | |
| 6f | Vegetation fringing open water often developed as a narrow (<0.5m wide or <0.25ha in extent) part of a hydrosere between standing water and upslope vegetation. Species include <i>Valeriana officinalis</i> , <i>Epilobium hirsutum</i> , <i>Filipendula ulmaria</i> , <i>Oenanthe crocata</i> , <i>Stachys palustris</i> and <i>Lythrum salicaria</i> . | Aquatic marginal vegetation (BH 11 Fen, Marsh, Swamp) | <i>Aquatic marginal vegetation</i> | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-----------------------------------------|----------------|
| 6g | Fertile, wetland tall-herb vegetation with less than 50% grass cover. Dominated by characteristic species such as <i>Epilobium hirsutum</i> , <i>Urtica dioica</i> , <i>Filipendula ulmaria</i> , <i>Phragmites</i> , <i>Arrhenatherum</i> . | Fen Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Tall herb wetland vegetation</i> | OV26 | |
| 7a | Mid to late-successional pulse-disturbance vegetation consisting entirely of long-lived perennials with little or no open ground. Vegetation with over 50% grass cover. <i>Arrhenatherum</i> , <i>Dactylis</i> and <i>Elymus repens</i> usually dominate but scattered shrubs and tall herbs maybe present particularly along linear features such as road verges, field boundaries, tracksides and ditchbanks. | Neutral Grassland (BH 6) | <i>Tall unmanaged neutral grass</i> | OV23, OV25, OV27, MG1 | |
| 7b | Early-successional pulse-disturbance vegetation dominated by annual weeds as well as perennial species usually with some open ground present. Open ground usually conspicuously present. Actual species composition dependent upon starting point. Unsown setaside will usually key out here. Indicators include <i>Poa annua</i> , <i>Plantago major</i> , <i>Agrostis stolonifera</i> , <i>Polygonum aviculare</i> , <i>Persicaria maculosa</i> , <i>Anisantha sterilis</i> , <i>Stellaria medi</i> and a diverse range of arable weeds. Excludes weed assemblages with managed crops present. These key out at 2c . | Arable and Horticultural BH (BH 4) or Urban (BH 17) | <i>Annual/early successional with open ground</i> | OV21-23 | |
| 7c | Vegetation containing some annual weeds but consisting mainly of long lived perennials including some grasses but <50% cover. Some shrubby species may be present as infrequent juveniles. Species include <i>Urtica dioica</i> , <i>Galium aparine</i> , <i>Chamaerion angustifolium</i> , <i>Cirsium arvense</i> , <i>Arrhenatherum elatius</i> and <i>Poa trivialis</i> . Includes stands dominated by invasive aliens such as <i>Reynoutria japonica</i> , <i>Impatiens glandulifera</i> and <i>Heracleum mantegazzanum</i> | Neutral Grassland (BH 6) | <i>Perennial vegetation, tall herb/grass</i> | OV24 | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------|
| 7d | 50-80% cover of grasses (notably <i>Holcus lanatus</i>) on old mine spoil or serpentine soils, with metalophyte species occurring e.g. <i>Minuartia verna</i> , <i>Thlapsi arvense</i> , <i>Armeria maritima</i> , <i>Silene maritima</i> , <i>Thlapsi caerulea</i> , <i>Lycnis alpina</i> , <i>Cerastium nigrescens</i> . | Calaminarian Grassland Priority Habitat (Inland Rock BH16)- | | | Annex 1 6130 - Calaminarian grasslands of the <i>Violetalia calaminariae</i> . |
| 8a | Grassland of many types with Mature and/or Ancient trees present (much lower than 25% cover), often in a parkland setting. Record this habitat and continue key for overlapping habitats. | Wood-pasture and Parkland Priority Habitat (not currently on PH/BH list) | Record as grassland with parkland as Primary qualifier | | |
| 8b | Vegetation usually dominated by palatable grasses with a rich or poor suite of accompanying herbs that indicate neutral, dry or damp soils. Calcareous or acid indicator species infrequent, rare or absent. Neutral indicators include <i>Trifolium repens</i> , <i>Lolium perenne</i> , <i>Stellaria media</i> , <i>Cynosurus cristatus</i> , <i>Trifolium pratense</i> , <i>Centurea nigra</i> , <i>Lotus corniculatus</i> , <i>Cerastium fontanum</i> , <i>Rumex acetosa</i> , <i>Ranunculus repens</i> , <i>Juncus inflexus</i> , <i>Juncus effusus</i> , <i>Montia fontana</i> , <i>Glyceria fluitans</i> , <i>Poa trivialis</i> , <i>Agrostis stolonifera</i> , <i>Juncus bufonius</i> and <i>Alopecurus geniculatus</i> . | 9 | | | |
| 8c | Calcareous indicators of wet or dry ground present e.g. <i>Galium verum</i> , <i>Briza media</i> , <i>Carlina vulgaris</i> , <i>Cirsium acule</i> , <i>Sanguisorba minor</i> , <i>Sesleria albicans</i> , <i>Helianthemum nummularia</i> , <i>Cirsium dissectum</i> , <i>Carex pulicaris</i> , <i>C. flacca</i> , <i>C. panicea</i> , <i>Eriophorum latifolium</i> , <i>Gymnadenia conopsea</i> . | 10 | | | |
| 8d | Acid indicators present (includes a large range of acid grassland, moorland, heath and peatland species). | 11 | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------|----------------------------------|------------------------------------------------------------------------------------------------------|
| 9a | Productive grasses and <i>Trifolium repens</i> usually (see below) dominate mainly <i>Lolium</i> , <i>Phleum</i> , <i>Dactylis</i> , <i>Cynosurus</i> , <i>Holcus</i> and the larger <i>Festuca spp.</i> <i>Agrostis capillaris</i> , <i>Cynosurus cristatus</i> and <i>Anthoxanthum odoratum</i> may be present at the less fertile end of the gradient. In wet grasslands <i>Juncus effusus</i> , <i>Deschampsia cespitosa</i> , <i>Glyceria fluitans</i> , <i>Alopecurus geniculatus</i> and <i>Festuca arundinacea</i> may be abundant. Varies from pure grass to moderately species rich grassland but hay meadow Priority Habitat indicators are always rare or absent. Some fields may be dominated by <i>Ranunculus</i> and/or <i>Trifolium repens</i> . | 17 | | | |
| 9b | Cover of grass species <i>Trifolium repens</i> and sown <i>T. pratense</i> usually less than 50%. Typically rich in forb species with frequent Priority Habitat lowland meadow indicators including <i>Lathyrus pratensis</i> , <i>Lotus corniculatus</i> , <i>Leucanthemum vulgare</i> , <i>Galium verum</i> , <i>Primula veris</i> , <i>Centaurea nigra</i> , <i>Leontodon hispidus</i> , <i>Ranunculus bulbosus</i> or on flood meadows some of <i>Caltha palustris</i> , <i>Sanguisorba officinalis</i> , <i>Filipendula ulmaria</i> and <i>Alopecurus pratensis</i> . Note that vegetation dominated by <i>F. ulmaria</i> keys out at 6g . | Lowland hay meadows Priority Habitat (BH 6 Neutral Grassland) | <i>Herb-rich grassland</i> | MG4, MG5, MG8 | Annex 1 6510 – Lowland hay meadows (<i>Alopecurus pratensis</i> – <i>Sanguisorba officinalis</i>). |
| 9c | Cover of grass species and clover usually less than 50% with a high proportion of Priority Habitat upland meadow indicators such as <i>Geranium sylvaticum</i> , <i>Alchemilla spp.</i> , <i>Trisetum flavescens</i> , <i>Conopodium majus</i> and <i>Anthoxanthum odoratum</i> . | Upland hay meadows Priority Habitat (BH 6 Neutral Grassland) | <i>Herb-rich grassland</i> | MG3 | Annex 6520 – Mountain Hay Meadows. |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 9d | Neutral flushes typically picking out enriched springlines and water seepage zones in lowland or upland situations. Acidic and calcareous indicators are absent or rare. Characteristic species include <i>Agrostis stolonifera</i> , <i>Calliergon cuspidatum</i> , <i>Lotus uliginosus</i> , <i>Montia fontana</i> , <i>Alopecurus geniculatus</i> , <i>Juncus articulatus</i> , <i>Caltha palustris</i> , <i>Brachythecium rivulare</i> , <i>J. bufonius</i> , <i>Glyceria fluitans</i> , <i>Ranunculus acris</i> , <i>Veronica beccabunga</i> , <i>Chrysosplenium oppositifolium</i> . | Fen, Marsh, Swamp Broad Habitat (BH 11) | <i>Flush</i> | | |
| 9e | Not as above. | 10 | | | |
| 10a | Vegetation on dry ground with scattered sedges and many calcicoles present. Can be relatively species poor but often species rich with >50% forb cover. On calcareous soils, usually rendzinas on chalk or limestone in lowland Britain. Indicators include <i>Bromus erectus</i> , <i>Brachypodium pinnatum</i> , <i>Linum catharticum</i> , <i>Sanguisorba minor</i> , <i>Carlina vulgaris</i> , <i>Cirsium acaule</i> , <i>Hippocrepis comosa</i> and <i>Asperula cynanchica</i> , <i>Filipendula vulgaris</i> , <i>Galium verum</i> , <i>Briza media</i> , <i>Koeleria macrantha</i> and <i>Helianthemum nummularia</i> . | Lowland Calcareous Grassland Priority Habitat (BH 7 Calcareous Grassland) | <i>Lowland Calcareous grassland</i> | CG1-CG9, CG10, | Annex 1 6210 - Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) |
| 10b | As 10a but often low in species richness. Often dominated by <i>Sesleria albicans</i> with <i>Festuca ovina</i> , <i>Thymus praecox</i> , <i>Galium sternerii</i> and <i>Agrostis capillaris</i> characteristic. Stands may comprise a confusing mix of calcicoles and acidophiles. Montane forms sometimes contain Arctic-Alpine plants, such as <i>Alchemilla alpina</i> , <i>Polygonum viviparum</i> and <i>Silene acaulis</i> . <i>Dryas octopetala</i> is also locally indicative. | Upland Calcareous Grassland Priority Habitat (BH 7 Calcareous Grassland) | <i>Upland Calcareous grassland</i> | CG10-CG14, U5c | Annex 1 6210 - semi-natural dry grasslands and scrubland facies: on calcareous substrates (festuco-brometalia). |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------|----------------|
| 10c | Rush or/and <i>Molinia</i> dominated vegetation usually on peat or peaty-gley soils with <i>Juncus acutiflorus</i> and/or <i>subnodulosus</i> abundant. Usually on level ground in lowland or marginal uplands. Acid indicators may be present but especially notable are uncommon assemblages of rich fen species such as <i>Juncus subnodulosus</i> , <i>Carex pulicaris</i> , <i>C. hostiana</i> , <i>Cirsium dissectum</i> , <i>Epipactis palustris</i> , <i>Crepis paludosa</i> , <i>Geum rivale</i> , <i>Briza media</i> , <i>Gymnadenea conopsea</i> and <i>Serratula tinctoria</i> | Purple Moor Grass and Rush Pastures Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Purple moor grass rush pasture</i> | M22, M24, M26 | |
| 10d | Localised areas of vegetation, often visibly associated with seepage zones where water movement is vertical (topogenous mires) or lateral (soligenous mires). Usually with several sedge species and species of wet soils. Includes <i>Briza media</i> , <i>Schoenus nigricans</i> , <i>Pinguicula vulgaris</i> , <i>Parnassia palustris</i> , <i>Carex hostiana</i> , <i>Carex dioica</i> , <i>Drosera anglica</i> , <i>Eriophorum latifolium</i> , <i>Primula farinosa</i> . Often with abundant <i>Molinia</i> . | Fen Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Flush</i> | M9-14 | |
| 10e | Not as above | 11 | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------|----------------------------------|---------|
| 11a | Rush or/and <i>Molinia</i> dominated vegetation usually on peaty-gley soils with <i>Juncus acutiflorus</i> or <i>Juncus effusus</i> abundant to dominant. Indicators of rich fen are absent. Instead typical species include <i>Galium palustre</i> , <i>Cirsium palustre</i> , <i>Ranunculus flammula</i> , <i>Agrostis canina</i> , <i>Mentha aquatica</i> , <i>Achillea ptarmica</i> , <i>Equisetum palustre</i> , <i>Cardamine pratensis</i> , <i>Epilobium palustre</i> and <i>Angelica sylvestris</i> ¹ . | Purple Moor Grass and Rush Pastures Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Purple moor grass rush pasture</i> | M23, M25 | |
| 11b | Not as above. | 12 | | | |
| 12a | Localised narrow wet areas of vegetation or obvious flushing. Vegetation usually dominated by acidiphilous species e.g. <i>Sphagnum</i> spp, <i>Juncus effusus/articulatus/acutiflorus</i> , <i>Carex echinata</i> , <i>Ranunculus flammula</i> , <i>Stellaria alsine</i> , <i>Carex rostrata</i> , <i>Carex nigra</i> . Often bryophyte rich. | Fen Priority Habitat (BH 11 Fen, Marsh, Swamp) | <i>Flush</i> | M4-8 | |
| 12b | Vegetation with many acid indicators. Not associated with clearly defined flushes and depressions but characterising larger, more extensive drier or wetter ground. Hence, all bogs with low cover of dwarf shrub heaths plus upland and lowland acid grasslands key out here. | 13 | | | |

