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GLASTIR MONITORING & EVALUATION PROGRAMME MAPPING FIELD HANDBOOK Part 1: Habitat attributes

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GMEP Procedure	Mapping Field Handbook Part 1: Habitat Attributes
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Background

Surveyors are asked to record information on habitats and landscape features for a 1km 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 methodologies for the GMEP survey. However, it is important that we maintain consistency with methods used previously in Countryside Survey because we will be using CS data to look at historical trends and we need to maintain a time-series of detailed, disaggregated environmental surveillance data that provides 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 GMEP 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 will be 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.

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.

2. Structure of the Editable Polygon/Habitats Layer

In unenclosed and enclosed habitats, surveyors will create and edit polygons. Surveyors will be able to create polygons, select the appropriate BH, and apply primary and secondary attributes. They will also be able to select, where relevant, from a subset of PHs. Since Priority Habitats nest into BHs, a polygon can be attributed as both a PH and a BH.

The role of the field keys to habitats and woodland types/features

Two keys are provided in the handbook. Each solves the problem of assigning surveyed areas and features to the units of a classification.

Key to Broad and Priority Habitats (Vegetation Key)

Based on plant species composition, patches of discrete vegetation (polygons) are assigned primary (and selected secondary attributes) and allocated by the surveyor to Broad and Priority Habitats. The key allows all vegetation stands to be keyed to a BH and to all PH's apart from those known as habitat complexes (i.e. those for which final definition requires the application of an agreed GIS mask to surveyed areas) and coastal PHs for which this survey is unrepresentative because the limit of survey is Mean High Water Spring tide.

Key to woodland types/features

Vegetation featuring woodland and scrub comprises 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. 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. 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 so, the surveyor then needs to determine whether the primary attributes Belt of trees, Clump of trees, 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 attributes apply then the patch can be keyed out using the vegetation key, based on its canopy species composition.

3 The Vegetation Key

The key below features the Broad and Priority Habitats that each habitat keys out to and also the primary and secondary attributes which provide extra description. NVC codes are also included for information.

Vegetation may only be sparsely present, for example on rock exposures, peat hags or in urban environments. If no vegetation is present the BH will likely be Urban, Inland Rock or one of the coastal types. Exercise common sense. Remember that ALL land must be allocated to a BH or PH. If no vegetation is present consult the BH and attribute descriptions and edit/add attributes accordingly.

CS2007 FIELD SURVEY KEY AND ALLOCATION RULES TO BROAD AND NON-COASTAL PRIORITY HABITATS (adapted for GMEP)

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(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 dwarf shrubs, less than 1m. Includes dwarf <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> . 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)	<i>Rock vegetation</i>	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 ≥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 (BH 19 Supra-littoral sediment)	<i>Sand dune vegetated</i>		

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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			

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
5b	Press-disturbance vegetation. Includes all grazed upland and lowland grasslands along with meadows and silage fields . Also included are those 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.	8			
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 eg. <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	

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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>		
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	

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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 mantegazzianum</i>	Neutral Grassland (BH 6)	<i>Perennial vegetation, tall herb/grass</i>	OV24	
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 alpine</i> , <i>Cerastium nigrescens</i> .	Calaminarian Grassland Priority Habitat (Inland Rock BH16)-			Annex 1 6130 - Calaminarian grasslands of the Violetalia calaminariae.
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			

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
8c	Calcareous indicators of wet or dry ground present eg. <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			
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</i> spp. <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>).

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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</i> spp., <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.
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.bufo</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)

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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).
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>Craex 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 eg. <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			
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 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			

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
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</i> spp., <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 eg. <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</i> spp 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			
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	

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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	
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 laggs 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			

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
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	
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			

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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)	<i>Recently sown neutral grass</i>		
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)	<i>Recently sown neutral grass</i>		
18c	Not as above.	Neutral Grassland (BH 6)	<i>Semi-improved neutral grass</i>		
19a	Scrub on sand dunes and shingle or <i>Salix repens</i> in dune slacks.	Supralittoral sediment (BH19)	<i>Sand dune</i>		
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

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
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	Not as above.	21			
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

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
21c	Species of acid peat soils 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 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	
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, <i>Alnus incanae</i> , <i>Salix albae</i> .

		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 spp</i>	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	
22e	>=25% canopy cover of Hornbeam (<i>Carpinus betulus</i>), Stands of <i>Quercus</i> sp. 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	

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
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	
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)			

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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.
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 caerulea</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 crista</i> , <i>Cystopteris fragilis</i> , <i>Gymnocarpium robertianum</i> and <i>Asplenium trichomanes</i>				
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. phylicifolia</i> .				Annex 1 4080 - Sub-Arctic Salix spp. scrub
26a	Coastal saltmarsh	27			

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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			
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>Glauco-Puccinellietalia maritimae</i>).

		Numbered links plus Broad & Priority Habitats	Primary attributes	NVC units (indicative list only)	Annex 1
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>Sarcocornete a 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 hydroses 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 calc 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.

4 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 50m apart?	YES – see Individual Trees under Point Features pg 100	NO – Step 5
5. Less than 0.25 ha with canopy >20% area	YES – see Clump of trees (BH/PH if >20x20m else Point Features pg 100)	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 100)	NO – Belt of Trees (BH/PH)
8. Canopy cover less than 20%?	YES – Step 9	NO – Woodland/Forest (BH/PH)
9. Trees less than 50m apart (on average)?	YES – Scattered Trees options pg 93	NO - see Individual Trees under Point Features (pg 100)
SHRUBBY FORM		
10. Individuals more than 50m apart?	YES – Individual Scrub under Point Features (pg 100)	NO – Step 11
11. At least 20m line?	YES – Step 12	NO – Step 13
12. Single tree width?	YES – see Woody Linear Features under Linears (pg 110)	NO – Belt of scrub (BH/PH)
13. Canopy covers more than 25% of area?	YES – Patch of scrub (BH/PH if >20x20m else Point Features pg 100)	NO – Step 14
14. Individuals less than 50m apart on average?	YES – Scattered scrub	NO see Individual Scrub under Point Features (pg 100)

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 below).** 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 from 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 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.

5 Setting priorities for mapping squares

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

- You should NOT spend more than 4 days mapping a square; this means 4 normal length days around 30 hours. Most squares to take 2-3 days to map and you should aim for that (20-24 hours), this may mean cutting down on some of the detail- tips below
- It is quickest to simultaneously map areas, lines and points in a 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 possible was mapped.

High priority

- Make sure you have a complete area map of habitats
- Record Primary attributes and 2-4 species in each parcel
- Map woody linear features
- Map fences but not necessarily double fences
- Map walls
- Ditches and streams
- Points- Representative individual and veteran trees
- Points- inland water ponds,

Lower priority and time-saving tips

- If you are short of time don't record more than 4 species per parcel, this is particularly the case in habitats dominated by species e.g. bracken Broad Habitat is allocated when there is 95-100% bracken so wouldn't be expecting too many other species.
- 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 broad habitat changes i.e. if wet woodland is adjacent to lowland mixed deciduous.
- Agricultural use- good to have but less essential than the priorities above.
- Forestry features- less essential than above
- Banks- use judgement, some banks may be critical, others as component of wall less so.
- If you are running short of time do not map every single individual tree but try to include enough to represent the landscape.
- If you are running short of time put less effort into specific linear features: fences, roads, don't put double fences on a feature if you don't have time
- Think about overall complexity of your map, can you simplify polygon structure to capture information more quickly?

- You can use the mosaic code if you have to, but think about how necessary it is first.
- Points- recreation and structures not a priority
- Inland physiography- points and linears not a priority
- Linears- grass strips not a priority
- Please **DO NOT** GPS map habitats and features. Obviously 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 included 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.



6 Mapping change in CS squares

In 2016 a small proportion (22) of the squares will be CS squares originally surveyed in 1978. For these squares surveyors will be provided with data from earlier surveys and instructed to map change in land cover and landscape features rather than mapping 'de novo' (from a blank square). Surveyors will be asked to indicate genuine change and changes that highlight where, in their opinion, earlier mapping (or subsequent data processing) resulted in the mis-allocation of polygons (mapped areas), linear features or point features to the wrong BH. This is a key role for surveyors in this survey as they will be both mapping change as well as correcting the data.

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. Where necessary, surveyors can indicate errors in spatial accuracy by changing the attributes and or shapes and sizes of polygons and recording Error change against those 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.

This will involve checking the polygon level attributes as well as the species and primary attributes

Area: the area of the polygon is given

Broad (Priority) habitat: Surveyors will be provided with an appropriate Broad or Priority habitat and using the vegetation key and the additional information on Broad and Priority habitats 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 whether based on the attributes, species and habitat recorded previously along with what you can see in the field the previous surveyor was correct then fill in the field accordingly.

BH (Broad Habitat) Accuracy – was the polygon allocated to the right BH in 98 (allocation ok)? Were the attributes right or wrong?

- **Broad habitat ok, attributes ok**
- **Broad Habitat ok, attributes wrong**
- **Broad Habitat wrong, attributes ok**
- **Broad Habitat wrong, attributes wrong**
- **New baseline for Priority Habitat** (Some of the PH's were not recorded separately last time and would have just been recorded as part of the Broad habitat)
- **Not previously surveyed**

Determining Change

Drop down fields available

- **Error change- surveyor was mistaken previously**
- **No change**
- **No previous code**
- **Real change**

It is important that surveyors indicate whether observed changes in primary and secondary attributes are the result of genuine change since the last surveyor or whether there was an error previously.

- a. Does a new allocation apply because the previous allocation is judged to have been wrong then and would also be wrong now? This is ERROR change and amounts to a correction of the data.
- b. Does the previous allocation still apply? i.e. no change has occurred. If so leave as is.
- c. Is a new priority habitat being recorded that wasn't recorded previously (this applies to habitats such as upland flush, calaminarian grassland)
- d. Does a new allocation apply because change has occurred since? This is REAL change.

7 Broad & Priority Habitats and Primary and Secondary Attributes for Polygons (Mapped Areas)

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 (400m²)- 20m x 20m, the feature measures at least 5m in all directions e.g. 5m x 80m (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. The **ONLY** case in which an area <MMU should be mapped is where part of a much larger bigger polygon e.g. a field of wheat, protrudes into the edge of a square. The system will prevent you from creating an area which is less than the MMU. Copying polygons through from OS MasterMap may result in some polygons below MMU being pulled through. These will need to be removed, through merging or modifying.
4. A new polygon should be created 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.
5. Only features above a minimum mappable unit in size (i.e. exceeding 1/25th ha) excepting ponds should be recorded within woodland.
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.
7. To edit you will need to be zoomed in to a scale of < 1:5000

In this next section detailed descriptions of 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 i.e. Area, Line or Point is indicated by the letters, A, L and P].

Non-Native species

There is concern about the prevalence of invasive non-native species in the countryside. We would like surveyors to look out for the following non-natives and to record them where they occur within a habitat (**and cover an area over the MMU**). Note that occurrences of these species can also be used to qualify mapped areas of any habitat type.

