

**PART 2:**  
**DETAILED CRITERIA FOR**  
**SELECTION**

## **HABITAT CRITERIA**

### **WOODLANDS**

Three habitat selection criteria are primarily dominated by woody vegetation (**Woodlands**, **Wood Pasture**, **Parkland Orchards and Veteran Trees**, and **Scrub** (H1, H2 and H3). The designation of these three habitat types may be supported by the presence of associated species. In particular for criteria H1, H2 and H3 associated species are likely to include fungi, bryophytes, lichens, flora, invertebrates, birds and mammals (see relevant Species Criteria).

#### **H1) WOODLANDS**

The following will be selected:

- All ancient woodlands as recorded in the Ancient Woodland Inventories, including Planted Ancient Woodlands (PAWs).
- All semi-natural woodlands over 0.25 ha which support an assemblage of ancient woodland indicator and/or semi-natural woodland plant species (see Table 1)
- All wet woodland sites over 0.25 ha with an assemblage of ancient woodland indicators, or wetland groundfloras.
- All planted woodland over 0.25 ha that support an assemblage of ancient woodland indicators, or other species-rich habitats.
- Smaller areas (less than 0.25 ha) of semi-natural or wet woodland as SINC if they either particularly species-rich, support important faunas, or if they form part of a larger SINC designation, or complex of habitats, or fulfil a strategic linking function between SINC areas, or other habitats.
- All conifer plantations which support important species, or species assemblages, or which support habitats, which would qualify under other Habitat criteria (e.g. bogs or heathland).

‘Ancient woodlands’ are defined as those which can be dated by documentary means to at least 1600 AD or where there is other archaeological or ecological evidence which suggests similar antiquity (see under ‘Indicator species’ below). ‘Semi-natural’ woodlands contain a high proportion (i.e.  $\pm 70\%$  or more) of native, locally indigenous tree and shrub species, a combination regarded as having the highest nature conservation value (Kirby *et al.*, 1984). The *Glamorgan Ancient Woodland Inventory* (Sothorn, 1986) provides some useful information on ancient woodland sites over 2 ha in size, it is not however a definitive audit of sites, and does not include any woods smaller than 2 ha in size. All planted ancient woodland (PAWs) will be designated as SINC, as will other plantation woodlands, which support species rich understoreys or ground floras.

Native woodland in the Mid-Valleys area includes a number of recognisable woodland types. The classic upland valley side woodlands are often sessile oak dominated, although many have a more mixed composition. Sheep often graze such woods, which characteristic support heath

ground flora. Often acid in character, such upland woodlands may not have the same diversity of 'wildflowers' as more lowland woods, but they often have rich fern and bryophyte/lichen assemblages, and characteristic bird and invertebrate faunas.

In the lowlands (and in particular where limestone influences the local geology) the woodlands tend to be naturally more species-rich with a greater diversity of woodland and under-storeys, and often very diverse ground floras.

Wet woodlands typically dominated by alder (*Alnus glutinosa*), willows (*Salix* spp.) and/or downy birch (*Betula pubescens*) are an integral feature of the Mid-Valleys landscape, and often occur in complex mosaics with drier woodlands. Wet woodlands often support ground floras characteristic of swamp or marshy grassland communities.

Important woodland networks occur along rivers and streams. The woodland along tributary streams on valley sides is often ancient in character and forms riparian wildlife corridors of both biodiversity and landscape value. Although generally of more recent origin, the secondary woodland corridors, which have developed along disused railway lines often represents important woodland areas.

South Wales contains numerous conifer, and mixed plantation woodlands. Whilst not generally considered to be as valuable for nature conservation as semi-natural woodlands, the plantation may have significant vegetation for fauna, including certain specialist breeding birds such as nightjar. The selection of such sites should be carried out with reference to the presence of rare species or significant species-assemblages (see Species Criteria). Conifer plantations often occur on upland bogs and moorland and can support significant residual habitat value and potential.

'Indicator species' represent an important means of identifying ancient or semi-natural woodland. Vascular plant indicators are the most readily familiar and identifiable group, but indicator species occur in many other taxa, including mosses, lichens, beetles, moths, flies and snails, amongst others. The list of semi-natural woodland vascular plants provided in Table 1 is for guidance only and is not comprehensive. No minimum threshold of indicator species is given because this varies depending on the type of woodland, underlying geology and woodland management. In addition wet woodlands may contain wetland plant communities. These can be diverse mixed wetland communities, where characteristic wetland species occur with elements of more typical ancient woodland ground floras, or stands of less diverse, but equally characteristic swamp communities (e.g. stands of pond sedge).

The following lists of ancient woodland vascular plants are based in part on the list suggested by Walker & Buckley (1989) for Gwent, and from interpretation of Ellis (1983), Stringer & Davies (1989), Wade (1970) and Wade *et al* (1994). Not all of the species listed are confined to ancient woodlands, but in most cases where they occur in woodlands they are indicative of ancient woodlands. There may be inconsistencies in these lists due to the different sources used for the different counties.