¹ Species-poor *Molinia* stands when associated with upland bog systems and flushes will key out as Moorland grass or be included pragmatically in a wider blanket bog unit. Similarly, grazed Fertile and Acid grasslands in the uplands and west of Britain can have a frequent to dominant overstorey of *Juncus effusus* and should be placed in those BH rather than in Purple Moor grass and Rush Pastures. Hence, to qualify as Purple Moor grass and Rush pasture PH the stand must have a reasonable representation of the listed indicator species.

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------|------------------------------------------------|------------------------------------------------------|
| 13a | Sub-arctic indicators present, for example prostrate <i>Salix herbacea</i> and <i>Calluna</i> , <i>Carex bigelowii</i> , <i>Juniperus communis ssp. nana</i> , <i>Empetrum nigrum ssp.</i> , <i>hermaphroditum</i> and <i>Racomitrium lanuginosum</i> . Includes montane, snowbed and sub-arctic sedge and rush communities on raw thin podzols, rankers and semi-skeletal soils. | Montane (BH 15) | <i>Sub-arctic (Montane)</i> | U7-12, U14-15, H13-15, H17, H19, H20, H22, W20 | Annex 1 6150 – Siliceous alpine and boreal grassland |
| 13b | Sub-arctic indicators not present, Peatland species under 25% on variable soil types. <i>Juncus effusus</i> , <i>J. conglomeratus</i> and <i>J. acutiflorus</i> can be abundant. | 14 | | | |
| 13c | Sub-arctic indicators not present, Cover of peatland species over 25%. Indicators include <i>Tricophorum</i> , <i>Molinia</i> , <i>Sphagnum</i> , <i>Eriophorum spp.</i> , <i>Juncus squarrosus</i> and <i>Myrica</i> . Usually on deep-peats or wet peaty rankers. <i>Juncus effusus</i> and <i>J. acutiflorus</i> scarce or absent | 15 | | | |
| 14a | Fine grasses predominate in generally dry situations e.g. <i>Agrostis curtisii</i> , <i>Festuca ovina</i> and <i>Anthoxanthum odoratum</i> usually on brown podzolic soils or rankers. Acid indicators present eg. <i>Galium saxatile</i> , <i>Potentilla erecta</i> , <i>Pleurozium schreberi</i> and <i>Rumex acetosella</i> . | Acid Grassland (BH 8) | <i>Acid grassland</i> | U2, U4 | |
| 14b | Grassland that can include a high proportion of bare ground or with a high proportion of <i>Cladonia spp</i> and small annuals such as <i>Erophila verna</i> , <i>Aphanes arvensis</i> and <i>Myosotis ramosissima</i> . Found on nutrient poor sandy soils or shingle in the lowlands below 300m. Typical species are <i>Festuca ovina</i> , <i>Galium saxatile</i> , <i>Sedum acre</i> , <i>Rumex acetosella</i> , <i>A. capillaris</i> and <i>Potentilla erecta</i> . Also includes lowland stands dominated by <i>Agrostis curtisii</i> and <i>Deschampsia flexuosa</i> . <i>Carex arenaria</i> locally present but only on inland stands. | Lowland Dry Acid grassland Priority Habitat (BH 8 Acid grassland) | <i>Acid grassland</i> | U1-U3, SD10b, SD11b | |
| 14c | Not as above | 15 | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------|-----------------------------------------------------|------------------------------|
| 15a | Coarse grasses predominate generally in upland wet situations eg. <i>Nardus</i> , <i>Molinia</i> , <i>Deschampsia flexuosa</i> and <i>Juncus squarrosus</i> usually on peaty-gley soils. Includes species poor <i>Molinia</i> dominated upland bog slopes and flushes. | Moorland grass (BH 8 Acid Grassland) | <i>Moorland-grass</i> | U5, U6, U7, U13 | |
| 15b | Peat largely >0.5m deep (use peat rod). Scattered to dominant <i>Eriophorum vaginatum</i> often with <i>Sphagnum</i> spp and/or <i>Rubus chamaemorus</i> . | Blanket bog PH ² (BH 12Bog) | <i>Blanket Bog</i> | M1-M3, M17-M20, (on deep peat H9, H12, M15-16, M25) | Annex 1 7130 – Blanket bogs. |
| 15c | Species of wet peat soils predominate. Indicators include <i>Tricophorum</i> , <i>Molinia</i> , <i>Sphagnum</i> , <i>Eriophorum</i> spp. (<i>E. Vaginatum</i> absent), <i>Narthecium ossifragum</i> , <i>Juncus squarrosus</i> and <i>Myrica gale</i> . Usually on deep-peats or wet peaty rankers. Valley bogs and other peat-based topogenous and soligenous mires key out here if with <=25% cover of Dwarf Shrubs. See guidance notes. | Bog Broad Habitat (BH 12) | <i>Other Bog</i> | M21, M25 | |

² Blanket Bog, Raised Bog and Other Bog are keyed out on floristic grounds but national estimates of extent further reflect the spatial restriction of the range of each habitat by application of GIS masks.

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-----------------------------------------|----------------|
| 15d | Peatland species predominate eg. <i>Tricophorum</i> , <i>Eriophorum angustifolium</i> , <i>Sphagnum</i> spp., <i>Vaccinium oxycoccus</i> and <i>Andromeda polifolia</i> . Often in lowland areas in unimproved/unafforested areas of flood plains. All lowland bog elements that appear to have a groundwater or riverine source to their water table should, depending on their species composition, key out as flushes (12a or 10d) or at 16c . Purely rainfed bog systems should key out here. This separation may be difficult. A good indicator is the location of the bog on level ground with a gently domed structure and an absence of calcicolous and mesotrophic wetland species. The lags around lowland raised bogs also key out here. | Lowland raised bog Priority Habitat (BH 12 Bog) | <i>Other Bog</i> | M1-M4, M17-M20 | |
| 15e | Dominated by dwarf shrubs e.g. <i>Calluna</i> , <i>Erica</i> , usually on podzolic soils but also on brown podzolics, shallow peats (<0.5m), rankers and gleys. | 21 | | | |
| 15f | Not as above | 16 | | | |
| 16a | Less than 80% conifers in canopy (excluding yew but includes juniper). | 19 | | | |
| 16b | More than 80% coniferous in canopy (excluding yew but includes juniper) | Coniferous Woodland (BH 2) | <i>Belt or Clump of trees or Woodland/ Forest</i> | All planted stands of conifers | |
| 17a | Palatable grasses dominate mainly <i>Lolium</i> , <i>Dactylis</i> , <i>Cynosurus</i> , <i>Holcus</i> . Grass cover usually over 75%. Broadleaved species restricted to <i>Trifolium repens</i> , <i>Ranunculus repens</i> , <i>Plantago major</i> , <i>Taraxacum</i> , <i>Rumex obtusifolius</i> and <i>Stellaria media</i> . Fertile but wetter situations may support occasional <i>Juncus effusus</i> or <i>J. inflexus</i> , but accompanying species will always indicate high fertility. | Improved Grassland (BH 5) | <i>Fertile Grass</i> | MG6, MG7 | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------|----------------------------------|---------|
| 17b | Palatable grasses predominate, usually <i>Lolium</i> and <i>Phleum pratense</i> 25% or below and other grasses more prominent such as <i>Cynosurus</i> , <i>Agrostis capillaris</i> , <i>Trisetum</i> , <i>Bromus hordeaceus</i> and <i>Anthoxanthum</i> . Semi-improved but wetter situations may support abundant <i>Juncus effusus</i> or <i>J. inflexus</i> , <i>Glyceria fluitans</i> , <i>Agrostis stolonifera</i> and <i>Poa trivialis</i> . Total grass cover usually between 50 and 75%. Forbs up to 50% cover and associated with less fertile soil eg. <i>Plantago lanceolata</i> , <i>Rumex acetosa</i> , <i>Ranunculus acris</i> , <i>R. repens</i> , <i>Prunella vulgaris</i> , <i>Achillea millefolium</i> , <i>Potentilla anserina</i> , <i>Cirsium palustre</i> and <i>Cardamine pratensis</i> . However, indicators of the two hay meadow Priority Habitats will be rare or absent. | 18 | | | |
| 18a | Recently sown mixtures of light grasses for agri-environment schemes or habitat creation/restoration such as <i>Anthoxanthum</i> , <i>Poa pratensis</i> , <i>Festuca rubra</i> , <i>Cynosurus</i> and <i>Trisetum</i> . 50-100% grass cover. Herb species rare or absent. Often on sown field margins. | Neutral Grassland (BH 6) | Recently sown neutral grass | | |
| 18b | As above but with high cover of sown mixtures of legumes such as <i>Trifolium pratense</i> , <i>T. hybridum</i> and <i>Lotus corniculatus</i> . Often on sown field margins. | Neutral Grassland (BH 6) | Recently sown neutral grass | | |
| 18c | Not as above. | Neutral Grassland (BH 6) | Semi-improved neutral grass | | |
| 19a | Scrub on sand dunes and shingle or <i>Salix repens</i> in dune slacks. | Supralittoral sediment (BH19) | Sand dune | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|----------------------------------|------------------------------------|
| 19b | All other broadleaved woodland (see guidance notes for Orchards). | 22 | | | |
| 20a | <i>Ulex europaeus</i> > 25%. | Broadleaved woodland (BH 1) | <i>Belt of trees or Woodland/Forest</i> | W23 | |
| 20b | Any of <i>Erica</i> spp., <i>Calluna</i> , <i>Empetrum</i> , <i>Vaccinium</i> or <i>Ulex minor/gallii</i> (co-) dominate but not in coastal situations. Species of wet/deeper peats absent eg. <i>Myrica</i> , <i>Narthecium</i> , <i>Eriophorum</i> spp. and <i>Sphagnum</i> spp absent. Soils generally thin peaty podzols or rankers. | Dry Heath ³ (BH 10 Dwarf Shrub Heath) | <i>Dwarf Shrub heath</i> | | Annex 1 4030 – European dry heaths |
| 20c | As above but heathland on sand dunes and shingle. | Supralittoral sediment (BH19) | <i>Sand dune</i> | | |
| 20d | As above but heathland on maritime cliffs. | Maritime cliff and slope Priority Habitat (BH18) | <i>Maritime vegetation</i> | | |
| 20e | Dense Bramble (<i>Rubus fruticosus</i>) | Broadleaved woodland (BH 1) | | | |
| 20f | Not as above. | 21 | | | |