Brassica napus (rape)
Buddleia davidii

Mimulus guttatus
Reynoutria japonica

Heracleum mantegazzianum
Impatiens glandulifera

Rhododendron ponticum
Symphoricarpos albus

Tree diseases

There is a lot of concern about the spread and impact of particular tree diseases (e.g. Ash dieback *Chalara fraxinea*) and existing monitoring may be a good way of capturing this information. We have added a field to the recording of woodland areas (forestry features), individual tree point features and there are also fields in the vegplots database. This is very much pilot work for this survey but we would ask surveyors to think carefully about how accurately tree diseases can be recorded and how much time it would take. In the appendix there are some information sheets on how to identify particular diseases.

Bare ground

There are different ways that bare ground can be recorded depending upon the context. Mostly it is expected that bare ground will be a component of another habitat type and should only be mapped separately if there is an extensive area.

The Broad Habitat at the folder level will depend upon the context, it may be peat hags within a Bog in which case the Broad Habitat would be bog, if it is an area of manure or dung within an agricultural context the Broad Habitat may be Improved grass it may be an area of abandoned land within an urban context in which case the Broad Habitat is Urban or it may be clearfelled plantation (see below) and the Broad Habitat coniferous plantation. If it is too difficult to decide where the bare ground lies then record as no allocation.

In the detailed attributes as a component (sub-folder) bare ground should be recorded under the

Theme 'Inland Physiography'

Primary Attribute Bare Ground/Disturbance/Bare soil

Phys cover- this has been updated to include % bare ground, % soil and % litter as well as % rock and % peat

If it is mudflats within a coastal context then it should be recorded as

Broad habitat: Littoral sediment

Theme: Coastal features

Primary attribute: Bare mud (A)

Clearfell

This survey records land cover rather than landuse 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 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, under the forestry theme dead lying trees can be chosen, from Theme Forestry feature: Felling/stumps, Theme Inland Physiography: bare ground as described above, and Forestry Use: Timber production.

8 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. If you think that you'll lose information on the local affinities of a woodland stand for a woodland Priority Habitat then consider putting in a Y plot.

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

The presence of this habitat type will be determined post-survey. However there is a parkland secondary forest attribute which surveyors can apply to indicate mature trees scattered across typically grazed grasslands in an extensive managed estate setting.

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 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

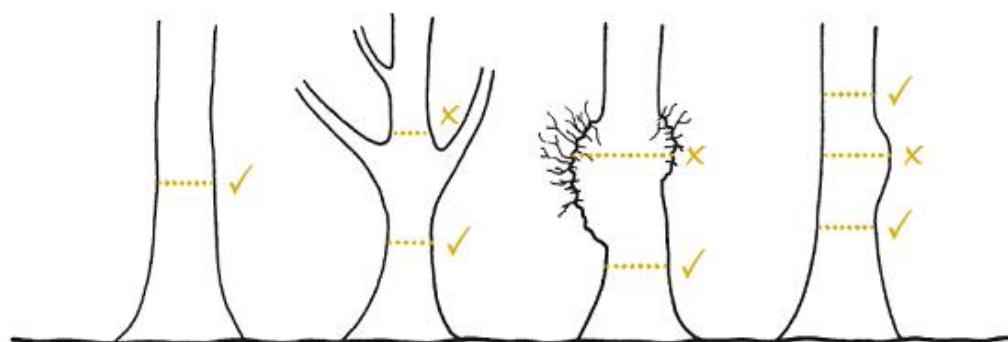
Modal DBH: should be used in conjunction with any of the species attributes describing either individuals or areas of shrubs or trees and, in the case of areas refers to the average DBH of the species making up the top canopy. This should be recorded in the following categories: <3cm, 3-20cm, 21-50cm,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

Deer fences

Bat boxes

Bird boxes

Bird and Bat boxes

Deer fences

Chalara

Dutch Elm disease

Felling/Stumps: (coppice should be recorded here)

Fenced (single trees)

Grazing (stock): to be used if there is any evidence of agricultural stock using the feature for grazing.

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

Grey squirrel damage

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.

Open glade and rides

Pheasants and pheasant pens

Phytophthora

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

Pollarded/Shredded

Regrowth - cut stump: applies to isolated regenerating trees

Signs of recent management

Staked trees: to be used for isolated trees only and not where 288 applies.

Sudden Oak Death

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

Underplanting: where semi-natural woodland has been under-planted with standard exotic or native species.

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.

9 Broad Habitat 2: Coniferous Woodland

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.

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, parkland.

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)

10 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 5m 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 5m in width (see below). The events will be recorded in the linear mapping.

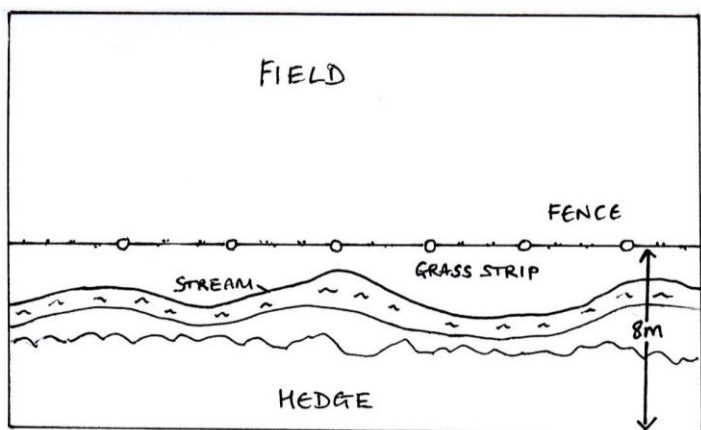


Figure 9.1 Wide linear feature

11 Broad Habitat 4: Arable and Horticultural

The primary attributes for this BH are straightforward - young crops may be difficult to recognise (the notes following each attribute may help). The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the three agricultural themes in the following fields;

Theme: Agricultural Crops

Primary attribute(s): (one from)

Barley (A): - barley has dull green leaves and auricles.

Blanket herbicide (A)

Commercial horticulture (A): to include strawberries, salad crops, cabbages and onions etc.

Evening primrose (A)

Field Beans (A)

Flowers (A)

Hemp (A)

Kale (A)

Maize (A)

Miscanthus (A)

Oats (A): oat plants have broad soft glaucous leaves with no auricles.

Oilseed rape (A)

Orchard (A): commercial enterprises only – not to include, for example a few fruit trees in a back garden where orchards occur as part of curtilage (see note below) around houses and farm buildings, use Gardens/ground with trees as the primary attribute and Orchard as the secondary.

Other crop (A)

Peas (A)

Perennial crops (A): to include raspberries, currents and vineyards.

Phacelia (A)

Ploughed (A): the crop harvested before ploughing should be identified (from fragments that remain) and this attribute used as an extra description after the crop primary attribute. If no crop fragments can be found then use this as a primary attribute.

Potatoes (A)

Rye (A)

Stubble (A)

Sugar beet (A)

Turnips/Swedes/Roots (A)

Undersown crop (A): may be organic, often cereal crops undersown with a *lolium perenne*/trifolium repens ley.

Unidentified cereal (A)

Wheat (A): wheat plants have broad, glaucous blades with auricles

Primary qualifier:

Field edge/Headland

Null

Vegetation type: Null

Species: Null

Species cover: Null

Theme: Agriculture/Natural Vegetation

Primary attribute:

Annual/early successional with open ground (A): includes 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.

Primary qualifier: do not record or Null

Vegetation type: likely to be Forbs or Grasses

Species: BRC list dependent on vegetation type chosen

Species cover: categories as above

Theme: Agriculture/Natural Vegetation Use

Setaside (A): Set-aside is not a current option for arable land and therefore this code should not be used.

Other features on arable land – Margins

Agricultural margins will be recorded according to their composition. The most common types of margin likely to be encountered are perennial grass margins, with or without supplementary wildflowers. 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;

The most popular margin options are likely to be 6m in width and these may be additive, i.e. one type of 6m margin immediately adjacent to another type. They should be mapped as areas where they exceed the MMU.

12 Broad Habitat 5: 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 Welsh lowlands. They are typically managed as pasture, or for silage or occasionally hay. Two NVC communities are included (MG6 and MG7).

At the component level all attributes should be recorded under the Agriculture/Natural vegetation and the Agriculture/Natural vegetation use themes in the following fields;

Theme: Agriculture/Natural Vegetation

Primary Attribute(s):

Fertile grass (A): 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*. Amenity grasslands e.g. playing fields should also be recorded in this BH but should also be recorded as amenity grassland.

Primary Qualifier(s): (one from)

Ley: a short-term grassland, re-seeded less than five years previously. Characterised by evidence of ploughing, bare soil between grass plants, scarcity of broadleaf species and is often dominated by a single grass species eg *Lolium*. This attribute should only be used if there is absolutely no doubt about these factors (eg from landowner information or recent sowing). Any field with more than 10% *Lolium* multiflorum (a short-lived ley species) would be included here.

Amenity grass (A): This should be used as a secondary descriptor with fertile or neutral grassland as a primary. It is used to describe non-agricultural grass which is clearly being used for amenity purposes (not recreation); to be recorded in units of 1ha or more eg parks, large lawns etc. Golf courses should be recorded separately.

Mown: to be used for any grassland type that has been mown such that the 'normal' vegetative structure of grasses is not present and therefore hinders species identification.

Anthills on grassland

Ridge and furrow present

Null

Vegetation type: likely to be Grasses or limited forbs.

The information below for recording species, species type, sward height and tussockiness may be applied to many of the Broad habitats.

Species: We would like surveyors to include at least 2 species for each polygon even if they are present at <10% cover (N.B. This means having at least 2 components for each polygon containing major agricultural grasses and semi-natural ground cover species). This ensures that ALL vegetated polygons are associated with at least 2 species records. Where there are more than 2 abundant species the maximum number to be recorded will be 4. A comprehensive BRC species list will be available to select from, but will depend on the vegetation type selected.

Species Cover: These cover % attributes should be used with the species attributes and, where a mosaic of vegetation categories exists, with land cover types. Usually, no more than four cover attributes may be used to describe any area. This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Sward<7cm: This category (<7cm) was chosen because some of the prescriptions applied to Glastir use this sward height and it is useful to us to know whether this has been applied. The dropdown menu concerns the area of a polygon over which this has been applied: Not applicable, <10%, 10-20%, 20-50%, 50-75%, 75-100%.

Sward height: This is a more general measure to capture sward height across the site. Categories include Not applicable, 0-10cm, 10-20cm, 20-50cm, 50-75cm, 75-100cm, 1-2m, 2-3m.

Variation in Sward Height: This needs to capture how variable Sward height is: Not applicable, Even, Some variation, Highly variable.

Tussockiness: The tussockiness of the mapped parcel should be described using one of the three categories. If there is considerable variation present then select the one that applies to the greatest area of the parcel. This information, although somewhat arbitrarily defined, will be useful when considering possible changes driven by Glastir prescriptions in order to favour various bird species. Example photographs are shown below. Tussockiness is a feature of grasses, sedges and rushes.