**Table 1. Semi-natural woodland vascular plants**

Scientific Name	Common Name
<i>Acer campestre</i>	field maple
<i>Adoxa moschatellina</i>	moshatel
<i>Allium ursinum</i>	ramsons
<i>Anemone nemorosa</i>	wood anemone
<i>Aquilegia vulgaris</i>	columbine
<i>Blechnum spicant</i>	hard fern
<i>Bromus ramosus</i>	hairy brome
<i>Calluna vulgaris</i>	heather
<i>Campanula trachelium</i>	nettle-leaved bellflower
<i>Carex laevigata</i>	smooth-stalked sedge
<i>Carex pallescens</i>	pale sedge
<i>Carex pendula</i>	pendulous sedge
<i>Carex remota</i>	distant sedge
<i>Carex strigosa</i>	thin-spiked wood-sedge
<i>Carex sylvatica</i>	wood sedge
<i>Chrysosplenium alternifolium</i>	alternate-leaved golden-saxifrage
<i>Chrysosplenium oppositifolium</i>	opposite-leaved golden-saxifrage
<i>Conopodium majus</i>	pignut
<i>Convallaria majalis</i>	lily-of-the-valley
<i>Corydalis claviculata</i>	climbing corydalis
<i>Daphne laureola</i>	spurge laurel
<i>Daphne mezereon</i>	mezeron
<i>Deshampsia flexuosa</i>	wavy hair grass
<i>Dryopteris affinis</i>	scaly male fern
<i>Dryopteris aemula</i>	hay-scented buckler fern
<i>Elymus caninus</i>	bearded couch-grass
<i>Epipactis helleborine</i>	broad-leaved helleborine
<i>Equisetum sylvaticum</i>	wood horsetail
<i>Euonymus europaeus</i>	spindle
<i>Euphorbia amygdaloides</i>	wood spurge
<i>Festuca gigantea</i>	giant fescue
<i>Frangula alnus</i>	alder buckthorn
<i>Galium odoratum</i>	sweet woodruff
<i>Geum rivale</i>	water avens
<i>Gymnocarpium dryopteris</i>	oak fern
<i>Hyacinthoides non-scripta</i>	bluebell
<i>Hymenophyllum tunbridgense</i>	Tunbridge filmy-fern
<i>Hymenophyllum wilsonii</i>	Wilson's filmy fern
<i>Hypericum androsaemum</i>	tutsan
<i>Iris foetidissima</i>	stinking iris
<i>Lamiastrum galeobdolon</i>	yellow archangel
<i>Lathraea squamaria</i>	toothwort
<i>Luzula forsteri</i>	southern woodrush
<i>Luzula pilosa</i>	hairy woodrush
<i>Luzula sylvatica</i>	great woodrush
<i>Lysimachia nemorum</i>	yellow pimpernel
<i>Malus sylvestris</i>	crab apple

<b>Table 1. Semi-natural woodland vascular plants</b>	
<b>Scientific Name</b>	<b>Common Name</b>
<i>Melampyrum pratense</i>	common cow-wheat
<i>Melica uniflora</i>	wood mellick
<i>Melittis melissophyllum</i>	bastard balm
<i>Mercurialis perennis</i>	dog's mercury
<i>Milium effusum</i>	wood millet
<i>Moehringia trinervium</i>	three-nerved sandwort
<i>Neottia nidus-avis</i>	bird's nest orchid
<i>Orchis mascula</i>	early purple-orchid
<i>Oxalis acetosella</i>	wood sorrel
<i>Paris quadrifolia</i>	herb-Paris
<i>Platanthera chlorantha</i>	greater butterfly orchid
<i>Poa nemoralis</i>	wood meadow grass
<i>Polygonatum multiflorum</i>	solomon's seal
<i>Polystichum aculeatum</i>	hard shield fern
<i>Polystichum setiferum</i>	soft shield fern
<i>Populus tremula</i>	Aspen
<i>Potentilla sterilis</i>	barren strawberry
<i>Primula vulgaris</i>	Primrose
<i>Prunus padus</i>	bird cherry
<i>Quercus petraea</i>	sessile oak
<i>Ranunculus auricomus</i>	goldilocks buttercup
<i>Rhamnus catharticus</i>	Buckthorn
<i>Ribes rubrum</i>	Redcurrant
<i>Sanicula europaea</i>	Sanicle
<i>Scirpus sylvaticus</i>	wood club-rush
<i>Scrophularia nodosa</i>	Figwort
<i>Sorbus torminalis</i>	wild service
<i>Stellaria neglecta</i>	greater chickweed
<i>Stellaria nemorum</i>	wood stichwort
<i>Taxus baccata</i>	Yew
<i>Tilia cordata</i>	small-leaved lime
<i>Ulmus glabra</i>	wych elm
<i>Vaccinium myrtillus</i>	Bilberry
<i>Veronica montana</i>	wood speedwell
<i>Viburnum opulus</i>	guelder rose
<i>Vicia sylvatica</i>	wood vetch
<i>Viola reichenbachiana</i>	pale dog violet

## H2) WOOD PASTURE, PARKLANDS, ORCHARDS AND VETERAN TREES

The following will be selected:

- Parkland sites which derived from ancient woodland and which continue to support large mature trees (often referred to as 'coedcae').
- Parkland sites, of whatever origin, containing good numbers of large over-mature trees
- Over-mature/veteran trees  $\geq 3.7\text{m}$  circumference at 1.3m from base, or individuals that are estimated to be at least 200 years old which exhibit veteran tree characteristics such as rot hollows, bracket fungi or a large proportion of dead wood.
- Examples of orchards which are, or were, traditionally managed and which still contain several old fruit trees