³ Discrimination between Upland and Lowland heath PH rests on application of altitude-based GIS masks applied post-survey.

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| 21a | Dwarf Shrub Heath with occasional to frequent indicators of wet conditions such as <i>Erica tetralix</i> , <i>Molinia</i> and/or <i>Narthecium</i> but lacking high cover of <i>Sphagnum</i> , <i>Eriophorum</i> spp and <i>Rubus chamaemorus</i> . Peat largely <0.5m in depth where this can be established using peat rod. This is a difficult separation to make particularly regarding degraded ombrogenous mires where low abundance of bog indicators may reflect overgrazing, burning and drainage rather than thinner, drier peats. | Wet heath (BH 10 Dwarf Shrub Heath) | Dwarf Shrub heath | M15, M16 | Annex 1 4010 – Northern Atlantic wet heaths with <i>Erica tetralix</i> . |
| 21b | Peat largely >0.5m, where this is possible to establish using the peat rod. Scattered to dominant <i>Eriophorum vaginatum</i> often with <i>Sphagnum</i> spp. and/or <i>Rubus chamaemorus</i> . | Blanket Bog Priority Habitat ⁴ (BH 12 Bog) | <i>Blanket Bog</i> | M1-M3, M17-M20, (on dep peat H9, H12, M15-M16, M25) | Annex 1 7130 – Blanket Bogs |
| 21c | Species of acid peat soils predominate e.g. <i>Tricophorum</i> , <i>Eriophorum angustifolium</i> , <i>Sphagnum</i> spp, <i>Vaccinium oxycoccus</i> and <i>Andromeda polifolia</i> . Often in lowland areas in unimproved/unafforested areas of flood plains. All lowland bog elements that appear to have a groundwater or riverine source to their water table should, depending on their species composition, key out as flushes (12a or 10d) or at 16b . Purely rainfed bog systems should key out here. This separation may be difficult. A good indicator is the location of the bog on level ground with a gently domed structure and an absence of calcicolous and mesotrophic wetland species. | Lowland raised bog Priority Habitat (BH12 Bog) | <i>Lowland raised bog</i> | M1-M3, M17-M20 | |

⁴ Blanket Bog, Raised Bog and Other Bog are keyed out on floristic grounds but national estimates of extent further reflect the spatial restriction of the range of each habitat by application of GIS masks.

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 21d | Species of acid peat soils predominate eg. <i>Tricophorum</i> , <i>Molinia</i> , <i>Narthecium ossifragum</i> , <i>Sphagnum</i> and <i>Myrica</i> usually on deep-peat soils or wet peaty rankers. Valley bogs and other topogenous and soligenous mires key out here. See guidance notes. | Bog (BH 12) | <i>Other bog</i> | M21 | |
| 22a | >=50% canopy cover of <i>Alnus glutinosa</i> or >=50% cover of <i>Salix</i> spp. Willow. | Wet woodland Priority Habitat (BH 1 Broadleaved Woodland) | <i>Belt of trees or woodland / Forest</i> (plus secondary attributes see guidance) | W1-W7 | Annex 1 91E0 - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae). |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------|---------|
| 22b | >=25% canopy cover of <i>Fagus sylvatica</i> (Beech) or >=25% canopy cover of <i>Taxus baccata</i> (Yew) | Lowland beech Priority Habitat ⁵ (BH 1 Broadleaved Woodland) | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | W12-W15 | |
| 22c | >=25% canopy cover <i>Fraxinus excelsior</i> or >=25% canopy cover of <i>Ulmus</i> spp. | 24 | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | (W7a-c, W8a-g, W9a, W12, W13a-b, W14) | |
| 22d | >=75% canopy cover of native <i>Quercus</i> spp or >= 75% canopy cover of native <i>Betula</i> spp. | 23 | | W8-W9, W13 | |

⁵ GIS masks delimiting the accepted native range for Beech will be used to constrain the range of the Priority Habitat.

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------|----------------|
| 22e | >=25% canopy cover of Hornbeam (<i>Carpinus betulus</i>), Stands of <i>Quercus sp.</i> with <i>Carpinus betulus</i> with Bluebell (<i>Hyacinthoides non-scripta</i>) | Lowland Mixed Deciduous Woodland Priority Habitat (BH1 Broadleaved Woodland) | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | W10 | |
| 22f | Not as above. | Broadleaved Woodland (BH 1) | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | | |
| 23a | >=95% canopy cover of native <i>Betula</i> spp in Scotland. | Northern Birchwood Priority Habitat (BH 1) | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | W10e, W11, W17 | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------|
| 23b | Not as above. | Upland Oak Woodland Priority Habitat or Lowland Mixed Deciduous Priority Habitat ⁹ (Broadleaved woodland BH 1) | <i>Belt of trees or woodland /Forest</i> (plus secondary attributes see guidance) | | |
| 24a | Upland or hyperoceanic woods of <i>Fraxinus excelsior</i> and/or <i>Ulmus glabra</i> often distinguished by a lush lichen flora. | Upland Mixed Ash priority habitat (Broadleaved Woodland BH) | | | |
| 24b | Lowland woods of <i>Fraxinus excelsior</i> and/or a suite of other species. Lichen flora not obvious | Lowland Mixed Deciduous Priority Habitat (BH 1 Broadleaved Woodland) | | | |
| 25a | Limestone, with clints and grikes | Limestone Pavement Priority Habitat (Inland Rock BH16) | | | Annex 1 8240 – Limestone pavements. |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------|-----------------------------------------|---------------------------------------------------------------------|
| 25b | Mine spoil or metalliferous river gravels or serpentine rocks, species include <i>Minuartia verna</i> , <i>Thlapsi arvense</i> , <i>Armeria maritima</i> , <i>Silene maritima</i> , <i>Thlapsi caerulescens</i> , <i>Lycnis alpine</i> , <i>Cerastium nigrescens</i> . | Calaminarian Grassland Priority Habitat (Inland Rock BH16) | | OV37 | Annex 1 6130 CALAMINARIAN GRASSLANDS OF THE VIOLETALIA CALAMINARIAE |
| 25c | Not limestone with clints and grikes nor metalliferous rocks. Solid rock outcrops or screes. Includes species such as <i>Cryptogamma crispera</i> , <i>Cystopteris fragilis</i> , <i>Gymnocarpium robertianum</i> and <i>Asplenium trichomanes</i> | Inland rock outcrop and scree (PH) (Inland rock BH) | | | |
| 25d | Rocky ungrazed ledges at high altitude with one or more of downy willow <i>Salix lapponum</i> , whortle-leaved willow <i>S. myrsinites</i> , mountain willow <i>S. arbuscula</i> and woolly willow <i>S. lanata</i> . Associated arctic-alpine and northern willows include net-leaved willow <i>S. reticulata</i> , dark-leaved willow <i>S. myrsinifolia</i> and tea-leaved willow <i>S. phyllicifolia</i> . | Mountain heaths and Willow scrub PH record as Montane BH | | | Annex 1 4080 - Sub-Arctic Salix spp. scrub |
| 26a | Coastal saltmarsh | 27 | | | |
| 26b | Inland saltmarsh vegetation around natural springs or old mine workings | Saltmarsh Priority Habitat | | SM16, SM23 | Annex 1 1340 – Inland salt meadow |
| 26c | Saltmarsh vegetation alongside roads | Linear Features BH3 or Urban BH17 | | | |

| | | Numbered links plus Broad & Priority Habitats | Primary attributes | NVC units (indicative list only) | Annex 1 |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------|
| 27a | Pioneer vegetation of lower saltmarshes made up of open stands of perennial glasswort <i>Sarcocornia perennis</i> , glasswort <i>Salicornia</i> spp., or annual seablite <i>Suaeda maritima</i> . | Saltmarsh Priority Habitat (Littoral sediment BH 21) | Saltmarsh | SM7-9, SM27 | Annex 1 1310 - <i>Salicornia</i> and other annuals colonising mud and sand. |
| 27b | Cord-grass <i>Spartina</i> spp. on a wide range of substrates, from very soft muds to shingle, in areas sheltered from strong wave action. It can be on the seaward fringes of saltmarshes and creek-sides and may occur on old pans in the upper saltmarsh. | Saltmarsh Priority Habitat (Littoral Sediment BH21) | Saltmarsh | SM4-6 | Annex 1 1320 - <i>Spartina</i> swards (<i>Spartinion maritimae</i>). |
| 27c | Vegetation forming the middle and upper reaches of saltmarshes, where tidal inundation still occurs but with decreasing frequency and duration. A wide range of community types is represented and the saltmarshes can cover large areas, especially where there has been little or no enclosure on the landward side | Saltmarsh Priority Habitat (Littoral Sediment BH21) | Saltmarsh | SM10-20 | Annex 1 1330 - Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>). |
| 27d | Halophytic shrubs growing at the base of sea-defences or at the landward slope of salt-marshes or where there is a transition to dunes or shingle. Typically bushes of shrubby sea-blite <i>Suaeda vera</i> and sea purslane <i>Atriplex portulacoides</i> comprise the majority of vegetation. | Saltmarsh Priority Habitat (Littoral Sediment BH21) | | SM25 | Annex 1 1420 - Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>) |