Moderately – tussocks occasional to frequent but the ground occupied by tussocks is less than the non-tussocky areas.

Very – tussocks dominate but there are still frequent gaps between the tussocks although these maybe small.

Closed – tussocks form a continuous storey with any gaps very scarce and mainly shaded by the foliage of the tussock and so not visible from above.



Moderately



Very tussocky



Closed

Figure 11.1 Measures of tussockiness

Theme:Agriculture/Natural vegetation Use

Beef: cattle which tend to be of stocky build and do not have udders - should also include 'sucklers' (0-6 mths) and 'rearers' (6 mths onwards)

Cattle (*unspecified*): only to be used if it is not possible to determine whether the cattle are dairy or beef (**note:** this attribute was used for 'breeder' cattle in 1990).

Dairy: cattle which have udders – especially Fresians –

Deer: only to be used if there is firm evidence including presence of animals or dung, artificial feeds, estate information

Goats

Grouse

Hay: should only be used if there is firm evidence eg wisps of dry grass after harvesting. If there it is impossible to tell whether a field has been left for hay or silage, then both attributes should be used, rather than not using a attribute.

Horses

Pigs

Sheep

Silage: Silage fields can be distinguished from hay fields only after cutting (silage-cut stems are fresh, bright green: hayfields usually produce dried grass remnants), or by asking the farmer.

Use unknown (A): should be used if the primary use of the land cannot be identified.

13 Broad Habitat 6: Neutral Grassland

This Broad Habitat covers a wide range of vegetation types. The Broad or Priority Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme.

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.

Theme: Agriculture/Natural Vegetation

Primary attribute(s):

Lowland hay meadow

Upland hay meadow

Broad Habitat: Neutral grassland

Theme: Agriculture/Natural Vegetation

Primary attribute(s): (one from)

Perennial vegetation: tall herb/grass(A): 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 mantegazzianum*.

Recently sown neutral grass(A): 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 (A): 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(A): 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 (eg. *Artemisia vulgaris*, *Cirsium arvense*, *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 ditchbanks but in these situations will only be mapped if >MMU or >5m wide.

Primary Qualifier(s): (if required, one from)

Ley

Amenity grass

Mown

Anthills on grassland

Ridge and furrow present

Null

Vegetation type: likely to be Grasses/Forbs.

Species: see above **Species Cover:** see above.

14 Broad Habitat 7: Calcareous Grassland

This Broad Habitat is uncommon. The Broad or Priority Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme.

Priority Habitats

Lowland calcareous grassland

In the lowlands of Wales, calcareous grasslands are more or less confined to outcrops of Carboniferous Limestone in the north and south. 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) is very rare in Wales, and confined to a handful of sites on the Carboniferous Limestone in the extreme north and south. *Avenula pubescens* grassland (CG6) is widely scattered but localised.

Festuca ovina - *Hieracium pilosella* - *Thymus praecox* grassland (CG7) is very rare in Wales.

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 restricted to fragmentary stands in the mountains of Snowdonia.

Primary attributes

Lowland calcareous grassland

Upland calcareous grassland

Theme: Agriculture/Natural Vegetation

Primary attribute:

Calcareous grassland (A): 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.

Primary Qualifier(s): (if required, one from)

Mown

Anthills on grassland

Ridge and furrow present

Null

Vegetation type: likely to be Grasses/Forbs.

Species: as for BH 5.

Species Cover: as for BH 5.

15 Broad Habitat 8: Acid Grassland

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme.

Priority Habitat

Lowland acid grassland

It is defined as both enclosed and unenclosed acid grassland throughout the UK lowlands (normally below c. 300m). 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. 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.

Primary Attribute

Lowland acid grassland

Broad habitat

Theme: Agriculture/Natural Vegetation

Primary attribute(s):

Acid grassland (A): Fine grasses predominate in generally in dry situations eg. *Agrostis curtisii*, *Festuca ovina* and *Anthoxanthum odoratum* usually on brown podzolic soils or rankers. Acid indicators present eg. *Galium saxatile*, *Potentilla erecta*, *Pleurozium schreberi* and *Rumex acetosella*

Moorland grass (A): 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.

Primary Qualifier(s): (if required, one from)

Anthills on grassland

Ridge and furrow present

Null

Vegetation type: likely to be Grasses/Forbs.

Species: see above.

Species Cover: see above.

16 Broad Habitat 9: Bracken

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme. As this Broad Habitat is defined by a very high cover of one species very few other attributes are required.

Theme: Agriculture/Natural Vegetation

Primary attribute:

Bracken: This primary descriptor 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) with bracken as a species and its cover value recorded.

Primary Qualifier(s): do not record or Null

Vegetation type: Forbs.

Species: *Pteridium aquilinum*.

Species Cover: 95-100%.

17 Broad Habitat 10: Dwarf Shrub Heath

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme. The **Priority Habitats** are upland and lowland dwarf shrub heath, these will be allocated post survey using a GIS mask.

Theme: Agriculture/Natural Vegetation

Primary attribute: Dwarf shrub heath (A): Includes vegetation dominated by species from the heath family or dwarf gorse species. It does not include vegetation from high mountain summits <750m 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 <0.5m 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.

Primary Qualifier:

Burnt vegetation: land which has been burned deliberately as a management practice e.g. for grouse (muirburn) within the last 12 months.

Null

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody

Species: BRC list according to selected vegetation type

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Theme:Agriculture/Natural vegetation Use

Grouse: only to be used if there is firm evidence including presence of birds or droppings.

18 Broad Habitat 11: Fen/Marsh/Swamp

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. The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation theme.

Priority Habitats

Fen Priority Habitat: This priority Habitat has been split into two: Upland flushes, Fens and Swamps and Lowland Fen. We will apply a GIS mask in post-processing to differentiate altitudinally but surveyors should use the following primary attributes to differentiate fen type.

Fen: 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: 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

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*, *Gymnadenea conopsea*, *Serratula tinctoria* and *Angelica sylvestris*.

Reedbed

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.

Primary attribute(s)

Fen

Flush

Purple moor grass rush pasture

Reedbed

Broad Habitat Fen, Marsh, Swamp

Theme: Agriculture/Natural Vegetation

Primary attribute(s):

Aquatic marginal veg (A): 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 crocata*.

Marsh (A): Nutrient-rich wetland on predominantly inorganic soil dominated by rushes or sedges. Commonly found indicative species are *Juncus artic./acutiflorus* and *J. effusus*. *Carex panicea*, *C. demissa*, *C. nigra*, *C. flacca* and *C. hostiana*; *Iris pseudacorus* frequently present, particularly in west. Found on wet, mineral soils. Does not include fertile grassland, with *Juncus effusus* and no wetland indicators.

Tall-herb wetland vegetation (A): 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 arvesis*, *Cirsium vulgare*, *Digitaria purpurea*, *Heracleum sphondylium*, *Triplospermum maritimum*, *Chamaerion angustifolium*).

Primary Qualifier: Lowland marshy grassland

This code can be used, it has been added to Surveyor because in Glastir there are a few specific options linked to lowland marshy grassland. It is defined as a range of plant communities dominated by *Molinia caerulea*, tall *Juncus* species, *Filipendula ulmaria* or *Iris pseudacorus*, and developed on mineral or peaty mineral soils or shallow peats. Impoverished examples of fen and bog vegetation may closely resemble marshy grassland but are separated by occurring on deep peat (greater than 0.5m); Marshy grassland is widespread in western and southern Wales, becoming rarer towards the east. It is most extensive in the uplands and around the upland fringes, becoming more fragmentary at low altitudes. In the lowlands, there are concentrations of the habitat in the south Wales coalfield, extending northwards through eastern Carmarthenshire to Ceredigion and Llŷn. Please use the priority habitat codes where you can and add this qualifier if it seems appropriate. NVC's M22, M23, M25, M24, M26, M27, M28

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

19 Broad Habitat 12: Bog

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural vegetation and Inland Physiography themes.

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 mapping 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 eg. *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.

Primary attribute(s)

Blanket Bog

Lowland raised bog

Broad Habitat Bog

Theme: Agriculture/Natural Vegetation

Primary attribute:

Other bog (A): 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* spp.

Theme: Inland Physiography

Primary attribute(s):

Peat hags (A): includes any bare or eroding peat which is not vegetated and should be qualified by a % cover attribute

Current peat workings (A): where peat has obviously been extracted in the current or previous season - should be qualified by a % cover attribute

Old peat workings (A): and may be qualified by a % cover attribute

Physiography cover: the following cover proportions should be used in conjunction with the primary attributes above and should relate to the percent of the area as seen from above: 95 - 100% peat, >50% peat, 10-50% peat.

Please use the proportion of bare peat if possible as it would be useful to have a measure of how much peat has eroded

Primary Qualifier: do not record or Null.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

20 Broad Habitat 13: Rivers And Streams

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Inland Water theme.

Theme: Inland Water

Primary attribute(s):

Canalised river (A): rivers which have been modified (eg sections straightened, banks smoothed), but which still follow the same basic direction as the natural watercourse.

River (A): defined as being more than 2.5m wide; a stream is less than 2.5m. (2.5 m would be a very brave leap).

21 Broad Habitat 14: Standing Open Waters and Canals

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Inland Water, Agriculture/Natural vegetation and Structures themes. Ponds occur in this BH and these will require detailed mapping in this survey.

Theme: Inland Water

Primary attribute(s):

Pond (A, P): –a body of standing water 25m² - 2 ha in area which usually holds water for at least 4 months of the year (this definition was used in the Lowland Pond Survey 1996 and may be difficult to apply in a one-off visit – particular attention should be paid to the type of vegetation associated with the feature). **Pond, sampled:** pond which will be sampled in this survey

Lake - natural (A, P): any inland water body bigger than a pond, should be mapped using this attribute.

Lake - artificial (A, P): usually distinguished by the presence of a dam or embankment.

Area of many small waterbodies

Canal (A): constructed where no watercourse existed previously.

Theme: Agriculture/Natural Vegetation

Primary attribute:

Aquatic macrophytes (A): aquatic vegetation where macrophytes persist as emergents within standing water. Species include *Typha* spp., *Ranunculus fluitans*, *Phragmites australis*.

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Theme: Structures

Primary attribute:

Gravel pit

Use:

Sporting/Recreational

Further Information on the identification and mapping of ponds

Overview

- During mapping - every pond in every square needs to be identified, and basic attributes need to be recorded for every pond. Data will be recorded on two forms (PC tablet) “Grid square inventory for ponds” and “Square inventory”. A screen shot of each is included at the end of this section.
- One pond in every square that contains ponds is then selected for a more detailed condition assessment, which consists of a survey of plants, macroinvertebrates, environmental characteristics and water chemistry carried out by the freshwater surveyors. This pond is named the “survey pond” (“Pond, sampled” in Surveyor).

- Once the mapping process is finished, you will use the PC tablet to select the survey pond based on the list of all ponds in the square collected during mapping. Full details of this process are given in the section entitled “Selecting one pond per square for condition survey”.