Wood pastures and parklands include all woodlands or wooded landscape, where deer and/or farm animals have historically been allowed to graze within a matrix of trees. These include traditional *wood-pastures* such as forests and chases, and wooded commons, as well as winter-grazed woodlands (Harding & Rose 1986). South Wales contains numerous remnants of medieval deer parks and pasture-woodland sites. Some of these may be identifiable from sources such as Cantor (1983), old maps etc. Such sites were often created from pre-existing ancient woodland and are today characterised by the presence of large, over-mature (or 'veteran') trees, often of pollard form, which in turn may support characteristic and declining plant and animal communities, including many ancient woodland indicator species.

'Over-mature' trees are here defined as being typically of large stature, and often supporting significant decay features such as dead timber in the canopy, heart-rot, root-rot, rot-holes, external fungal growths, loose bark, sap-runs etc. It may also include the standing trunks or fallen hulks and limbs of dead trees. The presence of characteristic assemblages of saproxylic invertebrates, epiphytic mosses and lichens, roosting bats and rare nesting birds etc (see Alexander 1999) should also be considered where appropriate. 'Over-mature' trees can be both native and non-native trees. Groups of large willow (*Salix* spp.) pollards may also qualify, where they do not already fall into Wildlife Sites based on watercourses (see H14). A separate recording form should be used for veteran trees designated as Wildlife Sites. The English Nature publication, *An Introduction to Surveying Ancient Trees* provides a recommended survey methodology for surveying and recording veteran trees. This methodology will be required for all planning applications affecting old or 'over-mature trees'. Any trees, which fulfil the criteria, will qualify as SINC within the planning process.

Orchards represent a traditional and historic land use and have greatly declined in recent decades. Recent work by entomologists (e.g. Whitehead 1992) has shown that traditionally managed orchards support characteristic invertebrate faunas, including a number of rare specialist species. Characteristic plants include mistletoe (*Viscum album*), a local species in the UK. Many historic fruit varieties may persist in old orchards and are of potential value to fruit-breeders.

### H3) SCRUB COMMUNITIES

The following will be selected:

- Structurally diverse and species-rich mixed scrub sites over 1 ha in size.
- Significant stands of gorse (over 1 ha in size) and/or stands which support key associated species (see below)
- Smaller stands of scrub (including less species-rich areas) if they form an integral part of a larger SINC designation or complex habitat mosaics or fulfil a strategic linking function between SINC.

It is suggested that 'mixed scrub' habitats considered for selection should normally contain at least 6 native woody species and that there is good structural diversity, for example with a varied range of shrub ages and canopy heights, mature trees, the presence of small rides and clearings, good gradations in edge habitats, varied ground flora etc.

Most scrub communities comprise common and ubiquitous woody species and are widespread in the UK. However, scrub habitats are extremely variable in form and composition, and even some of the common communities may be exceptionally rich in species (Hopkins 1996).

SINC selection includes large stands of gorse (*Ulex europaeus* - *Ulex galli*), even when few other woody species or other vascular plants of interest are present. Gorse supports a distinctive faunal community, with characteristic species such as stonechat, linnet and Dartford warbler, along with a high invertebrate diversity. The complex rigid structure of gorse bushes is such that it is a noted habitat for spiders, for instance and green hairstreak butterflies are often associated with stands of gorse.

In the Mid-Valleys area, scrub is widespread, often forming habitat linkages between other areas of habitat, for example along stream valleys and disused railway lines. In such situations it may be important in supporting the dormouse (*Muscardinus avellanarius*), a rare and protected species in Britain. Scrub habitats are also often of particular importance in maintaining the biodiversity of urban areas.

In addition to the above, scrub communities may also be selected where they form linking habitats between other features of interest, or form a peripheral part of another habitat of interest (i.e. as part of a mosaic site), or under the Species Criteria where they support species of significance.

## GRASSLANDS

Five habitat selection criteria are primarily dominated by grassland vegetation: **neutral, calcareous, acid, marshy grasslands and floodplains** (H4, H5, H6, H7 and H8). The designation of grassland SINC may be supported by the presence of associated species. Associated species are likely to include grassland fungi, bryophytes and lichens, flora, invertebrates, reptiles, birds and mammals. In addition marshy or wet grasslands may also be particularly valuable as amphibian habitat (see relevant Species Criteria).