Further guidance notes:

Pulse-disturbance vegetation: This will often be a difficult separation to make but refers to early to mid-successional vegetation that may still be undergoing species compositional turnover and either assembling in response to a single infrequent disturbance episode e.g. flooding, felling and natural gap formation in woodlands, or the cessation of disturbance e.g. urban derelict land and fallow arable. Also included here are the annual to less frequently mown communities of boundaries and linear features including hydroseres around waterbodies and 'rough' areas of amenity grassland on school playing fields, golf courses and churchyards. Their assemblages here may often be variable in height but usually typified by tall grasses and herbs not tolerant of grazing or agricultural mowing regimes. Hence, the vegetation is usually more than 25cm in average height. Variation in species composition may be large and unpredictable given the dynamic and spontaneous nature of the colonisation and establishment phases. Nitrophiles will often be very well represented given the association with fertile lowland soils, gardens, arable land and urban environments.

Press-disturbance vegetation: There is no naturally sharp distinction between these communities and pulse-disturbance types. Plant assemblages may reflect wet to dry, acid to calcareous conditions but the common feature is that they experience a relatively stable annual disturbance regime where biomass is removed by annual cutting or/and continuous grazing at varying intensities. Hence, all grazed upland and lowland grasslands are included here along with meadows and silage fields. Also included are those amenity grasslands which may be rabbit grazed but are generally managed by very frequent mowing. Also included here are areas of monocot rather than dwarf shrub dominated bogs and heaths that may typically be managed less intensively than agricultural lowland grasslands but may nevertheless experience frequent, predictable biomass removal by grazing. Surveyors will often find it difficult to effect the separation between **5a** and **5b**. This simply reflects real difficulties in establishing mapped boundaries when species vary individualistically and the environment varies continuously.

3 APPENDIX-2: KEY TO WOODLAND TYPES/FEATURES

| TREE FORM | | |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------|
| 1. Dominant canopy is a mix of trees and vegetation in shrubby form? | YES – Step 2 | NO – Step 3 |
| 2. Consider the two components separately in this key and use 2 primary codes as a mosaic | | |
| 3. Canopy composed of trees (not shrubby form)? | YES – Step 4 | NO – Step 10 |
| 4. Individual trees more than 50 m apart? | YES – see Individual Trees under Point Features (pg. 16) | NO – Step 5 |
| 5. Less than 0.25 ha with canopy >20% area | YES – see Clump of trees (BH/PH if >20 m x 20 m else Point Features (pg. 17) | NO – Step 6 |
| 6. Linear feature (area ratio 1:4 and <4 trees wide)? | YES – Step 7 | NO – Step 8 |
| 7. Single tree width? | YES – see Woody Linear Features under Linears (pg. 19) | NO – Belt of Trees (BH/PH) |
| 8. Canopy cover less than 20%? | YES – Step 9 | NO – Woodland/Forest (BH/PH) |
| 9. Trees less than 50 m apart (on average)? | YES – Scattered Trees options (pg. 17) | NO - see Individual Trees under Point Features (pg. 17) |
| SHRUBBY FORM | | |
| 10. Individuals more than 50 m apart? | YES – Individual Scrub under Point Features (pg. 17) | NO – Step 11 |
| 11. At least 20 m line? | YES – Step 12 | NO – Step 13 |
| 12. Single tree width? | YES – see Woody Linear Features under Linears (pg. 19) | NO – Belt of scrub (BH/PH) |
| 13. Canopy covers more than 25% of area? | YES – Patch of scrub (BH/PH if >20 m x 20 m else Point Features (pg. 17) | NO – Step 14 |
| 14. Individuals less than 50 m apart on average? | YES – Scattered scrub | NO see Individual Scrub under Point Features |

The woodland descriptions will be used to describe each 'woodland unit' (ranging from a single sapling to a forestry plantation). **The primary attributes referred to in bold (clump of trees, belt of trees, woodland/forest) can be assigned to Broad or Priority Habitats (see above).** Trees/scrub should be recorded in any situation except inside the curtilages of buildings or communication routes (e.g. roads, railways) or as individuals or lines immediately adjacent to non-agricultural curtilages. Trees should be recorded as points or areas of woodland on all recreation land such as golf courses and playing fields (except in urban situations). Tree species (with apical dominance leading to the formation of recognised trunks) of all sizes should be recorded, as should shrubby species (comprising scrub).

Cover types - all occurrences of trees should be allocated to one of the forestry feature primary attributes and qualified by secondary attributes e.g. species and species cover. If any one area of trees includes distinct variation in age or species composition the unit should be sub-divided into blocks and coded separately.

4 APPENDIX-3: GUIDANCE ON IDENTIFYING VETERAN TREES

Environmental Stewardship Farm Environment Plan Guidance 009

Identifying Ancient Trees

This guidance note provides further details on identifying ancient trees.

Definition of an Ancient (or Veteran) Tree

The FEP handbook describes ancient trees as:

Trees that are or look old relative to others of the same species. Characteristics include:

- Very large girth for the species.
- Hollow or hollowing trunk.
- A large quantity of dead wood in the canopy.

This definition also applies to dead trees and non-native species as they are important habitats for plants and animals and can be reminders of historic landscapes.

NB: The terms 'ancient tree' and 'veteran tree' are interchangeable for the purposes of the FEP.

What is a 'very large girth for the species' ?

The following table lists the minimum tree trunk girths and diameters that can be counted as "very large girth for the species" for a selection of tree species.

| Tree Girth ¹ (minimum) | Diameter at Breast Height (dbh) ² (minimum) | Species |
|--------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 190 cm | 60cm | Birch species, Hawthorn. |
| 240 cm | 75cm | Field maple, Rowan, Grey and Goat willow, Hornbeam, Holly, Cherry, Alder. |
| 310 cm | 100cm | Oak species, Ash Scot's pine, Yew, Elm species. |
| 470 cm | 150cm | Lime species, Sycamore, Horse chestnut, Poplar species, other Pine species, Beech, Sweet chestnut, White and Crack willows. |

¹ The data in the table above is based on research carried for English Nature to help understand the relationship between the size of a tree and its ancient status. The data was collected as dbh but we have converted to girth to help non-specialists.

² Diameter at breast height (dbh) is the measurement commonly used by foresters to calculate timber volumes and is most easily recorded with a special girth tape which is calibrated to show dbh.

Environmental Stewardship
Farm Environment Plan Guidance 009
First Edition
Published January 2006



Identifying Ancient Trees

How do I measure the girth of a tree ?

The girth or diameter of a tree trunk is normally measured at 1.3 metres above the ground and is known as breast height.

Drawbacks of using tree girth to identify Ancient Trees

Tree species grow to different sizes in different situations and conditions. In good growing conditions a tree may have a "very large girth" but not be ancient. Conversely, the girth can be restricted by poor growing conditions or by management, such as pollarding. The girth of some ancient trees (particularly pollarded oaks) may fall below the "very large girth" criteria. Therefore, please do not rely on girth measurements alone, but always make an assessment of whether the tree looks old and whether the other characteristics are present or not.

Other characteristics of Ancient Trees

There are other features which are typical of ancient trees and which add to their environmental interest. If these features are present then you can be more confident in identifying a tree as ancient.

- Girth large for the tree species concerned
- Major trunk cavities or progressive hollowing
- Large quantity of dead wood in the canopy
- Naturally forming water pools
- Decay holes
- Physical damage to trunk
- Bark loss
- Sap runs
- Crevices in the bark, under branches, or on the root plate sheltered from direct rainfall
- Fungal fruiting bodies (e.g. from heart rotting species)
- High number of interdependent wildlife species
- Epiphytic plants
- An 'old' look
- High aesthetic interest

In addition the tree may also:

- Have a pollard form or show indications of past management
- Have a cultural/historic value
- Be in a prominent position in the landscape

One of the difficulties of using these indicators of ancient status is that young trees which have been physically damaged eg by fire, can show these features whilst some ancients may exhibit very few.

Guidance on Tree girth for Veteran trees

| Species | Max girth (m) | Potentially interesting (32% of max girth) | Valuable (47% of max girth) | Truly ancient (62.5% of max girth) | Rule of thumb if species over girth value = notable |
|------------------------------|---------------|--------------------------------------------|-----------------------------|------------------------------------|-----------------------------------------------------|
| <i>Buxus sempervirens</i> | 0.8 | 0.26 | 0.38 | 0.50 | > 0.5 |
| <i>Arbutus unedo</i> | 1.2 | 0.38 | 0.56 | 0.75 | > 0.5 |
| <i>Mespilus germanica</i> | 1.5 | 0.48 | 0.71 | 0.94 | > 0.5 |
| <i>S. x thuringiaca</i> | 1.5 | 0.48 | 0.71 | 0.94 | > 0.5 |
| <i>Ilex aquifolium</i> | 1.8 | 0.58 | 0.85 | 1.13 | >1 |
| <i>Sorbus aria agg</i> | 1.9 | 0.61 | 0.89 | 1.19 | >1 |
| <i>Sorbus intermedia agg</i> | 2 | 0.64 | 0.94 | 1.25 | >1 |
| <i>Pyrus pyraeaster</i> | 2 | 0.64 | 0.94 | 1.25 | >1 |
| <i>Alnus incarna</i> | 2 | 0.64 | 0.94 | 1.25 | >1 |
| <i>Populus alba</i> | 2 | 0.64 | 0.94 | 1.25 | >1 |
| <i>Sorbus aucuparia</i> | 2.5 | 0.80 | 1.18 | 1.56 | >1 |
| <i>Sorbus latifolia agg</i> | 2.7 | 0.86 | 1.27 | 1.69 | >1 |
| <i>Sorbus torminalis</i> | 2.8 | 0.90 | 1.32 | 1.75 | >1 |
| <i>Malus sylvestris</i> | 3 | 0.96 | 1.41 | 1.88 | >1 |
| <i>Crataegus monogyna</i> | 3 | 0.96 | 1.41 | 1.88 | >1 |
| <i>Acer campestre</i> | 3 | 0.96 | 1.41 | 1.88 | >1 |
| <i>Betula pubescens</i> | 3 | 0.96 | 1.41 | 1.88 | >1 |
| <i>Betula pendula</i> | 3 | 0.96 | 1.41 | 1.88 | >1 |
| <i>Salix fragilis</i> | 3.5 | 1.12 | 1.65 | 2.19 | > 2 |
| <i>Alnus glutinosa</i> | 3.7 | 1.18 | 1.74 | 2.31 | > 2 |
| <i>Salix caprea</i> | 4 | 1.28 | 1.88 | 2.50 | > 2 |
| <i>Acer platanoides</i> | 4 | 1.28 | 1.88 | 2.50 | > 2 |
| <i>Carpinus betulus</i> | 4 | 1.28 | 1.88 | 2.50 | > 2 |
| <i>Quercus ilex</i> | 4.3 | 1.38 | 2.02 | 2.69 | > 2 |
| <i>Prunus avium</i> | 4.5 | 1.44 | 2.12 | 2.81 | > 2 |
| <i>Robinia pseudoaccacia</i> | 5 | 1.60 | 2.35 | 3.13 | > 3 |
| <i>Populus nigra</i> | 5 | 1.60 | 2.35 | 3.13 | > 3 |