Identifying ponds

The pond definition to be used for GMEP is “*a body of standing water 25m² to 2ha in area which usually holds water for at least four months of the year*”. Note, this includes ponds below the Minimum Mappable Unit area.

In order to work out the size of a pond to see if it fits this definition you must correctly identify the outer boundary of the pond. This is defined as the ‘*upper level at which water stands in winter*’. This is likely to be a larger area than the current water area, because most ponds dry down to some extent in the summer months. The outer boundary can be identified from one or more characteristics. It is often best identified by a change in the distribution of wetland plants, particularly by a rapid transition to terrestrial species, often marked by a fringe of rushes. Where solid features such as trees, walls or pipes occur within the water area a “water mark” will usually be evident. In some cases, where willow trees are present, thick bundles of fine roots out of the water can indicate the depth to which the roots have been submerged. Sometimes a break of slope is present at the winter waterline. If the pond has an outflow this will determine the upper winter water level.

The pond definition is deliberately broad and includes temporary waterbodies which may be dry at the time of survey. It also includes ponds of man-made and natural origin. It includes a variety of water body types such as quarry pools, heathland ponds, moats, small ornamental lakes, oxbow ponds, peat pools, pingos and dune slack pools. In some cases it will be difficult to identify ponds, to define their outer limits or to distinguish them from other water body types. Some help with these is given below.

Identifying temporary ponds

Ponds which are dry at the time of survey may be difficult to identify. The Lowland Pond Survey carried out in summer 1996 found 41% of ponds were dry or nearly dry (based on data from 150 Countryside Survey squares in lowland Britain). Ponds that are dry or nearly dry at the time of survey can be identified from the following features:

- wetland vegetation present;
- bare mud / deposits of soft sediment (may show poaching by stock);
- strandline deposits;
- a basin in which water will accumulate in winter;
- an evident break of bank slope; and
- water marks on trees / walls etc.

If it is evident from these signs that a currently dry area is a temporary pond that “*usually holds water for four or more months of the year*” then record it as a pond.

The images below show examples of temporary ponds when they are dry and wet, note how difficult they can be to spot when dry.



Figure 20.1 Examples of ponds

Distinguishing ponds from other standing waters - identifying ponds in fen, marsh and other mires

In areas of fen and marsh, ponds may sometimes merge into the surrounding wetlands without an obvious boundary. In such cases it is sometimes still possible to identify a change from wetter to damp-ground vegetation. If the boundary is still difficult to locate, use a break of slope to define the pond and note this on the survey form.

Distinguishing ponds from other standing waters - identifying ponds in bogs

In some blanket bogs it may be difficult to distinguish a pond because it is linked to many other small interconnected pools.

The surveyor will need to decide where the pond boundary falls. Sometimes the decision will be fairly arbitrary. In this case, it is important to define the pond so it can be easily identified again in the next round of Axis II. It may help to use fixed features and define an area from that point (e.g. 30m x 30m area next to the corner of a boardwalk).

Identifying boundaries of connected ponds

Where waterbodies are connected by channels the surveyor will need to decide whether they are a single pond or multiple ponds. Factors to consider are the maximum winter water level, the width and depth of joining channels, and the similarity in type of the waterbodies. Waterbodies which would only be joined during occasional flood, or which are joined by small narrow channels should be considered as separate.

Distinguishing ditches from ponds

Where ditches contain standing water they may appear to fit the pond definition. A ditch can be defined as a man-made waterbody more than 20 times long than it is wide and these should not be recorded as ponds.

Distinguishing dammed streams from ponds

Where streams are dammed they should not be included as ponds if there is flow through them or if they are less than approximately 15 times the width of the stream.

Distinguishing flushes from ponds

Flushes tend to form on a slope and do not have a 'basin' form in which water will accumulate in winter.

Pond attributes to record

If the square contains one or more ponds, the **mapping surveyor** will need to complete the "Grid square inventory for ponds" form (PC tablet). See POND SURVEY MAPPING section for more details on how to do this.

22 Broad Habitat 15: Montane

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. In Wales this vegetation is only found above 750m.

Surveyors will need to select the Broad Habitat montane at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural Vegetation theme

Theme: Agriculture/Natural Vegetation

Primary attribute:

Sub-arctic (montane) (A): 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.

Primary Qualifier: do not record or Null.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

23 Broad Habitat 16: Inland Rock

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, limestone pavements, quarries and quarry waste. It also includes Calaminarian grassland. The Broad or Priority Habitats are selected at the polygon level. At the component level all attributes should be recorded under the Inland Physiography, Agriculture/natural vegetation and Structures themes.

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 labs) support plants of rocky habitats or are often unvegetated. In the absence of grazing, scrub may develop.

Inland rock outcrop and scree habitats (A) (will need to be recorded as primary attribute rock vegetation): 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 crispa* 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. The *Cryptogramma crispa* - *Deschampsia flexuosa* community (U21) is locally abundant on acidic screes in the mountains of north-west Wales, while the *Gymnocarpium robertianum* - *Arrhenatherum elatius* community (OV38) is restricted to highly calcareous substrates, in particular Carboniferous Limestone in both north and south Wales. 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; it is most frequent in Snowdonia, but fragmentary stands are also found in other parts of Wales. The *Oryopteris limbosperma* - *Blechnum spicant* community (U19) has been recorded sporadically in western Wales. 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: Calaminarian grasslands include 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.

Primary Attributes

Limestone pavement

Calaminarian grassland (should have been a primary attribute, in current version is primary qualifier) so will need to be recorded under Broad Habitat: *Inland rock*, primary attribute *rock vegetation*, primary qualifier *Calaminarian grassland*.

Rock vegetation (A): Saxicolous (on rock) and chasmophytic (in crevices), non-coastal vegetation cover less than 50% with residual cover being rock. Includes species such as *Cryptogamma crispa*, *Cystopteris fragilis* and *Asplenium trichomanes*. Not including vegetation with sub-arctic species (see montane, above). This attribute may need to be used in a mosaic (ie with another primary attribute).

Broad Habitat

Theme: Inland Physiography

Primary attribute(s):

Cliff >30m high (A, L): a vertical or near-vertical face of rock

Cliff 5-30m high (A, L):

Rock outcrop & cliff <5m (A, L, P): areas of bare rock should be included here together with a % cover category (12-14)

Area of rock outcrops

Scree (A): more or less unstable loose or shattered rock on slopes

Surface boulders (A, P): boulders are defined as >50 cms in any direction and should be mapped as an area with a % cover attribute (12-14)

Soil erosion (A, L, P): includes both human and natural erosion in any situation

Physiography cover: The following cover proportions should be used in conjunction with the primary attributes above and should relate to the percent of the area as seen from above (this excludes many cliffs, for example).

95 - 100% rock:

>50% rock:

10-50% rock:

Theme: Agriculture/Natural Vegetation

Primary Qualifier: do not record or Null

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Theme: Structures

Quarry/Mine (A, P)...:

Use:

Commercial

Industrial

24 Broad Habitat 17: Urban

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Structures, Recreation, Transport and Agriculture/Natural Vegetation themes.

Curtilage: A 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.

Theme: Structures

Primary attribute(s): (one from)

Agricultural Curtilage: area of ground associated with agricultural buildings

Allotments (A): community gardens, usually used for growing vegetables.

Amenity grass >1Ha: Should be recorded as Improved grassland.

Building (A, P): usually present on the map. Gardens/Grounds apply to curtilages associated with residential or other buildings. Gardens/Grounds may be mapped and attributed in groups if they are all alike.

Car park (A)

Embankment (A): to be used for any constructed embankment in any situation eg motorway, reservoir etc.

Garden Centre/Nursery (A)

Garden/grounds with trees (A): Gardens/Grounds with trees includes those curtilages or mapped group of curtilages, which have a cover of 10% or more.

Garden/grounds without trees (A)

Glasshouse (A): refers to commercial, large-scale enterprises, not greenhouses at the bottom of gardens.

Gravel pit

Hard standing/concreted/gravel area

Other land (A, L, P): for use in exceptional circumstances; try and use other primary attributes first. Always qualify.

Public open space (A): includes Parks, Ornamental Gardens and Accessible Common Land, especially near large conurbations.

Quarry/mine

Waste domestic

Waste industrial

Use: (these use codes will be attached to the above primary codes)

Agricultural: covers all buildings used for agricultural purposes including the farmhouse if occupied by a farmer or farm-worker.

Commercial: includes all buildings devoted to selling things, including shops, garages, hotels, pubs, commercial offices etc.

Educational/Cultural: includes schools, establishments of further education, museums, theatres and cinemas.

Industrial: those used for the manufacture of goods and include workshops, warehouses and associated buildings such as stores.

Institutional: includes all buildings belonging to forms of public or private institutions, such as old peoples homes, local government and central government buildings, MOD buildings, Crown land, Remand homes, Prisons and even Research Stations.

Public Service & facilities: Public Services and facilities are those buildings which are associated with services available to the public, such as Police Stations, Hospitals, Libraries and facilities associated

with electricity, gas and telephone.

Religious: confined to places of worship including Churches, Mosques and Synagogues, and their curtilages e.g. graveyards, cemeteries etc.

Residential: covers all domestic living area (except farm houses, see agricultural, above).

Sporting/Recreational:

Theme: Recreation (these are generally areas deliberately set aside for recreational purposes)

Angling (A, P): any signs of angling eg notices, platforms etc.

Boat - inland water (A, P): any evidence that a boat is used on a piece of water, e.g. boathouse, moorings etc.

Boating area (A, P)

Camp site (A)

Golf course (A)

Horsiculture (A, P): any signs of horses used for recreational purposes eg jumps, schooling rings etc

Launch site (A, P)

Other designated area (A, L, P)

Other playing fields (A)

Other recreation (A, L, P)

Race track (A)

Static caravan(s) (A, P)

School playing fields (A)

Tennis courts (A, P)

Touring caravan park (A)

Theme: Transport

Constructed track (A, L) : includes any track which has been manufactured using stone or hard material

Railway track/land (A, L): to include tracks, yards, sidings and their associated curtilages (e.g. banks and 'verges').

Road (tarmac) (A, L): includes any road, whether private or not, which is totally tarmac across its width.

Unconstructed track (A, L): those tracks which are not defined as above ie no construction has been involved along their length.

Road Verge A: this refers to the width of the verge across the ground surface and should be recorded in the following categories: No verge, Verge <1m, Verge 1-5m, Verge >5m.

Road Verge B: as above.

Theme: Agriculture/Natural Vegetation

This type of vegetation can also be assigned to the Urban BH.

Annual/early successional with open ground (A): 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. Unsown setaside will usually key out here. Indicators include *Poa annua*, *Plantago major*, *Agrostis stolonifera*, *Polygonum aviculare*, *Dactylis glomerata*, *Taraxacum* agg. *Stellaria media*. Excludes weed assemblages with managed crops present.

25 Broad Habitat 18: Supra-Littoral Rock

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 maritum*, *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. At the component level all attributes should be recorded under the Agriculture/Natural Vegetation and Coastal features themes.