### H4) NEUTRAL GRASSLANDS

The following will be selected:

- All examples of crested dog's-tail - common knapweed grasslands (MG5) over 0.2 ha.
- All stands of species-rich MG1 and MG6 with at least 8 species from Table 2 and over 0.2 ha.
- All stands of species-rich atypical NVC neutral grassland, with at least 8 species from Table 2 over 0.2 ha. In particular important grassland communities, which occur on road verges, or brown field sites, are often not easily referable to NVC community.
- From Table 8, any grassland site which supports a population of rare or very restricted species in the Mid-Valleys area:
  - wood bitter-vetch (*Vicia orubus*)
  - moonwort (*Botrychium linaria*)
  - soft-leaved sedge (*Carex montana*)
  - meadow saffron (*Colchium autumnale*)
  - dyer's greenweed (*Genista tinctoria*)
  - adder's-tongue fern (*Ophioglossum vulgatum*)
  - green winged orchid (*Orchis morio*)
  - greater butterfly orchid (*Platanthera chlorantha*)
  - meadow saxifrage (*Saxifraga granulata*)
  - common meadow-rue (*Thalictrum flavum*)
- The species-poor MG10 grassland (which will rarely support 8 species from Table 2) will be designated where it either occurs as large areas of wet semi-improved grassland, where it creates a linking function between other habitats, or forms part of a habitat mosaic (often in association with marshy grassland communities).
- The *South Wales Guidelines* identify that all stands of MG4, MG11, MG12 and MG13 will be considered for SINC designation. Currently there are no records of these four communities in the Mid-Valleys area, however if any sites are found then they will be designated as SINC if over 0.2 ha in size.
- Smaller areas (less than 0.2 ha) of species-rich grassland, or larger stands (over 1 ha) of more species-poor semi-improved grassland, if they form an integral part of a larger SINC designation or complex habitat mosaics or fulfil a strategic linking function between SINC.



Neutral (or 'Mesotrophic') grasslands are those which have developed on soils which are not strongly of either an acidic or basic nature, and are typically of moderate fertility. Key grasses include species such as crested dog's-tail (*Cynosurus cristatus*), red fescue (*Festuca rubra*), common bent (*Agrostis capillaris*) and in some cases false oat-grass (*Arrhenatherum elatius*) and yorkshire fog (*Holcus lanatus*).

In practice it is suggested that 'relatively species-rich' is represented by sites with at least 8 species present from Table 2, a list of species indicative of unimproved neutral grasslands. Whilst qualifying sites will in the main be referable to one or more of the NVC types initially listed above, the threshold species guideline referring to Table 2 may be applied to grasslands of any NVC type, or where an NVC type has not been determined. Some of the Wildlife Sites qualifying under these guidelines will be 'atypical' in NVC terms, for instance some grasslands on roadside verges, woodland edges, post-industrial land or sea walls. Consideration should also be given to grasslands with less than 8 such species present, but where those indicator species present are occurring at a high frequency throughout.

MG5 grassland is a particular feature of South Wales, being especially associated with the edges of the South Wales coalfield. This species-rich community has declined greatly throughout its British and European range, and all remaining examples are therefore of value. The community is characterised by very low levels of rye-grass (*Lolium perenne*) and high frequencies of grasses such as red fescue (*Festuca rubra*), crested dog's-tail (*Cynosurus cristatus*) and common bent-grass (*Agrostis capillaris*), together with high diversity and proportion of forb species which give a characteristic 'flowery' appearance. The latter typically include bird's-foot trefoil (*Lotus corniculatus*), and common knapweed (*Centaurea nigra*), together with, *inter alia*, red clover (*Trifolium pratense*), hawkbits (*Leontodon* spp.), cowslip (*Primula vulgaris*), ox-eye daisy (*Leucanthemum vulgare*) and buttercups (*Ranunculus* spp.). Orchids, including the scarce and declining green-winged orchid (*Orchis morio*), are often present.

MG5 grassland was probably the natural community type for much of the lowland grassland of South Wales in its original, unmodified state. Agricultural improvement has altered huge areas into the less diverse and more widespread MG6 grasslands (here referred to as 'semi-improved neutral grassland'), or to other improved grassland communities of low diversity and value. Nevertheless species-rich examples of MG6 are still comparatively widespread and locally common in Wales, and can be worthy of recognition and conservation. The plant community is generally similar to MG5 but contains much higher frequencies of rye-grass and forbs such as white clover (*Trifolium repens*), common mouse-ear (*Cerastium fontanum*) and daisy (*Bellis perennis*). Species-rich stands may also include species such as common knapweed (*Centaurea nigra*), meadow vetchling (*Lathyrus pratensis*) and bird's-foot trefoil (*Lotus corniculatus*).

Other neutral communities of lesser value may also occur, including examples of MG1 *Arrhenatherum elatius* grassland or MG10 *Holcus lanatus*-*Juncus effusus* rush-pastures. The former may occur especially in situations such as roadside verges, old railway lines and abandoned rough grazing sites, and is typically dominated by tall grasses including false oat-grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis glomerata*) and Yorkshire fog (*Holcus lanatus*), together with forbs such as hogweed (*Heracleum sphondylium*), common knapweed, nettle (*Urtica dioica*) and thistles (*Cirsium* spp.). In richer examples, however, the sward has an 'under storey' of finer species typical of MG5 (see above). MG10 is more typical of wetland sites and is usually dominated by Yorkshire fog with creeping bent. Often these grasslands are present as important linking habitats between other grasslands and wetlands of significance.

The selection criteria include a limited number of rare grassland species. These species are sufficiently restricted in their distribution in the Mid-Valleys area that any Site supporting a population will qualify as a SINC.

SINC selection criteria will in particular target the designation of unimproved and semi-improved grassland sites. If habitat management is poor, important grassland sites can sometimes be missed or overlooked e.g. unimproved grasslands can appear to be species-poor if heavily grazed. This is a concern for SINC selection. Experience has shown that management condition is often reversible and on the resumption of more sympathetic management such sites can recover floristic diversity.