| | | | | | |
|-------------------------------------|-----|------|------|------|-----|
| <i>U. x hollandica</i> | 5 | 1.60 | 2.35 | 3.13 | > 3 |
| <i>P. x canescens</i> | 5 | 1.60 | 2.35 | 3.13 | > 3 |
| <i>Pinus sylvestris</i> | 5 | 1.60 | 2.35 | 3.13 | > 3 |
| <i>U. x vegeta</i> | 5.5 | 1.76 | 2.59 | 3.44 | > 3 |
| <i>Tilia platyphyllos</i> | 5.8 | 1.86 | 2.73 | 3.63 | > 3 |
| <i>Juglans regia</i> | 6 | 1.92 | 2.82 | 3.75 | > 3 |
| <i>Tilia cordata</i> | 6 | 1.92 | 2.82 | 3.75 | > 3 |
| <i>Fraxinus excelsior</i> | 6 | 1.92 | 2.82 | 3.75 | > 3 |
| <i>P. x canadensis var serotina</i> | 6 | 1.92 | 2.82 | 3.75 | > 3 |
| <i>Ulmus minor</i> | 6.1 | 1.95 | 2.87 | 3.81 | > 3 |
| <i>Fagus sylvatica</i> | 6.2 | 1.98 | 2.91 | 3.88 | > 3 |
| <i>Aesculus hippocastanum</i> | 6.4 | 2.05 | 3.01 | 4.00 | > 4 |
| <i>Acer pseudoplatanus</i> | 7 | 2.24 | 3.29 | 4.38 | > 4 |
| <i>Ulmus procera</i> | 7 | 2.24 | 3.29 | 4.38 | > 4 |
| <i>Ulmus glabra</i> | 7 | 2.24 | 3.29 | 4.38 | > 4 |
| <i>T. x europea</i> | 7 | 2.24 | 3.29 | 4.38 | > 4 |
| <i>Quercus cerris</i> | 8 | 2.56 | 3.76 | 5.00 | > 4 |
| <i>Quercus petraea</i> | 8.9 | 2.85 | 4.18 | 5.56 | > 4 |
| <i>Taxus baccata</i> | 10 | 3.20 | 4.70 | 6.25 | > 4 |
| <i>Castanea sativa</i> | 10 | 3.20 | 4.70 | 6.25 | > 4 |
| <i>Quercus robur</i> | 10 | 3.20 | 4.70 | 6.25 | > 4 |

Girth data from Mitchell, A. F. 1974. *A field guide to the trees of Britain & N. Europe*. Categories from Read, H. 2000. *Veteran trees: a guide to good management*. English Nature. Proportions calculated assuming overall 10m max girth and girth classes from Read: 3.2 m potentially interesting (1 m dbh), 4.7 m valuable (1.5 m dbh), 6.25 m truly ancient (2.0 m dbh). Compiled by Heather Robertson, English Nature.

5 APPENDIX-4: MAPPING NOTES

By Robert Seaton

Map what's behind you NOT what's in front of you

Often you will walk through a gate into a field and very quickly form an impression of it and it's very tempting to put a polygon in straight away. What you may find though is that it is not representative of the larger area, or conditions change. Alternatively with linear features in particular you may be able to see where a feature starts but not where it ends. While it is possible to split/merge/modify features later it is often easier to map a feature when you get to the end of it and the start of something else, knowing you won't have to change it later. If you feel the need to put something down in order to remember what the species/condition was at the start then mark it as in progress until you get to the end as a reminder. Obviously this isn't necessary with point features as by definition you should be able to see the whole extent of a point feature in one go.

Points and linears first

If you map the boundaries and any point features of small polygons of habitat first, the fact you haven't mapped the majority of the field will still be obvious and mapping it should be easy.

Extent not Shape

This has already been covered a few times: it is the extent of habitats which is important not their precise location or shape. The natural world tends to work in curves while GIS software works in straight lines and it therefore can be difficult to draw completely accurate polygons. As long as the feature is the right size and in the right place, an accurate shape is not important. A pond may be round or a patch of scrub completely irregular rather than a rectangle or an octagon or any other regular polygon, but a rectangle, octagon or any other polygon is easier to draw so draw a rectangle, octagon or whatever.

Remember the land use

Most land in the countryside is managed and has a use. With woodland it may be forestry, or if managed for shooting you may want to note 'Pheasant feeders/pens', all found under 'Forestry use'. Just about anywhere can be used for recreation which has its own option and can be applied to any habitat.

Snapping

By default, vertices are set to snap to points, ends, other vertices and edges. Having a line snap to the end of another line, to a vertex of a polygon or the edge of a polygon is all very handy, having it snap to a point feature isn't. Snapping can be adjusted to suit your needs.

Linear theory

Lines cannot be added outside of the survey square - if you start to draw a line from outside the square it will not work. If you start to draw a line inside the square and then continue it outside, the line you create will stop at the square boundary, in other words, if the line you are mapping extends beyond the square rather than trying to draw your line precisely to the square boundary you can draw it to a point outside the square and the software will ignore the part of the line that lies outside the square.

A linear feature should not be mapped unless it is 20 m long. If the linear is over 20 m long but less than 5 m of it lies within the square, in this circumstance you simply do not map the feature on the grounds of it being too small.

All lines are directional - lines have a start and an end and that will reflect the way in which you drew it, if you join a start to an end the two lines will join to become one, if you join two starts together or two ends they will remain separate.

Visit status

You will notice that every Event, Point and Area has a VISIT STATUS field that has to be filled in. This serves several purposes, REFUSED ACCESS will help show you where you aren't allowed to go, don't have to survey and where there will be no data to analyse. The IN PROGRESS field acts as an aide memoir as to where you have got up to and allows you to start adding details to a large area or long linear where you cannot see the full extent of the feature. If you are looking across a valley or up a slope it may be very easy to see the extent of a habitat and map it but you will be unable to judge the species composition. If you record the feature as IN PROGRESS it will act as a reminder that you still have to go over and assign species which you can then do very quickly. COMPLETED should only be used once you finished mapping the feature in its entirety, if you haven't reached the far end of the feature so cannot tell if the habitat changes, if there is a patch of other habitat contained within it or which direction a path or wall takes you should not record a feature as COMPLETED. The VISIT STATUS field will also be used to judge whether or not you have actually surveyed and completed the whole square and so when you have finished a square every feature should be recorded as either COMPLETED or REFUSED ACCESS. A filter is provided to view the Visit Status of features.

6 APPENDIX-5: HABITAT DESCRIPTIONS

Key to Broad and Priority Habitats (Vegetation Key)

Based on plant species composition, patches of discrete vegetation (polygons) and vegetation, plots are assigned by the surveyor to Broad and Priority Habitats (used for BAP reporting), priority habitats nest within Broad habitats. The vegetation key allows all vegetation stands to be keyed to a Broad and Priority Habitat. The information below (taken from JNCC priority habitat descriptions and other sources) can be used to guide your habitat allocation.

6.1 Broadleaved Mixed and Yew woodland Broad Habitat

This Broad Habitat is used for broadleaf woodland which does not fall into PH. The Broadleaved Mixed and Yew Woodland BH includes *Ulex europaeus* scrub but not *U. gallii* or *U. minor* scrub, also woodlands dominated by *Acer pseudoplatanus* where the cover of native broadleaf is too low to qualify for PH status. Since the Broad Habitat can have up to 80% conifer cover it also includes mixed woodland that may appear largely coniferous.

6.2 Broadleaved Mixed and Yew woodland Priority Habitats

Lowland beech and yew woodland

Beech can grow on both acidic and calcareous soils, although its association with yew tends to be most abundant on the calcareous sites. In the UK beech is considered native only in southern England and southern Wales. Beech is dominant in the canopy (greater than 30%), but the canopy can include mixtures of beech, ash, sycamore (non-native), oak, yew and whitebeam. In some areas, this woodland type occurs as intricate mosaics with lowland mixed deciduous woods. Bramble (*Rubus fruticosus*) forms a characteristic ground layer on neutral-slightly acidic soils. Holly is the main understorey species, less often yew, on acidic soils. The main corresponding National Vegetation Classification (NVC) plant communities associated with this habitat type are W12 *Fagus sylvatica* - *Mercurialis perennis* woodland (base-rich soils), W14 *Fagus sylvatica* - *Rubus fruticosus* woodland (mesotrophic soils), W15 *Fagus sylvatica* - *Deschampsia flexuosa* woodland (acidic soils). Yew stands fall into W13 *Taxus baccata* woodland.

Lowland wood-pasture and parkland

Mature trees scattered across typically grazed grasslands in an extensive managed estate setting.

Northern Birchwood

This Habitat is only found in Scotland, it is dominated by a series of stands of downy and/or silver birch with constituents such as rowan, willow, juniper and aspen. Boundaries are often diffuse and liable to change as woodlands expand and contract in response to fires and changes in grazing pressure. On more acidic soils, rowan is a prominent component, and juniper can form the underwood in the eastern highlands. Aspen grows on a variety of site types where mineral soil is present, occurring frequently within upland birchwoods as small groups and rarely as extensive stands. Only 12 stands greater than 5 ha are known to exist within Scotland.

Upland (northern) birchwoods are composed of the following main communities from the National Vegetation Classification: W11 *Quercus petraea*-*Betula pubescens*-*Oxalis acetosella* woodland, a, b, c, d, W17 *Quercus petraea*-*Betula pubescens*-*Dicranum majus* woodland, a, c, d, W4 *Betula pubescens*-*Molinia caerulea* a, b.