Priority Habitat

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 eg *Plantago maritima*, *Plantago coronopus*, *Armeria maritima* and *Tripleurospermum maritum*.

Broad Habitat Supra-littoral rock

Theme: Agriculture/Natural Vegetation

Primary attribute:

Maritime vegetation

Theme: Coastal features (coastal features should only be mapped above Mean High Water Mark).

Primary attribute:

Cliff > 30m high (A, L)

Cliff 5-30m high (A, L)

Rock outcrop & cliff <5m (A, L, P): to be used when the rock is outcropping base rock, as opposed to

Rocky/Boulder shore (A, L): used when the shore is of shattered rocks or boulders >10cm diam (ie grapefruit-size)

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

26 Broad Habitat 19: Supra-Littoral Sediment

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural Vegetation and Coastal features themes.

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*.

Theme: Agriculture/Natural Vegetation

Primary attribute:

Sand dune (vegetated)

Strandline

Theme: Coastal features

Primary attribute:

Pebble/Gravel shore (A, L):

Sandy shore (or un-vegetated dune) (A):

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

27 Broad Habitat 21: Littoral Sediment

The Broad Habitat is selected at the polygon level. At the component level all attributes should be recorded under the Agriculture/Natural Vegetation and Coastal features themes.

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

Theme: Agriculture/Natural Vegetation

Primary attribute:

Saltmarsh

Broad habitat

Theme: Coastal features

Primary attribute:

Bare mud (A)

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

28 Broad Habitat 22: Sea

The Broad Habitat Sea is selected at the polygon level. At the component level the primary attribute Sea should be recorded under the Coastal features themes.

Theme: Coastal features

Primary attribute:

Sea (A): this may seem obvious but is helpful in estuarine and coastal marsh situations - always record.

29 Broad Habitat: Mosaic

If it is impossible to delimit an area of Broad and Priority Habitat because the habitats are spatially indistinguishable or within a wider area patches are smaller than the MMU then the polygon may be described as a mosaic. **Please use the mosaic code carefully, if you can, record component features rather than mosaics.** You will need to include the Broad/Priority Habitat description at the component level and against each primary code you will be asked to assign a percentage cover of the habitat. **The percentages for these must add up to 100%.**

Example

A mosaic of Bog and Dwarf Shrub Heath in an upland area would be assigned Mosaic at the polygon level with at least two components.

Component 1

Theme: Agriculture/Natural Vegetation

Primary attribute:

Other Bog

% area: 30%

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Component 2

Theme: Agriculture/Natural Vegetation

Primary attribute:

Dwarf shrub heath

% area: 70%

Primary Qualifier: do not record.

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Species Cover: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

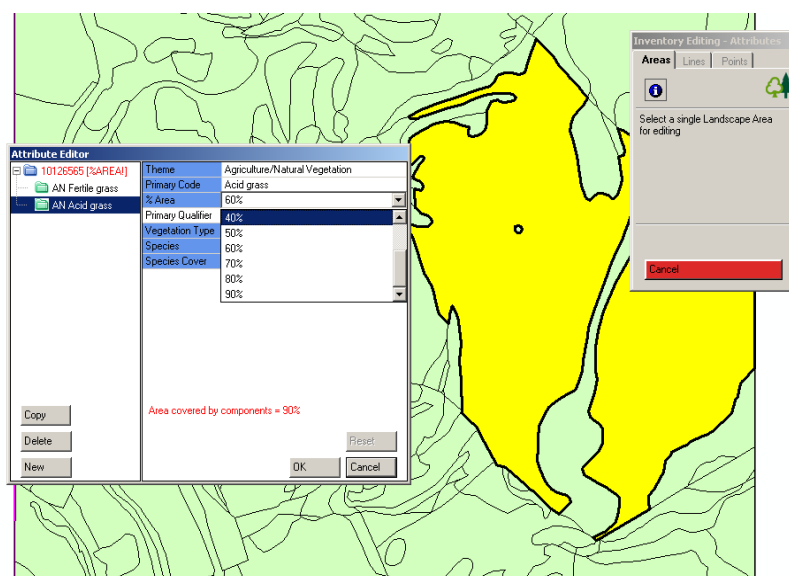


Figure 28.1 recording a mosaic

30 Non-Specific Primary Attributes

All of the following can be recorded under a range of Broad/Priority Habitats;

Theme: Inland Physiography

Bare ground/disturbance/bare soil

For the following primary attributes the species composition of the field layer beneath the scattered trees or shrubs determines the Broad/Priority Habitat.

Physiography cover: The following cover proportions should be used in conjunction with the primary attribute above.

95 - 100% bare ground:

>50% bare ground:

10-50% bare ground:

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.

Theme: Inland Water

Signs of drainage

31 Freshwater Survey Mapping

Location of pond and stream sites: instructions

1. An approximate location for the stream site in a square has been provided by the FW team and is included in the square survey packs distributed by Anthea Owen. Not all squares will have streams-if there is no PDF then assume the square has no stream (although if you have queries about this then contact the Freshwater team).
2. Surveyors must go to this location (which is approximate within a few metres) and put their P plots and S plots in place and take a GPS reading the grid reference format should be 10 figure alphanumeric e.g. ST1234567890
3. It is very important that this GPS reading is communicated to the FW team and Anthea Owen as soon as possible– the FW surveys will be centred on this exact location. It could be texted and in addition should be entered onto an FW sheet in the square pack and returned when possible.
4. Surveyors are responsible for selecting the survey pond and mapping it
5. The GPS reading for the pond must be communicated to the FW team and Anthea Owen as above by text and entered onto the FW sheet.
6. note that not all squares will have ponds. If the square has no pond that can be sampled, this needs to be reported to the FW team and Anthea Owen.
7. squares are considered incomplete until FW team has received the locations of the stream and pond if applicable, or confirmation that there is no pond, Anthea Owen will doublecheck that this has taken place
8. this info should be communicated promptly so as not to delay the FW team
9. the team leader is ultimately responsible for ensuring that this info is provided promptly and accurately

32 Historic Features

There are two classes of Historic Environment Assets (HEA's) that will be recorded as part of the survey work:

Scheduled Ancient Monuments (SAM's) – nationally important with statutory protection (The Ancient Monuments and Archaeological Areas Acts, 1979, legislation similar to SSSI legislation). SAM's will be identified by **SAM No.** SAM's are also covered by Cross-Compliance.

Historic Environment Features (HEF's) – regionally important but no statutory protection. HEF's will be identified by **PRN** (Primary Record number). HEF's are protected from damage under the Glastir regulations.

Recording of both classes of HEA's should be undertaken in the same format.

HEA Site Recording

The surveyor will be provided with a Fieldnote paper form to complete. This will be provided by the relevant Welsh Archaeological Trust (WAT).

NB – if you have any queries please contact the named contact at the head of the fieldnote on the phone number provided.

All HEA's will have a defined polygon area that will appear as a layer in the table of contents in ArcGIS. Surveyors should use the information button (i) to find the unique identifier (Sam No or PRN) which should be used on the accompanying form.

There are approximately 1400 different HEA site types – the relevant site type(s) (eg Hut Circle, Hillfort, Cairn etc) will be provided to you as an accompanying paper document for each HEA that you survey, along with some basic information to aid your field recording.

Photographs

Photographs are an invaluable record of condition. General shots of the site are needed along with detailed shots showing any specific condition issues that have been identified (eg areas of erosion, bracken infestation etc)

Naming of photographs – suggest:

SAM No./PRN_date_brief desc

E.g.: MG273_20130422_erosion SW side, looking NE

Information provided to the Surveyor (front page)

Brief Description: a brief description of the site will be provided – number of features and type – eg small building 7x4m

Mangt Issues: an assessment by the WATs of likely issues that may be encountered on the site – eg heavily overgrown, possible root damage and erosion issues

Survival of remains: the type of feature (eg earthwork remains) along with likely survival – eg low earthwork banks, with ruined walls

Recording Advice: basic advice from WATs as to what should be – e.g. vegetation mapping, photographs, general walkover to identify issues

Map Extract: a map extract identifying the feature(s) along with an AP will also be provided (page 2)

Information to be recorded by the Surveyor

Threat Identification Table (page 78)

A list of issues encountered on archaeological sites, along with boxes to record the severity and extent of the 'threat'.

Extent: record as you would for vegetation mapping – i.e. we need to know how extensive the issue is as an approximation of the percentage of the site that is affected by this issue. **Record as localised (1-15%), moderate (15-60%) or extensive (60%+)**

Severity:

Severity score – record on a scale of 1 – 6 regarding the severity of the threat:

1 = not a threat to the site 6 = very severe threat,

1. The threat has occurred in the past but the affected area has fully recovered without intervention – e.g. evidence of stock erosion that has grassed over/self-repaired/regenerated and is no longer active
2. There has been active deterioration but it is very localised and/or showing signs of self-repair, e.g. minor stock scars where the erosion face is exposed but showing signs that the vegetation cover is regenerating.
3. The threat is active but localised and unlikely to deteriorate further. The 'threat area' is defined/contained, essentially stable and not likely to worsen e.g. minor wear along line of footpath, seasonal animal erosion – eg lambs within field, poaching around a feeder or gate.
4. The threat is active and likely to deteriorate further, e.g. invasive vegetation that is spreading; vertical erosion of earthworks with exposed soil faces; ploughing; heavily used animal track ways, surface downcutting due to vehicle routes.
5. The threat is active and has partially damaged some of the site and the condition will continue to deteriorate unless there is active intervention e.g. collapsing lintels or corner stones of buildings; large trees growing from masonry; earthworks which require in-filling to repair extensive areas of active erosion.
6. The threat has destroyed this part of the site - Virtually all archaeological features / potential for archaeological remains obliterated, e.g. demolition of a building; cuttings through earthwork remains, deep ploughing of an earthwork, cliff collapse.

Threat Identification Table

Key to Table:

Extent	Record – L, M, E	Localised = 1% – 15%, Moderate = 15% – 60%, Extensive = 60% – 100%
Severity (Sev)	Score 1 – 6	See note below

Threat Type	L,M,E	Sev	Threat Type	L,M,E	Sev
Stock:			Other:		
Erosion			Rubbish/flytipping		
Poaching			Footpath wear		
Stock wear			Vandalism		
Stock path wear - surface			Metal detecting		
Stock path wear – bare ground			Stone removal		
Stock path wear – eroded areas			Coastal erosion		
Burrowing animals – rabbits			Water channel erosion		
Burrowing animals – moles			Natural decay		
Burrowing animals – badgers			Quarrying		
			Development		
Agricultural Operations:			Utility poles		
Tyre tracks – surface					
Tyre tracks – rutting			Vegetation:		
Dumping – FYM, agric machinery, agric waste/rubbish etc			Bracken		N/A
Ploughing			Gorse		N/A
Ploughing - deep			Bramble		N/A
Pasture improvement			rushes		N/A
Farm track			Scrub Broadleaf		N/A
Drainage			Scrub Conifer		N/A
Agricultural buildings			Scrub Mixed		N/A
Building deterioration			Windblown tree(s)		
Building upgrades			Dead tree(s)		
Stone clearance			Dying tree(s)		
			Windthrow hazard		
			Afforestation - broadleaf		N/A
			Afforestation – conifer		N/A
			Afforestation - mixed		N/A

Additional Notes: this is a free text box for the surveyor to record any additional information that they think is relevant but is not covered in the threat identification table. Think in particular about the survival and stability of the remains and site as a whole.