Discerning and identifying important grassland (especially dry grasslands) can therefore sometimes be difficult. The CCW Phase I Habitat Survey (1992-1995) on which much of the grassland context for SINC selection is based was an excellent baseline assessment, which undoubtedly identified much of the grassland resource. However experience over the last 10 years has shown that a significant area of additional species-rich grassland occurs in the Mid-Valleys Area. This has been particularly apparent on a number of development sites where prior to development relaxations in the management of grasslands previously mapped as improved revealed species-rich MG6 and even MG5 grassland communities. Such masking of quality grassland is also apparent in horse grazed urban edge pastures where over-grazing can have significant impacts on species composition of previously mapped MG5 grasslands. Although prolonged over-grazing can significantly alter floristic composition, unless soil structure has been severely damaged or chemicals have been applied, on the resumption of a more relaxed grazing regime valuable (SINC quality) grasslands can often recover.

Based on the above experience, SINC criteria will therefore look to protect the whole resource of unimproved and semi-improved grassland communities and the selection criteria will allow the 'potential' of Sites to be recognised within SINC designations. This selection criterion is an additional element to that identified in the Wildlife Site Guidelines. It is however based on the first hand experience of the Mid-Valleys area, and recognition that vegetation condition is not the only measure of habitat quality. Therefore unless a site identified in the CCW Phase I Habitat survey 1992-1995 (or subsequent surveys) has been obviously ploughed, drained, re-seeded or received repeatedly herbicide or fertiliser it will qualify for SINC designation.

**Table 2. Indicator Species for Neutral Grasslands**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Achillea ptarmica</i>	sneezewort
<i>Agrimonia eupatoria</i>	agrimony
<i>Agrimonia procera</i>	fragrant agrimony
<i>Ajuga reptans</i>	bugle
<i>Alchemilla glabra</i>	lady's-mantle
<i>Alchemilla filicaulis</i>	lady's-mantle
<i>Alchemilla xanthochlora</i>	lady's-mantle
<i>Allium vineale</i>	wild onion
<i>Botrychium lunaria</i>	moonwort
<i>Briza media</i>	quaking grass
<i>Bromus commutatus</i>	meadow brome
<i>Bromus racemosus</i>	smooth brome
<i>Campanula rotundiflora</i>	harebell
<i>Cardamine pratensis</i>	cuckoo flower

**Table 2. Indicator Species for Neutral Grasslands**

Scientific Name	Common Name
<i>Carex caryophyllea</i>	spring sedge
<i>Carex divulsa</i>	grey sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex montana</i>	soft-leaved sedge
<i>Carex muricata</i>	prickly sedge
<i>Carex nigra</i>	common sedge
<i>Carex panicea</i>	carnation sedge
<i>Carex spicata</i>	spiked sedge
<i>Centaurea nigra</i>	common knapweed
<i>Centaureum erythraea</i>	common centuary
<i>Cirsium dissectum</i>	meadow thistle
<i>Colchicum autumnale</i>	meadow saffron
<i>Conopodium majus</i>	pignut
<i>Dactylorhiza spp.</i>	spotted orchids
<i>Danthonia decumbens</i>	heath grass
<i>Erophila verna</i>	whitflow grass
<i>Euphrasia officinalis agg.</i>	eyebright
<i>Festuca arundinacia</i>	tall fescue
<i>Festuca pratensis</i>	meadow fescue
<i>Galium verum</i>	lady's bedstraw
<i>Genista tinctoria</i>	dyer's greenweed
<i>Geranium pratense</i>	meadow crane's-bill
<i>Helictotrichon pubescens</i>	downy oat-grass
<i>Hordeum secalinum</i>	meadow barley
<i>Hypericum hirsutum</i>	hairy St John's-wort
<i>Hypericum maculatum</i>	imperforate St John's-wort
<i>Hypericum perforatum</i>	perforate St John's-wort
<i>Hypochoeris radicata</i>	common cat's-ear
<i>Knautia arvensis</i>	field scabious
<i>Koeleria macrantha</i>	crested hair grass
<i>Lathyrus linifolius</i>	bitter-vetch
<i>Lathyrus nissolia</i>	grass vetchling
<i>Lathyrus pratensis</i>	meadow vetchling
<i>Leontodon hispidus</i>	rough hawkbit
<i>Leontodon saxatilis</i>	lesser hawkbit
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Linum catharticum</i>	fairy flax
<i>Listera ovata</i>	common twayblade
<i>Lotus corniculatus</i>	common bird's-foot-trefoil
<i>Lotus glaber</i>	narrow-leaved bird's-foot-trefoil
<i>Luzula campestris</i>	field wood-rush
<i>Narcissus pseudonarcissus</i>	wild daffodil
<i>Ononis repens</i>	common restharrow
<i>Ononis spinosa</i>	spiny restharrow
<i>Ophioglossum vulgatum</i>	adder's-tongue
<i>Orchis mascula</i>	early-purple orchid
<i>Orchis morio</i>	green-winged orchid
<i>Pedicularis sylvatica</i>	lousewort