Upland mixed ashwoods

The term upland mixed ashwoods is used for woods on base-rich soils, in most of which ash is a major species, although locally oak, birch, elm, small-leaved lime and even hazel may be the most abundant species. Yew may form small groves in intimate mosaics with the other major tree species and alder may occur where there are transitions to wet woodland. Upland in the name reflects the abundance of this type of woodland on base-rich soils in upland Britain rather than to the altitude at which individual sites occur indeed some are only just above sea level. The ground flora is rich, and characteristic species include *Mercurialis perennis*, *Phyllitis scolopendrium*, *Rubus*, *Geranium robertianum* and *Allium ursinum*.

In terms of National Vegetation Classification (NVC) plant communities this habitat is characterised by W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland, sub communities d. *Hedera helix*, e. *Geranium robertianum*, f. *Allium ursinum* and g. *Teucrium scorodonia*, and W9 *Fraxinus excelsior* - *Sorbus aucuparia* - *Mercurialis perennis* woodland, together with W13 *Taxus baccata* woodland for the yew groves on the Carboniferous and Magnesian limestones.

Upland oakwood

Upland oakwoods occur on acidic soils in areas of high rainfall and are typically found on steep valley sides. The word 'upland' is used from a UK perspective, and they occur almost down to sea level in the west of the British Isles. Upland oakwoods are characterised by a predominance of oak (most commonly sessile, but locally pedunculate) and birch in the canopy, with varying amounts of holly, rowan and hazel as the main understorey species. Most oakwoods also contain areas of more alkaline soils, often along streams or towards the base of slopes where much richer communities occur, with ash and elm in the canopy. Classically, upland oakwoods have a ground flora of *Calluna vulgaris* and *Vaccinium myrtillus* with few flowering plants, but with abundant and luxuriant mosses, liverworts and epiphytic ferns.

Wet woodland

Wet woodland occurs on poorly drained or seasonally wet soils, usually with alder, birch and willows as the predominant tree species, but sometimes including ash, oak, pine and beech on the drier riparian areas. They occur on floodplains, lake edges, as successional habitats on fens, mires and bogs, and in peaty hollows and hill-side flushes within other woodland types. Wet woods frequently occur in mosaic with other woodland key habitat types and with open key habitats such as fens. In terms of National Vegetation Classification (NVC) plant communities this habitat is characterised by W1 *Salix cinerea* - *Galium palustre* woodland, W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland, W3 *Salix pentandra* - *Carex rostrata* woodland, W4c *Betula pubescens* - *Molinia caerulea* woodland: *Sphagnum* sub-community, W5 *Alnus glutinosa* - *Carex paniculata* woodland, W6 *Alnus glutinosa* - *Urtica dioica* woodland, and W7 *Alnus glutinosa* - *Fraxinus excelsior* - *Lysimachia nemorum* woodland. Some birch stands classified as W4 are relatively dry and in management terms better treated alongside other extensive birch stands. The ground flora is diverse, and within different types the dominant species include *Phragmites*, *Molinia*, *Sphagnum*, *Urtica* and large sedges. Wet woodlands frequently intergrade with other woodland types, notably upland oakwoods and mixed ashwoods. Habitats with canopies composed of *Salix* spp. should be classed as wet woodland even if the trees are low and 'scrubby' in appearance (these will usually be stands of W1 *Salix cinerea* - *Galium palustre* woodland, or W2 *Salix cinerea* - *Betula pubescens* - *Phragmites australis* woodland).

Lowland mixed deciduous

Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England, and in parts of lowland Wales and Scotland. It thus complements the ranges of upland oak and upland ash types. It occurs largely within enclosed landscapes, usually on sites with well-defined boundaries, at relatively low altitudes, although altitude is not

a defining feature. Many are ancient woods. The woods tend to be small, less than 20 ha. Often there is evidence of past coppicing, particularly on moderately acid to base-rich soils; on very acid sands the type may be represented by former wood-pastures of oak and birch.

There is great variety in the species composition of the canopy layer and the ground flora, and this is reflected in the range of associated NVC and Stand Types. *Quercus robur* is generally the commoner oak (although *Quercus petraea* may be abundant locally) and may occur with virtually all combinations of other locally native tree species.

In terms of the National Vegetation Classification the bulk of this type falls into W8 (*Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland, mainly sub-communities a - c in ancient or recent woods; in the lowlands W8d mostly occurs in secondary woodland) and W10 (sub-communities a to d) with lesser amounts of W16 (mainly W16a). Locally, it may form a mosaic with other types, including patches of beech woodland, small wet areas, and types more commonly found in western Britain. Rides and edges may grade into grassland and scrub types.

Orchards

Traditional orchards are defined, for priority habitat purposes, as groups of fruit and nut trees planted on vigorous rootstocks at low densities in permanent grassland and managed in a low intensity way. There are many regional variations on this theme, including apple, pear, cherry, plum, damson, and walnut orchards. They are a composite habitat (similar to wood-pasture and parkland), defined by their structure rather than vegetation type, which can include trees, scrub, grassland, ponds, walls, hedgerows and hedgerow trees. Prime traditional orchard habitat consists of grazed grassland with fruit trees of varying age structure, with an abundance of standing and fallen dead and decaying wood. Young trees and newly planted orchards that are managed in a low intensity way are also included in the definition. Low intensity management refers to orchards that are managed extensively, with little or no use of chemicals such as pesticides, herbicides and inorganic fertilisers, with relatively long-lived trees that are allowed to reach the veteran stage, and with a permanent grass sward that is usually grazed by cattle or sheep or cut for hay. In intensive orchards where bare herbicide-cleared soil is present between trees, the BH should be Arable and Horticulture.

6.3 Coniferous Woodland Broad Habitat

The Broad Habitat includes all coniferous woodland that is not native pine woodland PH. Conifer cover needs to exceed 80% for a woodland polygon to be allocated to Coniferous rather than Broadleaved. Mixed and Yew Woodland.

How to record Clearfell

We want surveyors to record the habitats they find when they survey rather than trying to describe what might be there in the future or the way that land is used e.g., part of a forestry cycle. This means that in areas of felled conifer plantations the surveyor should describe the habitats that they see. For example, heathland vegetation may have developed/survived under the canopy and now that the trees have been felled has sufficient continuous cover for the area to be described as Broad Habitat Heathland, alternatively the area may have been recently felled and there is no continuous cover of vegetation in which case record the Broad Habitat as coniferous woodland and make a note about the felling and disturbance.

Coniferous Woodland Priority Habitat

Native pine woodland

Native pine woodlands are relict indigenous forests dominated by self-sown Scots pine *Pinus sylvestris* which occur throughout the central and north-eastern Grampians and in the northern and western Highlands of Scotland. Native pinewoods do not support a large diversity of plants

and animals compared with some more fertile habitats. However, there is a characteristic plant and animal community which includes many rare and uncommon species. The main tree species is Scots pine although birches *Betula* spp., rowan *Sorbus aucuparia*, alder *Alnus glutinosa*, willows *Salix* spp., bird cherry *Prunus padus* are also found. Sessile oak *Quercus petraea* also occurs infrequently, mainly in the north-east of Scotland. A shrub understorey, where browsing levels are low, includes common juniper *Juniperus communis*, aspen *Populus tremula*, holly *Ilex aquifolium* and hazel *Corylus avellana*. Old or dead trees and rotting wood supports significant beetle and bryophyte communities. The field layer is characterised by acid-tolerant plants like bell heather *Erica cinerea*, bilberry *Vaccinium myrtillus* and crowberry *Empetrum nigrum*.

6.4 Boundary and Linear features

Where a combination of linear features is wide enough to form an area e.g., ditch, line of trees, fence, wall, then these should be mapped as areas and assigned to this Broad Habitat.

6.5 Arable and Horticultural

Should be fairly self-evident, includes ploughed land, land planted with crops and also annual/early successional with open ground habitats which is apparently fallow land dominated by annual weed species often with much open ground present. Perennials may be present but if they are a significant component of the vegetation cover it implies greater time since last disturbed and a Neutral Grassland category would likely be more appropriate.

You may also encounter margins, the most common types of margin are perennial grass margins, with or without supplementary wildflowers. If >MMU these margins will be recorded as areas of Neutral and or Improved grassland. Other rarer types include:

- Uncropped strips, usually cultivated each year;
- Wild bird seed cover e.g., kale, quinoa;
- Pollen and nectar mixes, usually with a high proportion of legumes;

And would be recorded as arable and horticultural.

6.6 Improved Grassland

This is an extensive Broad Habitat comprising low botanical quality grassland with high grazing value. The Broad Habitat is selected at the polygon level. Intensively managed agricultural grasslands include impoverished swards usually dominated by *Lolium perenne*, often with varying amounts of *Cynosurus cristatus*, *Holcus lanatus* and *Poa trivialis*. The coarse grass *Dactylis glomerata* may be frequent in some stands. Forb diversity is characteristically low, the commoner species being *Trifolium repens*, *P. major*, *Taraxacum officinale* agg., *Stellaria media* and *Ranunculus repens*. Patches of coarse weeds (*Rumex obtusifolius*, *Urtica dioica*, *Cirsium vulgare* and *C. arvense*) are often present.

Separation of improved from semi-improved grassland relies mainly on the abundance of agricultural species on the one hand and the diversity of forbs on the other. Stands with greater than 25% cover of *Lolium perenne* can be safely regarded as improved, unless any of the characteristic marker species of unimproved grassland are present at high frequency. In addition, impoverished grasslands dominated by *Cynosurus cristatus*, *Holcus lanatus* or *Poa* spp. should be classified as improved, even if *Lolium* is rare or absent, unless any of the characteristic marker species of unimproved grassland are present at high frequency.

Improved grasslands are ubiquitous on heavily fertilised soils throughout the lowlands. They are typically managed as pasture, or for silage or occasionally hay. Two NVC communities are included (MG6 and MG7).

This broad habitat includes:

- Species-poor, grass dominated swards, often sown for agricultural or recreational use, or created by modification of unimproved grasslands by fertilisers and selective herbicides. They are particularly characterised by the abundance of rye grass *Lolium spp.* and white clover *Trifolium repens*.
- 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 often dominated by a single grass species e.g., *Lolium*.
- Amenity grass: This is non-agricultural grass which is clearly being used for amenity purposes (not recreation) e.g., parks, large lawns, may be component of golf course.