Condition Recording

This is an assessment of the overall condition of the site. There may be individual threats you have identified as severe but they may be very localised and not adversely impacting upon the overall condition of the site.

Use the following classifications:

- **Excellent Condition**
- **Sound with long standing defects**
- **Sound with minor defects**
- **Signs of potential deterioration**
- **Major signs of deterioration**
- **Damaged**

The following provides guidance as to how to identify the relevant condition:

Excellent Condition – stable grass sward (no over or under grazing), no invasive species (bracken, bramble, gorse etc) or tree/scrub growth, no evidence of erosion or poaching, no fencing or feeders

Sound with long standing defects – generally good no erosion or scrub – long standing issues – would be mature tree cover or pre-existing fence, established trackway through the site etc

Sound with minor defects – generally good condition – minor defects would be – localised poaching, surface trample – along stock or footpath routes, small amounts of invasive vegetation/scrub, minor wear around base of standing stones, minor vehicle tracking (not rutting), molehills, small amount of rubbish

Signs of potential deterioration – larger areas of trample poaching that may well be persistent (ie not seasonally repairing), smaller active erosion scrapes particularly on earthwork banks (active scars are where there does not appear to be any self-repairing taking place), tyre tracks (particularly on slopes) that have developed into established ruts, larger areas of established invasive vegetation and scrub, satellite badger setts, localised rabbit burrowing, dumping/flytipping

Major signs of deterioration – large active badger setts, large rabbit warrens, vehicle ruts along slopes that have developed into water/run-off channels, large areas of active/persistent erosion (includes active and self-repairing areas), extensive bracken, bramble and gorse cover, extensive/established scrub/tree regen, ploughing encroachment, cultivation

Damaged – obvious recent damage – will tend to be as a result of human actions – excavation with a machine, quarrying, development over the site, stone robbing, over enthusiastic ditch clearance, ploughing etc

General Guidance

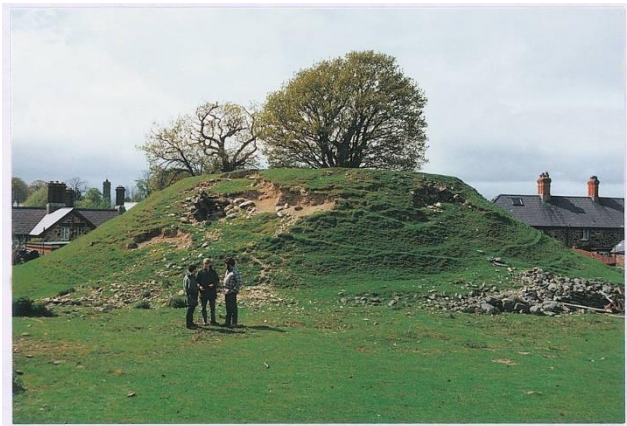
Many of the condition issues that you are likely to encounter are illustrated in the picture below



The picture above illustrates:

Afforestation, Ploughing, Poaching, Inappropriate location of feeders, Tyre tracking/rutting, Stock scrapes/erosion, Invasive vegetation, Stock path wear, Footpath wear

Photographic Examples



Active and extensive erosion



Windblow damage – resulting in the rootplate destroying archaeological deposits



Multiple issues – tree root damage (long standing) plus badger damage & stock wear



Fence through monument (long standing) & feeder too close resulting in wear and poaching



Ploughing encroachment – too close to monument



Damage to lime kiln due to vegetation growth – root system forcing out stonework – long standing issue but damage is active and ongoing



Stock erosion
(persistent – although evidence of self-repair,
problem is clearly longstanding and ongoing)



Vehicle Damage

Vehicle damage – Once ruts develop they may then act as a channel for rainfall run-off resulting in significant downcutting of the channel – see below



Background

Site Types

There are some 1400 different site type classifications ranging from small discrete readily identifiable features such as standing stones through to complex and extensive multi-period settlement sites and industrial complexes.

Site type information will be provided to aid in identification. However, the photographs below illustrate some of the site/monument types that will be encountered



Standing Stone



Cairn



Hut circle



Hut Circle



Neolithic Chambered Tomb



Large well-preserved upland Hillfort



Motte



Mine Complex



Dyke Section



Pillbox



Settlement and field systems can be extensive and cover a number of hectares

Traditional perceptions of a monument may not accord with what is found on the ground particularly in upland Wales.

Upland monuments in particular are not always readily identifiable. The photograph below shows a hut circle – lower right hand side of photo



Above ground preservation of a monument will also depend on landuse – see below the difference on the same monument between improved and unimproved land



Some sites are extremely important but only actually visible from the air – illustrated by this roman villa complex below, where the ground plan is clearly evident but it is a site for which there is no above ground evidence



33 Point Attributes

When mapping repeat squares change should be recorded as for area features as real or error change.

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

Trees/scrub should 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.

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.

Note on Buffer zones

Many landowners are being paid to 'buffer' the point features that you will be recording, i.e. protect them from the management of the adjacent field. Record Yes (for buffer present)/No against 'buffer zones' for each of these features.

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 20 m 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

Buffer zone: Yes/no

Habitat boxes: Bird, Bats, Birds and Bats, none

Signs of disease: Chalara (Ash dieback), Sudden Oak death, Phytophthora, Dutch Elm disease, none. We are piloting the capture of information on tree diseases and would welcome notes/suggestions from surveyors on the best way to capture information.

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 2** 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
Buffer zone	Yes/No
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
Ivy cover	<30% or >30%
% canopy live	(<25%, 25-49%, 50-89%, 90-100%)
Tree dead	Yes/No
Missing limbs	Yes/No
Dead wood attached	Yes/No
Dead, loose, missing bark	Yes/No
Tears, scars, lightening strikes	Yes/No
Hollow trunk or major rot sites	Yes/No

Theme: Inland Water

Of the inland water features to be recorded, ponds are the most difficult to define and the most important in this survey. Hence there is a detailed protocol regarding pond mapping included above.

Primary attribute:

Lake – Natural (A, P) : any inland water body bigger than a pond, should be mapped using this code

Lake – Artificial (A, P): usually distinguished by the presence of a dam or embankment

Pond (A, P): – a body of standing water 25m² - 2 ha in area which usually holds water for at least 4 months of the year (this definition was used in the Lowland Pond Survey 1996 and may be difficult to apply in a one-off visit – particular attention should be paid to the type of vegetation associated with the feature).

Pond, sampled: pond which will be sampled in this survey. This needs to be done to inform the freshwater survey team.

Spring (P): usually marked on the map but implies a continual supply of water at ground surface.

Well (A, L, P)

Gorge (L, P)

Waterfall

Buffer zone: Yes/no

Theme: Inland Physiography

Primary attribute:

Rock outcrop & cliff <5m (A, L, P): areas of bare rock should be included here together with a % cover category (12-14)

Soil erosion (A, L, P): includes both human and natural erosion in any situation

Surface boulders (A, P): boulders are defined as >50 cms in any direction and should be mapped as an area with a % cover attribute (12-14)

Theme: Structures

Primary attribute:

Building (A, P): usually present on the map. Gardens/Grounds apply to curtilages associated with residential or other buildings. Gardens/Grounds may be mapped and attributed in groups if they are all alike.

Gravel pit

Other land

Quarry/Mine (A, P)

Waste domestic

Waste- industrial

Use:

Agricultural

Commercial

Educational/Cultural

Industrial

Institutional

Public Service and Facilities

Religious

Residential

Sporting/Recreational

Theme: Coastal features

Rock outcrop & cliff <5m (A, L, P): areas of bare rock should be included here together with

a % cover category (12-14)

Theme: Recreation

Angling (A, P): any signs of angling e.g. notices, platforms etc.

Boat - inland water (A, P): any evidence that a boat is used on a piece of water, e.g. boathouse, moorings etc.

Boating area (A, P)

Horsiculture (A, P): any signs of horses used for recreational purposes e.g. jumps

Launch site (A, P)

Other designated area (A, L, P)

Other recreation (A, L, P)

Static caravan(s) (A, P)

Tennis courts (A, P)

Theme: Forestry Features

Fenced (single trees)

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.

34 Linear Features - Event Attributes

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

When mapping change on repeat squares the same rules apply as to area features i.e. need to map whether it is real change or error change.

Note on Margins

The margins will be additional to the cross compliance margin which is a 1m margin measured from the edge of the following boundary types; hedges, walls, stone-faced banks, earthbanks, slate fences and watercourses that all landowners receiving the Single Farm Payment are required to retain at field boundaries (in fields >2ha). Margin types are described in the Mapping areas section. The most popular margin options are likely to be 6m in width and these may be additive, i.e. one type of 6m margin immediately adjacent to another type.

Theme: Agriculture/Natural Vegetation

Primary attribute:

Perennial vegetation, tall herb/grass

Vegetation type: Bryophytes, Forbs, Grasses, Monocots (other), Sedges, Trees, Woody.

Species: BRC list according to selected vegetation type.

Proportion: This should be recorded in the following categories: <10%, 10-25%, 25-50%, 50-75%, 75-95%, 95-100%.

Theme: Bank

Primary attribute:

Stone bank (L)

Earth bank (L)

Stone and earth bank (L)

Height	<1m, 1-2m, >2m-3m, >3m
Margin Left	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
Margin Right	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m

Theme: Grass strip (L): to be used where a grass strip separates two fields with no vertical boundary.

Primary attribute: Grass strip

Width	<1m, 1-5m
Margin Left	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
Margin Right	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m

Theme: Coastal features

Primary attribute:

Cliff 5-30m high (A, L, P)

Pebble/gravel shore (A, L)

Rock outcrop and cliff <5m (A, L, P)

Rocky/boulder shore (A, L)

No attributes are recorded with these features.

Theme: Fence**Primary attribute:**

Wood only (L)

Iron only (L)

Wire on posts (L)

Other fence(L)

Height	<1m, 1-2m, 2m-3m, >3m , 3-4m, 4-6m, >6m
Condition	A - Excellent condition, B - Sound with minor defects, C - Major signs of advancing or potential deterioration, D - In early stages of dereliction, E - Derelict, F – Remnants*
Margin Left	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
Margin Right	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m

Theme: Forestry**Primary attribute:**

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

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.