**Table 2. Indicator Species for Neutral Grasslands**

Scientific Name	Common Name
<i>Petroselinum segetum</i>	corn parsley
<i>Phleum bertolonii</i>	small cat's-tail
<i>Pilosella officinarum</i>	mouse-ear hawkweed
<i>Pimpinella saxifraga</i>	burnet-saxifrage
<i>Plantago media</i>	hoary plantain
<i>Platanthera chlorantha</i>	greater butterfly-orchid
<i>Poa angustifolia</i>	narrow-leaved meadow-grass
<i>Poa humilis</i>	spreading meadow-grass
<i>Polygala vulgaris</i>	common milkwort
<i>Polygonum bistorta</i>	common bistort
<i>Potentilla anglica</i>	trailing tormentil
<i>Potentilla erecta</i>	tormentil
<i>Primula veris</i>	cowslip
<i>Ranunculus bulbosus</i>	bulbous buttercup
<i>Rhinanthus minor</i>	yellow rattle
<i>Sanguisorba minor</i>	salad burnet
<i>Sanguisorba officinalis</i>	greater burnet
<i>Saxifraga granulata</i>	meadow saxifrage
<i>Saxifraga tridactylites</i>	rue-leaved saxifrage
<i>Senecio erucifolius</i>	hoary ragwort
<i>Serratula tinctoria</i>	saw-wort
<i>Silaum silaus</i>	pepper-saxifrage
<i>Sison amomum</i>	stone parsley
<i>Stachys officinalis</i>	betony
<i>Stellaria graminea</i>	lesser stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Thalictrum flavum</i>	common meadow-rue
<i>Thymus pulegioides</i>	large thyme
<i>Torilis nodosa</i>	knotted hedge-parsley
<i>Trifolium fragiferum</i>	strawberry clover
<i>Trifolium medium</i>	zig-zag clover
<i>Trifolium micranthum</i>	slender trefoil
<i>Trifolium pratense</i>	red clover
<i>Trifolium scabrum</i>	rough clover
<i>Trifolium striatum</i>	knotted clover
<i>Trisetum flavescens</i>	yellow oat-grass
<i>Veronica officinalis</i>	heath speedwell
<i>Vicia cracca</i>	tufted vetch
<i>Vicia orobus</i>	wood bitter-vetch
<i>Viola riviniana</i>	common dog-violet
<i>Vulpia bromoides</i>	squirreltail fescue

## H5) CALCAREOUS GRASSLANDS

The following will be selected:

- All examples of unimproved calcareous grassland over 0.2 ha
- All examples of species-rich semi-improved or secondary calcareous grassland over 0.2 ha
- Smaller areas (less than 0.2 ha) of species-rich calcareous grassland if they form an integral part of a larger SINC designation or complex habitat mosaics or fulfil a strategic linking function between SINC, or as part of a road verge designation.

Calcareous grasslands are confined to basic soils or substrates, which are usually of low fertility and often free-draining. The calcareous grasslands of unimproved and semi-improved grasslands, and quarries/road cuttings occur on the Carboniferous limestone, which runs along edges of the South Wales coalfield (across the southern part of Rhondda Cynon Taf and Caerphilly, and as a northern belt across Merthyr). The limestone is usually overlain by non-calcareous soils supporting circum-neutral grasslands and therefore the occurrence of calcareous grasslands is therefore localised. A feature of quarries and road cuttings is the artificial exposure of limestone, and the resulting development of calcareous grassland communities.

Secondary calcareous grassland can also develop away from the main Carboniferous limestone areas on post-industrial land, which, develop on lime-rich substrates such as concrete or railway ballast. The grassland that develops on such 'secondary' sites is often only poorly described by the National Vegetation Classification (NVC) but may nevertheless be species-rich and of high conservation value.

Unimproved calcareous grassland is a particularly rare habitat in the Mid-Valleys area and is mainly confined to the Merthyr area. Unimproved calcareous grasslands will include a characteristic suit of species including key grass species such as upright brome (*Bromus erecta*) and sheep's fescue (*Festuca ovina* agg.) together with characteristic herbs such as common thyme (*Thymus polytrichus*), rockrose (*Helianthemum nummularium*), lady's bedstraw (*Galium verum*), fairy flax (*Linum catharticum*), and salad burnet (*Sanguisorba minor*).

'Semi-improved' grasslands include those swards which have been degraded by agricultural management but which are still recognisably derived from calcareous grassland. Only those semi-improved sites that are 'species-rich' should be considered as a SINC.

Secondary calcareous grassland is more widespread, but is it still uncommon, and generally only occurs as small stands of vegetation associated with particular man-made topographical or post-industrial features. As such secondary grassland can arise on post-industrial substrates, e.g. rail and road cuttings, quarries, ballast, flue ash or slag and spoil tips.

Based on the size criteria given above, all 'species-rich' grasslands (with at least 8 species present from the list of species indicative of unimproved calcareous grasslands in Table 3) will be designated as SINC.

The SSSI selection guidelines (NCC 1989) identify a number of calcareous grassland NVC types as of particular importance. Three of these are very scarce in South Wales – CG6 (downy

oat-grass grassland), CG7 (sheep's fescue - mouse-ear hawkweed - thyme grassland) and CG8 (blue moor-grass - small scabious grassland). However three important communities occur widely in South Wales – CG1 (sheep's fescue - carline thistle grassland, CG2 (sheep's fescue - meadow oat-grass grassland) and CG3 (upright brome grassland). One further important community CG10 (sheep's fescue - common bent - thyme grassland) occurs inland in the north and western parts of South Wales.