6.7 Neutral Grassland Broad Habitat

This Broad Habitat includes:

- Vegetation containing some annual weeds but consisting mainly of long-lived perennials with grass cover less than <50% cover. Species include *Urtica dioica*, *Galium aparine*, *Chamaerion angustifolium*, *Cirsium arvense*, *Bromus sterilis* and *Poa trivialis*. Includes stands dominated by invasive aliens such as *Reynoutria japonica*, *Impatiens glandulifera* and *Heracleum mantegazzanum*.
- Recently sown neutral grass: Recently sown mixtures of fine-leaved grasses such as *Anthoxanthum*, *Poa pratensis*, *Festuca rubra*, *Cynosurus* and *Trisetum*. 50-100% grass cover. Herb species rare or absent. Often on sown field margins.
- Semi-improved Neutral grassland: This includes all semi-improved and unimproved grassland occurring on circum-neutral soils. It includes enclosed and managed grassland such as pastures, a range of grasslands which are inundated with water periodically, permanently moist or even waterlogged grassland, where the vegetation is dominated by grasses, and tall and unmanaged grassland.
- Tall unmanaged neutral grass: Long-lived perennials with little or no open ground. Vegetation with over 50% grass cover. *Arrhenatherum*, *Dactylis* and *Elymus repens* usually dominate but scattered shrubs and tall herbs may be present (e.g., *Artemisia vulgaris*, *Cirsium arvensis*, *Cirsium vulgare*, *Digitalis purpurea*, *Heracleum sphondylium*, *Chamaerion angustifolium* N.B. does not include wetland indicators e.g., *Filipendula ulmaria*, *Epilobium hirsutum*, *Urtica dioica*, *Filipendula ulmaria*, *Phragmites*). Associated with linear features such as road verges, field boundaries, tracksides and ditch banks but in these situations will only be mapped if >MMU.

Neutral grassland Priority Habitats

Lowland hay meadow

This habitat consists of traditionally managed hay-meadows and pastures in which grasses such as *Cynosurus cristatus*, *Festuca rubra*, *Agrostis capillaris* and *Anthoxanthum odoratum* typically occur in a species-rich sward with a high cover of associated herbs. Cover of grass species and clover are usually less than 50%. Typically rich in forb species with frequent PH lowland meadow indicators including *Lathyrus pratensis*, *Lotus corniculatus*, *Leucanthemum vulgare*, *Galium verum*, *Primula veris*, *Centaurea nigra*, *Leontodon hispidus*, *Ranunculus bulbosus* or on flood meadows some of *Caltha palustris*, *Sanguisorba officinalis*, *Filipendula ulmaria* and *Alopecurus pratensis*. NVC communities include MG4, MG5 and MG8.

Upland hay meadow

The habitat comprises the single NVC community MG3, *Anthoxanthum odoratum* - *Geranium sylvaticum* grassland and is characterised by a dense growth of grasses and herbaceous dicotyledons up to 60 - 80 cm high.

6.8 Calcareous Grassland Broad Habitat

This Broad Habitat is uncommon. It comprises vegetation with scattered sedges, many calcicoles present in often species rich turf on calcareous soils usually rendzinas on chalk or limestone. Indicators include *Bromopsis erecta*, *Lotus corniculatus*, *Linum catharticum*, *Sanguisorba minor*, *Carlina vulgaris*, *Sesleria albicans*, *Helianthemum nummularium*, *Cirsium acaule*. These vary from mostly coastal grasslands through to upland and mountain grasslands rich in arctic alpines. The habitat divides into:

Priority Habitats

Lowland calcareous grassland

NVC communities include CG1 (*Festuca ovina* - *Carlina vulgaris* grassland (excludes CG1f)), CG2 *Festuca ovina* - *Avenula pratensis* is the most common form of grazed calcareous grassland in the lowlands. Note that the more improved examples of the *Holcus lanatus* - *Trifolium repens* sub-community (CG2c) are included under semi-improved grassland. *Bromus erectus* grassland (CG3) and *Avenula pubescens* grassland (CG6) are also included.

Upland calcareous grassland

Most examples occur above 250-300 m altitude, but the habitat is also found within unenclosed moorland at lower elevations. *Festuca ovina* - *Agrostis capillaris* - *Thymus praecox* grassland (CG10) is the most prevalent form of calcareous grassland in the uplands and occurs occasionally in the lowlands.

Festuca ovina - *Alchemilla alpina* - *Silene acaulis* dwarf-herb community (CG12) and *Dryas octopetala* - *Silene acaulis* ledge vegetation (CG14) are often restricted to fragmentary stands.

6.9 Acid Grassland Broad Habitat

Fine grasses predominate generally in dry situations e.g. *Agrostis curtisii*, *Festuca ovina* and *Anthoxanthum odoratum* usually on brown podzolic soils or rankers. Acid indicators present e.g. *Galium saxatile*, *Potentilla erecta*, *Pleurozium schreberi* and *Rumex acetosella*. Also includes Moorland grass; which is dominated by coarser grass species, usually occurring in a moorland setting but is also present within lowland heath landscapes in southern Britain and in the Scottish lowlands. Usually dominated by *Nardus* or *Molinia* but often with significant amounts of *Deschampsia flexuosa* and *Juncus squarrosus*. *Sphagnum* species may be present but if so, associated with *Anthoxanthum odoratum* and/or *Juncus* species. Dwarf shrubs and peatland species may be frequent but are usually less than 25% cover and are never dominant. Usually on peaty gley soils but also on some peats.

Acid grassland Priority Habitat

Lowland acid grassland

It is defined as both enclosed and unenclosed acid grassland throughout the UK lowlands (normally below c. 300 m). Includes the *Festuca ovina* - *Agrostis capillaris* - *Rumex acetosella* (U1), *Deschampsia flexuosa* (U2), *Agrostis curtisii* (U3) and *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* (U4) NVC grassland plant communities but really only U4c *Lathyrus montanus*-*Stachys betonica* sub-community. Inland vegetation, but not coastal dunes. It is characterised by a range of plant species such as *Galium saxatile* *Festuca ovina*, *Agrostis capillaris*, *Rumex acetosella*, *Carex arenaria*, *Deschampsia flexuosa*, *Agrostis curtisii* and *Potentilla erecta*, with presence and abundance depending on community type and locality.

6.10 Bracken Broad Habitat

This should only be used where vegetation consists of Bracken at $\geq 95\%$ cover with or without a sparse herbaceous understorey. Stands that have not yet peaked in seasonal biomass should still be recorded as dense Bracken if you believe peak cover is likely to be at least 95%. If cover of bracken is less than this, then it should be recorded as the underlying vegetation (probably acid grassland).

6.11 Dwarf Shrub Heath

Includes vegetation dominated by species from the heath family or dwarf gorse species. It does not include vegetation from high mountain summits $< 750\text{m}$ which may be included in the "Montane habitats" BH type. Heathland is characterised by presence of *Erica* spp., *Calluna*, *Empetrum*, *Vaccinium* or *Ulex minor/gallii*. Dry and wet heath are included in this category so there may be occasional to frequent indicators of wet conditions such as *Erica tetralix*, *Sphagnum*, *Molinia* and/or *Narthecium* but wet heath is differentiated from blanket bog by peat being on average $< 0.5\text{ m}$ deep without *Eriophorum vaginatum*. Vegetation dominated by *Ulex gallii* is included within the definition of heath, but vegetation in which *U. europaeus* predominates should be classified as scrub within the Broadleaved, Mixed & Yew Woodland Broad Habitat.

6.12 Fen/Marsh/Swamp Broad Habitat

This BH includes vegetation that is ground water fed; and permanently, seasonally or periodically waterlogged on peat, peaty or mineral soils where grasses do not predominate. It also includes emergent vegetation or frequently inundated vegetation occurring over peat or mineral soils. It does not include fertile grassland, with *Juncus effusus* and no wetland indicators. It also includes vegetation fringing open water often developed as a narrow part of a hydrosere between standing water and upslope vegetation. Species include *Valeriana officinalis*, *Epilobium hirsutum*, *Filipendula ulmaria*, *Oenanthe croccata* and Tall-herb wetland vegetation consisting of only wetland tall herb species e.g. *Epilobium hirsutum*, *Urtica dioica*, *Filipendula ulmaria*, *Phragmites*, (not including non-wetland tall herb species such as *Artemisia vulgaris*, *Brassica* sp., *Chenopodium album*, *Cirsium arvensis*, *Cirsium vulgare*, *Digitaria purpurea*, *Heracleum sphondylium*, *Triplospermum maritimum*, *Chamaerion angustifolium*).

Fen, marsh, Swamp Priority Habitats

Fen priority habitat

Fens are minerotrophic peatlands that receive water and nutrients from the soil, rock and ground water. Species include *Carex paniculata*, *C. acutiformis*, *C. rostrata*, *C. elata*, *C. riparia*, *Iris pseudacorus*, *Filipendula ulmaria*, *Phragmites australis* (but not virtually pure stands), *Equisetum fluviatile*, *Eupatorium cannabinum*, *Lythrum salicaria* and *Epilobium hirsutum*.

Flush priority Habitat

Localised, usually narrow areas (which may coalesce where adjacent) influenced by lateral water movement. Calcareous flushes are dominated by species such as *Linum catharticum*, *Carex hostiana* and *C. dioica*, *Campyllum stellatum* and *Parnassia palustris*. Non-calcareous flushes are usually dominated by *Juncus effusus*, *J. articulatus/acutiflorus* and *Carex echinata*, often with *Sphagnum*. Usually found on peaty gley soils.

Purple moor grass rush pasture priority habitat

Purple moor grass and rush pastures occur on poorly drained, usually acidic soils in lowland areas of high rainfall in western Europe. Purple moor grass *Molinia caerulea*, and rushes, especially sharp-flowered rush *Juncus acutiflorus*, are usually abundant. Key species associated with purple moor grass and rush pastures include: *Hypericum undulatum*, *Carum*

verticillatum, *Cirsium dissectum*, *Crepis paludosa*, *Platanthera chlorantha*, *Galium palustre*, *Cirsium palustre*, *Ranunculus flammula*, *Agrostis canina*, *Mentha aquatica*, *Achillea ptarmica*, *Equisetum palustre*, *Cardamine pratensis*, *Epilobium palustre*, *Juncus subnodulosus*, *Carex pulicaris*, *C. hostiana*, *Epipactis palustris*, *Geum rivale*, *Gymnadenia conopsea*, *Serratula tinctoria* and *Angelica sylvestris*.

Reedbed priority habitat

Reedbeds are wetlands dominated by stands of the common reed *Phragmites australis*, wherein the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches, and small areas of wet grassland and carr woodland may be associated with them.