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

Ride/Firebreak (L)

Modal DBH - diameter at breast height (DBH) for most trees along the length of the feature.	<3cm, 3-20cm, 21-50cm, 50cm-75cm, >75cm ,1-2m, >2m
Staked trees - to be used for individual trees within the features	Yes or No
Tree protectors - light weight plastic tubes around 1m high to protect newly planted trees	Yes or No
Margin Left	not present, <2m, 2m-<4m, 4m-<6m, 6m-<12m, 12m-20m
Margin Right	not present, <2m, 2m-<4m, 4m-<6m, 6m-<12m, 12m-20m
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: Inland Physiography**Primary attribute:**

Cliff >30m high (A, L)

Cliff 5-30m high (A, L)

Rock outcrop and cliff >5m (A, L, P)

Soil erosion (A, L, P)

No attributes are recorded with these features.

Theme: Inland Water

Primary attribute:

Canal (A) – was previously recorded as a line, make sure to record as area only in this survey

Canalised river (A) – was previously recorded as a line, make sure to record as area only in this survey

Gorge (L, P)

Levee (A, L)

Other ditch (L): Linear excavations for the purpose of drainage – should be recorded even if dry at the time of the survey.

Other ditch, sampled

River (A) – was previously recorded as a line, make sure to record as area only in this survey

River, sampled (A) – was previously recorded as a line, make sure to record as area only in this survey

Roadside ditch (L): See other ditch, but beside a road

Roadside ditch, sampled

Stream (L): Defined as being <2.5m wide

Stream, sampled

Margin Left: as above

Margin Right: as above

Theme: Structures

Primary attribute:

Other land (A, L, P)

No attributes are recorded with this feature.

Theme: Transport

Primary attribute:

Footpath (exclusive): includes fenced or walled paths

Footpath (other)

Constructed track (L): includes any track which has been manufactured using stone or hard material

Unconstructed track (A, L): those tracks which are not defined as above ie no construction has been involved along their length.

Verge left: this refers to the width of the verge across the ground surface and should be recorded in the following categories: No verge, Verge <1m, Verge 1-5m, Verge >5m.

Verge right: as above.

Theme: Wall

Primary attribute:

Dry-stone (L)

Mortared (L): includes dry-stone walls which have been capped with mortared stone.

Other (L)

Height	<1m, 1-2m, >2m-3m, >3m
Condition	A - Excellent condition, B - Sound with minor defects, C - Major signs of advancing or potential deterioration, D - In early stages of dereliction, E - Derelict, F – Remnants*
Margin Right	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m

Margin Left	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
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*(after ADAS report to Countryside Commission) – see Figure 37.1 Condition of dry stone walls
(adapted from Countryside Commission leaflet CCP 482)

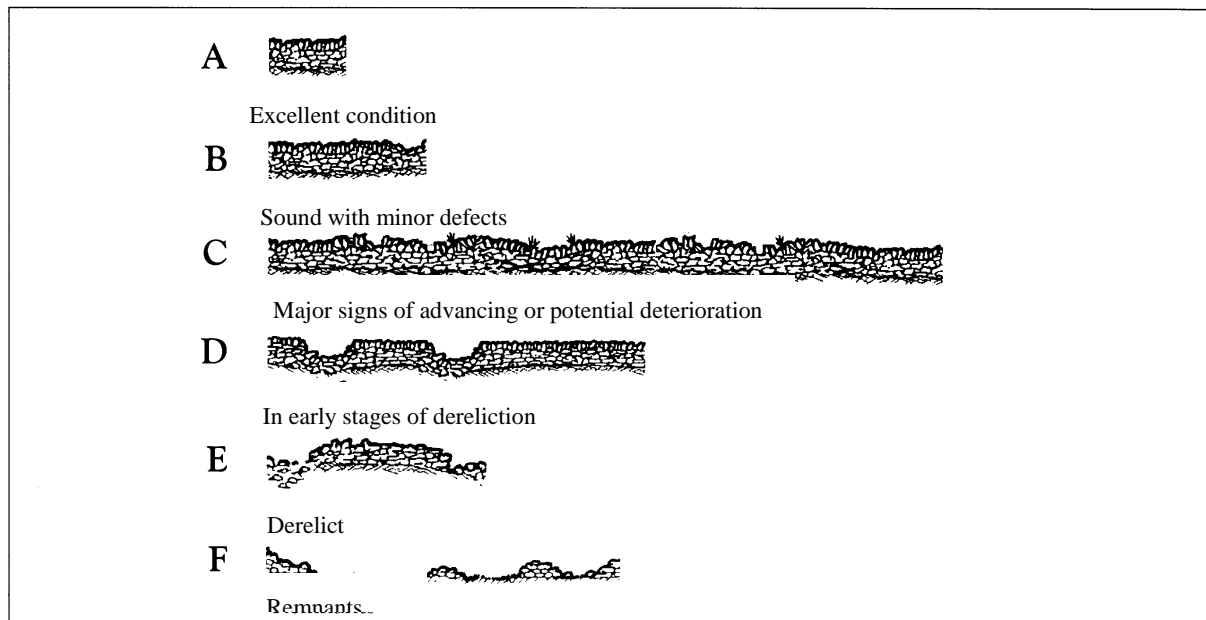


Figure. 34.1 Wall condition descriptors

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 20m or over exist in these features they should be mapped either in individual sections of minimum length 20m (including gaps <20m) or as individual trees/scrub, as appropriate. Where woody linear features are greater than 5m 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 >5m 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 (field as it appears in Surveyor is recorded in brackets):

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
Modal DBH - diameter at breast height (DBH) for most trees along the length of the feature.	<3cm, 3-20cm, 21-50cm, 50cm-75cm, >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)
Staked trees - to be used for individual trees within the features	Yes or No
Tree protectors - light weight plastic tubes around 1m high to protect newly planted trees	Yes or No
Margin Left	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
Margin Right	not present, <2m, 2m-4m, 4m-6m, 6m-12m, 12m-20m
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 of recent management - 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%
Margin Left	not present, <2m, 2m-<4m, 4m-<6m, 6m-

	<12m, 12m-20m
Margin Right	not present, <2m, 2m-<4m, 4m-<6m, 6m-<12m, 12m-20m
Staked trees - to be used for individual trees within the features	Yes or No
Tree protectors - light weight plastic tubes around 1m high to protect newly planted trees	Yes or No

* N.B. If >2m 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 below) would also be recorded as part of this linear feature.
6. (Feature on right of road) **WLF unnatural shape & WLF natural shape.**
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)

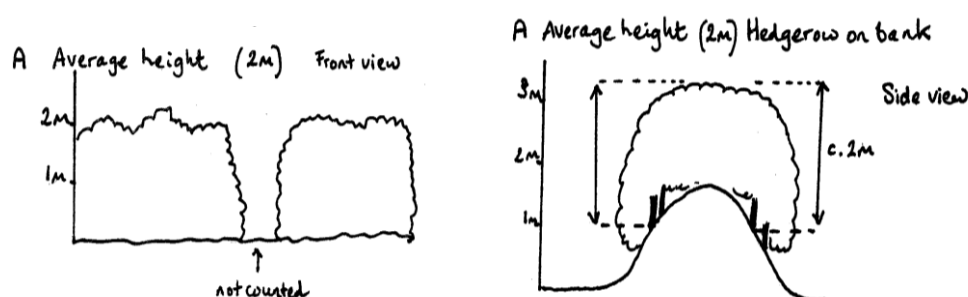


Figure. 34.2 Illustrations to help in the assessment of modal height (referred to here as average) in different circumstances N.B Modal differs from average as described above (i.e. it is NOT the heights of different features added together and then divided by the number of features).

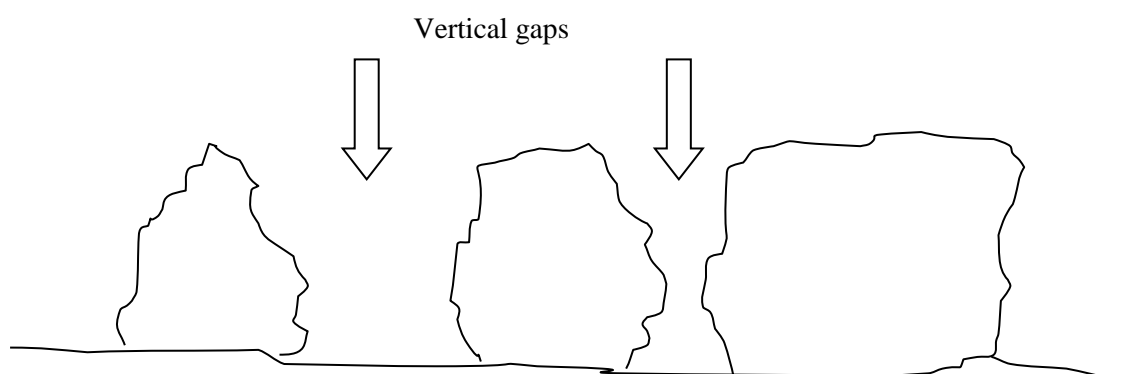


Figure. 34.3. Illustration of what is meant by vertical gappiness in WLFs.

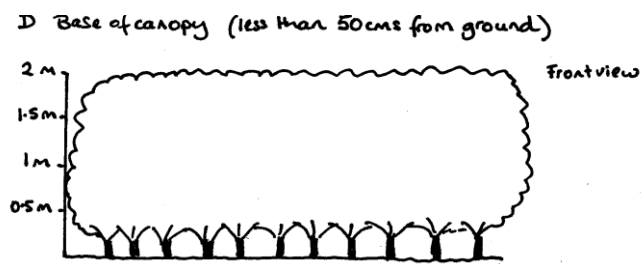


Figure. 34.4. Illustration showing Height of base of canopy (Base height)

Appendix 1: Mapping notes

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 i.e. it's all semi-improved grass and it's very tempting to put a polygon in straight away. What you may find though is that as livestock tend to congregate around gates that is not representative of the larger field, or conditions change it becomes wetter or there's a pond or a bit of Fen etc. 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.

Once the full map schema is in place you will have a semi-transparent habitats layer and a hatched visit status layer as well as the aerial photos and Mastermap meaning things can be obscured. A patch of scrub or lone tree that was obvious on the aerial photo before can now be easily overlooked, or if you look down and see a block of colour it is easy to believe you have completed the field when you have forgotten about the boundaries or more likely boundary trees. 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 most grass and heathlands it will either be grazed by livestock or cut for hay or silage these are all found under the agricultural/natural vegetation use feature option. 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 vertexes are set to snap to points, ends, other vertexes and edges. Having a line snap to the end of another line to one of the vertexes of a polygon or the edge of a polygon is all very handy, having it snap to a point feature isn't. Therefore it's probably best to turn

off points, to do this open the snapping toolbar and deselect the first icon from the left which should be labelled as snap to points.

Linear theory

The map must be at a scale of 1:5000 or less before you can edit lines - if you are not at this scale the cursor will default to the zoom in tool instead forcing you to zoom in. Once you have zoomed the cursor will revert to the appropriate editing tool and will allow you to proceed.

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 try 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.

Lines can only be added one at a time - however if lines intersect multiple events can be created at one time.