**Table 3. Indicator Species for Calcareous Grasslands**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Allium vineale</i>	wild onion
<i>Aloina aloides</i>	
<i>Anacamptis pyramidalis</i>	pyramidal orchid
<i>Anthyllis vulneraria</i>	kidney vetch
<i>Arabis hirsuta</i>	hairy rock-cress
<i>Asperula cynanchica</i>	squincywort
<i>Blackstonia perfoliata</i>	yellow-wort
<i>Brachypodium pinnatum</i>	tor grass
<i>Briza media</i>	quaking grass
<i>Bromopsis erecta</i>	upright brome
<i>Campanula glomerata</i>	clustered bellflower
<i>Campanula rotundiflora</i>	harebell
<i>Campanula trachelium</i>	nettle-leaved bellflower
<i>Carex caryophyllea</i>	spring sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex montana</i>	soft-leaved sedge
<i>Carlina vulgaris</i>	carline thistle
<i>Centaurea nigra</i>	common knapweed
<i>Centaurea scabiosa</i>	greater knapweed
<i>Centaureum erythraea</i>	common centuary
<i>Cirsium acaule</i>	dwarf thistle
<i>Cirsium eriophorum</i>	woolly thistle
<i>Cirsium tuberosum</i>	tuberous thistle
<i>Clinopodium acinos</i>	basil thyme
<i>Clinopodium ascendens</i>	common calamint
<i>Clinopodium calamintha</i>	lesser calamint
<i>Clinopodium vulgare</i>	wild basil
<i>Coeloglossum viride</i>	frog orchid
<i>Crepis biennis</i>	rough hawk's-beard
<i>Cruciata laevipes</i>	crosswort
<i>Daucus carota</i>	wild carrot
<i>Ditrichum flexicaule</i>	
<i>Ditrichum gracile</i>	
<i>Echium vulgare</i>	viper's-bugloss
<i>Erophila verna</i>	whitlow grass
<i>Festuca ovina</i> agg.	sheep's fescue
<i>Galium mollugo</i>	hedge bedstraw
<i>Galium sternerii</i>	limestone bedstraw
<i>Galium verum</i>	lady's bedstraw
<i>Genista tinctoria</i>	dyer's greenweed
<i>Gentianella amarella</i>	autumn gentian

**Table 3. Indicator Species for Calcareous Grasslands**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Geranium columbinum</i>	long-stalked crane's-bill
<i>Helianthemum nummularium</i>	common rock-rose
<i>Helictotrichon pratense</i>	meadow oat-grass
<i>Helictotrichon pubescens</i>	downy oat-grass
<i>Hippocrepis comosa</i>	horseshoe vetch
<i>Homalothecium lutescens</i>	
<i>Hypericum hirsutum</i>	hairy St John's-wort
<i>Hypericum montanum</i>	pale St John's-wort
<i>Hypericum perforatum</i>	perforate St John's-Wort
<i>Inula conyzae</i>	ploughman's spikenard
<i>Knautia arvensis</i>	field scabious
<i>Koeleria macrantha</i>	crested hair-grass
<i>Lathyrus nissolia</i>	grass vetchling
<i>Leiocolea turbinata</i>	
<i>Leontodon hispidus</i>	rough hawkbit
<i>Leontodon saxatilis</i>	lesser hawkbit
<i>Linum catharticum</i>	fairy flax
<i>Listera ovata</i>	twayblade
<i>Lotus corniculatus</i>	common bird's-foot trefoil
<i>Medicago lupulina</i>	black medick
<i>Ononis repens</i>	common restharrow
<i>Ononis spinosa</i>	spiny restharrow
<i>Ophioglossum vulgatum</i>	adder's-tongue
<i>Ophrys apifera</i>	bee orchid
<i>Orchis mascula</i>	early-purple orchid
<i>Orchis morio</i>	green-winged orchid
<i>Origanum vulgare</i>	wild majoram
<i>Pastinaca sativa</i>	wild parsnip
<i>Petroselinum segetum</i>	corn parsley
<i>Picris hieracioides</i>	hawkweed oxtongue
<i>Pilosella officinarum</i>	mouse-ear hawkweed
<i>Pimpinella saxifraga</i>	burnet-saxifrage
<i>Plantago media</i>	hoary plantain
<i>Platanthera chlorantha</i>	greater butterfly-orchid
<i>Poa angustifolia</i>	narrow-leaved meadow-grass
<i>Poa humilis</i>	spreading meadow-grass
<i>Polygala vulgaris</i>	common milkwort
<i>Potentilla sterilis</i>	barren strawberry
<i>Primula veris</i>	cowslip
<i>Ranunculus bulbosus</i>	bulbous buttercup
<i>Rhodobryum roseum</i>	
<i>Sagina nodosa</i>	knotted pearlwort
<i>Sanguisorba minor</i>	salad burnet
<i>Saxifraga hypnoides</i>	mossy saxifrage
<i>Saxifraga tridactylites</i>	rue-leaved saxifrage
<i>Scabiosa columbaria</i>	small scabious
<i>Senecio erucifolius</i>	hoary ragwort