6.13 Bog Broad Habitat

This broad category includes all vegetation (other than blanket bog) that is dominated by peatland species and should be identified by the plants present and not by topographic position since across the whole of Britain there is no consistency in the position of bogs within the landscape. The category therefore includes raised bogs and valley bogs but note that the soligenous mires dominated purely by *Molinia* and *Juncus* species would be included under moorland grass as no other peatland species are present. *Calluna* may be up to 50% cover but usually less. *Molinia* and *Sphagnum* species are usually present, often over 25%. *Trichophorum* is also often present as a significant cover species. Other species which may be locally dominant include *Myrica gale*, *Eriophorum angustifolium* and *Nardus stricta*. Indicative species include *Narthecium ossifragum*, *Drosera* spp., and *Pedicularis* ssp.

Priority Habitats

Blanket bog

The term blanket 'bog' strictly applies only to that portion of a blanket 'mire' which is exclusively rain-fed. Peat depth is very variable, with an average of 0.5-3 m being fairly typical but depths in excess of 5 m not unusual. The principal vegetation (NVC) types covered are M1, M2, M3, M15, M17, M18, M19, M20 and M25, together with their intermediates. Other communities, such as flush, fen and swamp types, also form an integral part of the blanket bog landscape but should be mapped separately if areas are greater than the MMU (20x20m). Dominant species include *Calluna vulgaris*, *Erica tetralix*, *Trichophorum cespitosum*, *Eriophorum vaginatum* and *Sphagnum* species. For allocation purposes, the most important defining feature is dominant to occasional *E. vaginatum*.

Lowland raised bog

In the UK lowland raised bogs are a particular feature of cool, rather humid regions. Plant communities that are typical of natural raised bogs include the bog pool communities M1 to M3 and M18 *Erica tetralix* - *Sphagnum papillosum* raised and blanket mire. In addition, a number of communities, including M15 *Scirpus cespitosus* - *Erica tetralix* wet heath, M19 *Calluna vulgaris* - *Eriophorum vaginatum* blanket mire, M20 *Eriophorum vaginatum* blanket and raised mire, M25 *Molinia caerulea* - *Potentilla erecta* mire. Peatland species predominate e.g., *Trichophorum*, *Eriophorum angustifolium*, *Sphagnum* spp, *Vaccinium oxycoccus* and *Andromeda polifolia*. Often in lowland areas in unimproved/unafforested areas of flood plains. A good indicator is the location of the bog on level ground with a gently domed structure and an absence of calcicolous and mesotrophic wetland species.

6.14 Rivers and Streams

Not to be mapped.

6.15 Standing Water

Not to be mapped.

6.16 Montane Broad Habitat

This Broad Habitat has now been classified as a Priority Habitat 'Mountain heaths and Willow scrub'. This habitat encompasses a range of natural or near-natural vegetation occurring in the montane zone, lying above or beyond the natural tree-line. Surveyors will need to select the Broad Habitat montane from the drop down.

This habitat includes montane heath (dominated by *Calluna vulgaris* and *Vaccinium myrtillus* typically with abundant bryophytes e.g., *Racomitrium lanuginosum*) and/or lichens e.g., *Cladonia* species) and snow bed communities which are dominated by prostrate *Salix* spp., *J. trifidus*, *C. bigelowii*, *Racomitrium*, and dwarf forb communities of *Alchemilla alpina*, and *Saxifrage* species. It also includes moss and lichen dominated heaths of mountain summits. It does not include montane dwarf shrub heaths, flushes, grasslands, and rock and scree communities that straddle the notional boundary of the former treeline with little change in floristics and these should be treated as components of other BH types.

6.17 Inland Rock Broad Habitat

This BH includes both natural and artificial exposed rock surfaces where these are almost entirely lacking in vegetation, as well as various forms of excavations and waste tips. It includes inland cliffs, ledges and caves, screes, quarries and quarry waste.

Priority Habitats

Limestone pavement: are of both geological and biological importance. The vegetation is rich in vascular plants, bryophytes and lichens and varies according to geographical location, altitude, rock type and the presence or absence of grazing animals. Limestone pavement vegetation may also contain unusual combinations of plants, with woodland and wood-edge species well-represented in the sheltered grikes. The clints (limestone slabs) support plants of rocky habitats or are often unvegetated. In the absence of grazing, scrub may develop.

Inland rock outcrop and scree habitats: This habitat covers a wide range of rock types, varying from acidic to highly calcareous and includes five Habitats Directive Annex 1 habitat types. The habitat occurs throughout the uplands and is particularly characteristic of high altitudes. Coastal cliff and ledge habitats are excluded as they form part of the maritime cliffs and slopes priority habitat.

Screes are typically dominated by *Cryptogramma crispera* and other ferns, lichens and bryophytes. On cliff ledges, tall herbs such as *Sedum rosea* and *Angelica sylvestris* are generally abundant. Chasmophytic vegetation (in rock crevices) is usually dominated by ferns such as *Asplenium viride* and small herbs such as *Thymus polytrichus* and *Saxifraga* spp. Bryophytes and lichens also occur in crevices but are able to flourish on the open rock surfaces where there is a lack of competition from vascular plants. NVC: U16-U18, U21, OV38-OV40. Tall-herb and fern vegetation of cliff ledges and ungrazed upland hillsides is represented by three NVC types. The *Luzula sylvatica* - *Vaccinium myrtillus* community (U16) is widespread but highly localised on acidic substrates. *Luzula sylvatica* - *Geum rivale* vegetation (U17) occurs on outcrops of base-rich rock in upland areas. Rock crevice vegetation includes the *Asplenium trichomanes* - *Asplenium ruta-muraria* (OV39) and *Asplenium viride* - *Cystopteris fragilis* communities (OV40). The *Festuca ovina* - *Minuartia verna* community (OV37) is confined to heavy metal-rich mine spoil.

Calaminarian grassland: includes a range of semi-natural and anthropogenic sparsely vegetated habitats on substrates characterised by high levels of heavy metals such as lead, chromium and copper, or other unusual minerals. These are associated with outcrops of

serpentine and river gravels rich in heavy metals, as well as with artificial mine workings and spoil heaps. Seral succession is slowed or arrested by the toxicity of the substrate. Open-structured plant communities, sometimes known as 'Calaminarian grasslands', typically occur, composed of ruderal/metallophyte species of lichens, bryophytes and vascular plants, such as spring sandwort *Minuartia verna*, alpine pennycress *Thlaspi arvense*, and genetically adapted races of species such as thrift *Armeria maritima* and bladder campion *Silene maritima*. Notable species include *Epipactis youngiana*, *Asplenium septentrionale*, *Ditrichum cornubicum*, *Marsupella profunda*, *Cephaloziella nicholsonii* and *Ditrichum plumbicola*.

Vegetation on metalliferous substrates is found in three distinct settings in the UK:

- Near-natural substrates;
- Mine spoil, in situations where naturally occurring metalliferous outcrops have been quarried away;
- Metalliferous river gravels, sometimes derived from washed-out mine workings. In many localities the metalliferous outcrops which would have been the natural habitat for the species referred to above have been quarried away but the mine spoil still provides suitable habitat.

6.18 Urban Broad Habitat

This Broad habitat includes;

- Curtilage is an area of ground that is associated with a building, and which has a use linked with that building e.g. gardens, 'grounds', forecourts etc.
- Allotments community gardens, usually used for growing vegetables.
- Buildings - residential and public
- Car parks
- Garden Centre/Nursery
- Glasshouses: refers to commercial, large-scale enterprises, not greenhouses at the bottom of gardens.
- Gravel pits
- Hard standing/concreted/gravel area
- Public open space: includes Parks, Ornamental Gardens and Accessible Common Land, especially near large conurbations.
- Quarry/mine
- School playing fields
- Tennis courts
- Touring caravan park
- Railway track/land: to include tracks, yards, sidings and their associated curtilages (e.g. banks and 'verges').
- Road (tarmac): includes any road, whether private or not, which is totally tarmac across its width.
- Annual/early successional vegetation with open ground in urban setting. Early-successional pulse-disturbance vegetation containing annual weeds as well as perennial species usually with some open ground present. Open ground usually conspicuously present. Actual species composition dependent upon starting point. Indicators include *Poa annua*, *Plantago major*, *Agrostis stolonifera*, *Polygonum aviculare*, *Dactylis glomerata*, *Taraxacum* agg. *Stellaria media*.

6.19 Supra-Littoral Rock Broad Habitat

Supralittoral rock occurs above high water mark, in areas influenced by wavesplash and sea-spray. Features that may be present include vertical rock, boulders, gullies, ledges and pools,

depending on the wave exposure of the site and its geology. Salt-tolerant species are the characteristic colonisers. Typical plants in such areas include *Cochlearia officinalis*, *Plantago maritima*, *Tripleurospermum maritimum*, *Sedum rosea*, *Ligusticum scoticum*, *Silene maritima*, *Armeria maritima*, *Crithmum maritimum*, *Plantago coronopus* and, in some rich areas, Arctic species such as purple saxifrage *Saxifraga oppositifolia* and *Silene acaulis*. The Broad Habitat is selected at the polygon level.

Supra-littoral rock Priority Habitats

Maritime (cliffs and slopes) vegetation

This habitat type is found on sea cliffs or other coastal situations and usually herb-rich due to salt spray. Halophytes always present e.g. *Plantago maritima*, *Plantago coronopus*, *Armeria maritima* and *Tripleurospermum maritimum*.

6.20 Supra-Littoral Sediment

Supra-littoral sediment Priority Habitats

Sand dune (vegetated)

Sand dune vegetation should be recorded where the area is vegetated at 25% or greater, otherwise the physiography attribute sandy shore (36) should be used. Typical species include *Ammophila arenaria*, *Leymus arenarius*, *Elymus farctus*, *Viola tricolor*, and *Euphorbia portlandica*. Dune slacks should also be included with typical species such as *Salix repens*.

Strandline vegetation

Vegetation will establish on shingle beaches when there is a matrix of finer material such as sand or silt, and where the structure is stable. Herb-rich open pioneer stages colonise the seaward edge with species such as *Crambe maritima*, *Lathyrus japonicus*, *Armeria maritima*, *Glaucium flavum* and *Eryngium maritimum*.

6.21 Littoral rock Broad Habitat

Not to be mapped.

6.22 Littoral Sediment

Priority Habitats

Saltmarsh

This PH should only be recorded where the area is vegetated, otherwise bare mud (Physiography section) is appropriate. Typical species include *Salicornia*, *Puccinellia*, *Triglochin maritima* and *Aster tripolium*. In complex situations which cannot be mapped, the polygon should be assigned to a mosaic and proportions of 'bare mud' and vegetated ground in a polygon indicated.

Mudflats

Not to be mapped.

This page is intentionally blank.

ERAMMP Programme Office
UKCEH Bangor
Environment Centre Wales
Deiniol Road
Bangor, Gwynedd
LL57 2UW
+ 44 (0)1248 374500
erammp@ceh.ac.uk

www.erammp.cymru

www.erammp.wales