Lines must be 5.0m long minimum - if you try to draw something shorter the software will not create it, but as a linear feature should not be mapped unless it is 20m long there is only a few circumstances this should occur. Firstly if the linear is over 20m long but less than 5m of it lies within the square, in this circumstance you simply do not map the feature on the grounds of it being too small. Secondly and more commonly, intersecting lines. If lines intersect, the software will split them into different sections, it may be that one of those sections is less than 5m long, especially if you overshoot where you intended the lines to intersect. If the less than 5m section is part of your new linear the software will simply not create that part of the line, effectively trimming the line to fit. If the less than 5m section is part of a pre-existing line the new line will not be drawn and you will receive an error message.

A line cannot cross over itself - obviously you can have intersecting lines but you must draw them separately.

When a line crosses another line, all of the lines are automatically split at the intersect point - not strictly true, all events will be automatically split but two of the lines will be joined together. This is because all lines have a start and an end following the direction you drew them, the start and the end points you drew will be maintained with the intersect point becoming and start for some lines and an end for others. The important fact is to do with the events being split as what you regard as a single event will become two events or more.

Every new line is created with a single Unsurveyed/Missing data event which runs over the entire length of the line - this event is retained if you copy attributes from another line in which case this event should be changed to a deleted feature and then deleted.

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. To find which end is which either use the SET option to adjust feature length or MODIFY where the start will be green and the end red

Adjusting lines

If you drew a line and it doesn't go exactly where you intended you have several options for adjusting it depending on what you want to do.

Too long. If your line is too long the easiest way to deal with it is to **CUT** off the excess, you can copy through from another layer such as Mastermap or landscape areas to help you.

Too short. If your line is too short then the obvious thing to do is to use **MODIFY** to drag the start or end point where you want it. **NB** this will only extend your line NOT any events you have added along it you will have to extend them by editing their attributes separately. Linears often appear to be a law unto themselves and appear to be completely unpredictable. Sometimes it seems, if your line ends within 15m of where another line ends **MODIFY** simply will not work, you do however have options but it does depend on whether you want to move the ends of both lines, just one and whether you want the two lines to join or remain separate. If you want to adjust one line, the simplest (although perhaps the least obvious) is just to draw another **NEW** line joining the end of your old line to where you now want it to go. As long as the new line is over 5m long and you draw it in the same direction as your existing line they will join together into one.

The more complicated way is to first shorten the line, using **CUT**, so the gap is greater than 15m and then use **MODIFY** to drag the end where you want it, in both cases remember to extend your events.

If you want to adjust both lines but keep them separate, the shorten (**CUT**) then **MODIFY** technique is probably your only option, you will only need to shorten one line but obviously **MODIFY** both. This is also probably the best option if you want to adjust two lines and join them together, you could try to draw a **NEW** line between them but they will not join together properly if you drew them in different directions, meaning you could have a single feature represented by two different events on two different lines.

Wrong place. If your line doesn't go exactly where you want you can use **MODIFY** or **RESHAPE**. Reshape may be the easier to use, although not the most obvious, and is the only option under linears that allows you to copy through from another layer however it cannot be used to adjust the ends of a line just the middle section. To adjust the ends you must use **MODIFY** or draw a **NEW** line adjoining the old ensuring they both run in the same direction.

Visit status

You will have noticed by now 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 they 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. When the map schema is fully implemented there will be additional layers that will change colour or pattern to indicate the current status, large features will be easy to see but small features within the map will be difficult or impossible to see. Luckily the software itself can be used to search and find features by their VISIT STATUS.

There are three different ways to do this each with its own advantages and disadvantages. You need to select the LAYER you wish to search (Landscape Points, Landscape Events or Landscape Areas), the FIELD you wish to search (VISIT STATUS) and the criteria to search for. The criteria is the only complicated bit, because we are using drop down lists rather than text entry you have to enter the number of the option you are looking for rather than typing in the term you are looking for. We have four options to choose from;

0 = unsurveyed,

1 = IN PROGRESS

2 = COMPLETED

3 = REFUSED ACCESS

and generally what you will be doing is searching for unsurveyed and IN PROGRESS features as these will be the ones you need to finish and change.

Perhaps the easiest option is to use the FIND command (binocular symbol), click on the symbol select the relevant layer and field and then type either 0 or 1 into the search box. Find cannot search for two criteria and none of the option can search more than one layer at a time. If you have any feature that match that criteria it will appear in a list at the bottom. If you click on the feature in the list it will “flash” on the map so you can see where it is. If you didn’t see where it was or it was obscured by the find window, just click again to make it flash again, maybe panning the map or moving the Find window out of the way. If it is a very small feature or in a very congested area it will still be very difficult to see, but if you right-click on the feature in the list “Zoom to feature” comes up as an option which will do exactly what it says.

You can keep the Find window open while in an edit session and when you change the VISIT STATUS it should disappear from the list. Once the list is blank you can change the Layer or VISIT STATUS you are searching and go through it again.

The option listed in the manual under Linears page 124 is to use the SELECT BY ATTRIBUTE feature. This works largely in the same way, has the advantage of highlighting all the areas on the map at once and allowing you to search for both 0 (unsurveyed) and 1 (in progress) at the same time but will not produce a list of features so you have to rely on your eyesight to find them. It’s a bit more complicated to use because you can search for multiple things at once and have complex search terms, but the principle is the same, choose layer, choose field choose criteria. The layer is selected in the drop-down at the top and then scroll down the list of fields until you reach VISIT STATUS, double click it to add it to the search box at the bottom, double click “=” and then type in 0, double click OR then VISIT STATUS and = again and then

type 1. So what you should have in the box at the bottom is
OR VISIT_STATUS = 1

VISIT_STATUS = 0

Then click APPLY and any unsurveyed or in progress feature will appear outlined in bright blue and the search by attributes box will remain open allowing you to just change the layer and not have to re-enter the search criteria. If you click OK instead of Apply the features will be highlighted but the box will close and you may have to re-enter the search terms. If you want to be really clever the search terms can be saved and then reloaded, which is handy if you plan on surveying different parts of the square on different days, especially if it is divided by rivers or roads etc but with practice it becomes very quick to enter.

If bringing up the keyboard each time to type numbers is too fiddly click the box labeled use unique values and that will bring up 0,1,2,3 in the box on the right and you can double-click to add them to the search criteria instead.

To remove the blue highlights click on the clear selection icon next to the select by attributes icon or found under the selection tab at the top.

The final option is to use the ATTRIBUTE TABLE, which is rather as it sounds a table of all features to which you can apply a selection and then work through one at a time. To bring up the Attributes table right-click on the appropriate layer in the list on the left. The search criteria will be along the top and is used in a similar way to the find command but make sure you click on the SHOW SELECTION button at the bottom or you will continue to display the list of every feature you have created. While you have the advantage of having a list to work through you are again limited to searching by only one criteria at a time. The creative way to use the attribute table is if you permission to survey your whole square and therefore have no REFUSED ACCESS features, you can search for COMPLETED features and then INVERT THE SELECTION to find features which are not completed i.e. both unsurveyed and in progress features at the same time.

Lines and points are created in an unsurveyed state but this only applies with area when you have a completely blank square and disappears as soon as you make your first split, therefore you don't have to search for unsurveyed features in the Landscape areas layer.

Dealing with MMUs

You cannot map anything smaller than MMU but you may still encounter problems with it. If a small part of a much larger area i.e. the corner of a field creeps into the edge of your square there is nothing you can do, so just include it as part of your adjoining polygon, if it's the end of a long hedge, fence or wall then leave it. However if what you want to do is split off a small part of a larger polygon before merging it with another you have only two options. Merge the whole lot together and then split them apart again, it's messy and you'll have to re-enter all the fields relating to one of the polygons as they will be lost when you merge them together. The alternative and more sensible way to do it is to use UPDATE, which will split and merge a polygon together in one operation so the below MMU sized polygon never actually exists. The key to successfully using UPDATE is to know how to select the area you want. What I mean here is that you can use a combination of freehand selection tools and copying through from other layers and you are not confined to copying through purely from the Mastermap layers. If you have drawn a polygon freehand and now want to add something extra to it you may feel you have to draw it freehand again but you don't. If you select Landscape areas rather than Mastermap you can select the polygon you have already drawn and add it using copy +

in exactly the same way. Copy + is an add to selection command, in other words you can keep selecting and adding polygons, so if the area you wish to add is on the Mastermap change the layer and select from it, if they overlap there will not be a problem as the selection is the combined area of the two. If the area is not on Mastermap and you need to draw it freehand then that too is an add to selection command so you can combine the two operations. Likewise copy - and the other freehand tool are remove from selection tools so they can be used to remove areas from a selection.

Appendix 2: 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.

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
Buxus sempervirens	0.8	0.26	0.38	0.50	> 0.5
Arbutus unedo	1.2	0.38	0.56	0.75	> 0.5
Mespilus germanica	1.5	0.48	0.71	0.94	> 0.5
S. x thuringiaca	1.5	0.48	0.71	0.94	> 0.5
Ilex aquifolium	1.8	0.58	0.85	1.13	>1
Sorbus aria agg	1.9	0.61	0.89	1.19	>1
Sorbus intermedia agg	2	0.64	0.94	1.25	>1
Pyrus pyraeaster	2	0.64	0.94	1.25	>1
Alnus incarna	2	0.64	0.94	1.25	>1
Populus alba	2	0.64	0.94	1.25	>1
Sorbus aucuparia	2.5	0.80	1.18	1.56	>1
Sorbus latifolia agg	2.7	0.86	1.27	1.69	>1
Sorbus torminalis	2.8	0.90	1.32	1.75	>1
Malus sylvestris	3	0.96	1.41	1.88	>1
Crataegus monogyna	3	0.96	1.41	1.88	>1
Acer campestre	3	0.96	1.41	1.88	>1
Betula pubescens	3	0.96	1.41	1.88	>1
Betula pendula	3	0.96	1.41	1.88	>1
Salix fragilis	3.5	1.12	1.65	2.19	> 2
Alnus glutinosa	3.7	1.18	1.74	2.31	> 2
Salix caprea	4	1.28	1.88	2.50	> 2
Acer platanoides	4	1.28	1.88	2.50	> 2
Carpinus betulus	4	1.28	1.88	2.50	> 2
Quercus ilex	4.3	1.38	2.02	2.69	> 2
Prunus avium	4.5	1.44	2.12	2.81	> 2
Robinia pseudoaccacia	5	1.60	2.35	3.13	> 3
Populus nigra	5	1.60	2.35	3.13	> 3
U. x hollandica	5	1.60	2.35	3.13	> 3
P. x canescens	5	1.60	2.35	3.13	> 3
Pinus sylvestris	5	1.60	2.35	3.13	> 3
U. x vegeta	5.5	1.76	2.59	3.44	> 3
Tilia platyphyllos	5.8	1.86	2.73	3.63	> 3
Juglans regia	6	1.92	2.82	3.75	> 3
Tilia cordata	6	1.92	2.82	3.75	> 3
Fraxinus excelsior	6	1.92	2.82	3.75	> 3
P. x canadensis var serotina	6	1.92	2.82	3.75	> 3
Ulmus minor	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.