**Table 3. Indicator Species for Calcareous Grasslands**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Serratula tinctoria</i>	saw-wort
<i>Sherardia arvensis</i>	field madder
<i>Sison amomum</i>	stone parsley
<i>Spiranthes spiralis</i>	autumn lady's-tresses
<i>Thalictrum minus</i>	lesser meadow-rue
<i>Thymus polytrichus</i>	wild thyme
<i>Thymus pulegioides</i>	large thyme
<i>Torilis nodosa</i>	knotted hedge-parsley
<i>Trichostomum brachydontium</i>	
<i>Trichostomum crispulum</i>	
<i>Trifolium campestre</i>	hop trefoil
<i>Trifolium scabrum</i>	rough clover
<i>Trifolium striatum</i>	knotted clover
<i>Trisetum flavescens</i>	yellow oat-grass
<i>Veronica arvensis</i>	wall speedwell
<i>Viola hirta</i>	hairy violet
<i>Viola riviniana</i>	common dog-violet
<i>Vulpia bromoides</i>	squirreltail fescue
<i>Weissa controversa</i>	
<i>Weissa brachycarpa</i>	
<i>Weissa microstoma</i>	



## H6) ACID GRASSLANDS

The following will be selected:

- All examples of unimproved acid grassland over 0.2 ha
- All examples of semi-improved acid grassland over 0.5 ha, which retain a relatively high diversity of indicator species.
- Smaller areas (less than 0.5 ha) of unimproved or semi-improved acid grassland if they form an integral part of a larger SINC designation or complex habitat mosaics or fulfil a strategic linking function between SINC.

Acid grasslands are comparatively scarce in the lowlands, being restricted to areas of nutrient-poor acidic soils, and frequently occur on old colliery tips. Acid grasslands are more characteristic of the uplands where they occur over extensive areas, particularly on Common Land, although many of these have been subject to agricultural improvement or are in deteriorating condition due to neglect or over grazing. Acid grasslands are characteristically rather poor in terms of plant species-diversity, but unimproved swards often support characteristic plant species, as well as a range of other wildlife including scarce or rare species.

'Unimproved' in this context refers to swards, which contain a high proportion of the species listed as community constants or preferential associates of the relevant NVC community as described by Rodwell (1992). A list of species indicative of unimproved acid grasslands is given in Table 4. A site should be considered for selection if 7 or more of these species are recorded.

The SSSI selection criteria (NCC 1989) identify U1 sheep's fescue-common bent-sheep's sorrel grassland, U2 wavy hair-grass grassland and U3 bristle bent grassland NVC communities as being of greatest potential value. The UK BAP goes on to define the Priority Habitat as comprising examples of U1-U3 grasslands, together with U4 sheep's fescue-common bent-heath bedstraw grasslands below 300m (UK Biodiversity Group 1998).

The CCW Phase II grassland survey found species-rich U4 grassland to be widespread in lowland South Wales and of high conservation significance. U3 grassland is scarce in South Wales, being more usually confined to southwest England, but it does occur in Glamorgan. U1 and U2 grasslands are comparatively widespread in Wales although chiefly of upland occurrence, the former often associated with upland crags and ledges. A variant of U1 is common on old colliery tips and along parts of old railways. Good examples of U4 grassland typically have high frequencies of species such as common bent-grass (*Agrostis capillaris*), sheep's fescue (*Festuca ovina*), sweet vernal-grass (*Anthoxanthum odoratum*), tormentil (*Potentilla erecta*) and heath bedstraw (*Galium saxatile*), and low frequencies of mesotrophic species such as Yorkshire fog (*Holcus lanatus*) and white clover (*Trifolium repens*).

Acid grassland dominates large areas of upland South Wales; particularly where there has been a history of heavy grazing which has reduced the cover of ericoid species (e.g. heather), which would otherwise dominate this habitat once the tree cover, had been removed. This upland acid grassland is of value as a semi-natural habitat. It supports a characteristic fauna, and short-grazed areas can be of great importance for grassland fungi.

**Table 4. Indicator Species for Acid Grasslands**

Scientific Name	Common Name
<i>Agrostis curtisii</i>	bristle bent
<i>Agrostis vinealis</i>	brown bent
<i>Aira caryophyllea</i>	silver hair-grass
<i>Aira praecox</i>	early hair-grass
<i>Botrychium lunaria</i>	moonwort
<i>Calluna vulgaris</i>	Ling heather
<i>Campanula rotundiflora</i>	harebell
<i>Carex caryophyllea</i>	spring sedge
<i>Carex pilulifera</i>	pill sedge
<i>Carex muricata</i>	prickly sedge
<i>Cirsium dissectum</i>	meadow thistle
<i>Conopodium majus</i>	pignut
<i>Dactylorhiza maculata</i>	heath spotted-orchid
<i>Danthonia decumbens</i>	heath grass
<i>Deschampsia flexuosa</i>	wavy hair-grass
<i>Dicranum scoparium</i>	
<i>Erica cinerea</i>	bell-heather
<i>Erophila verna</i>	whitlow grass
<i>Festuca ovina</i>	sheep's fescue
<i>Galium saxatile</i>	heath bedstraw
<i>Hieracium spp.</i>	hawkweed spp.
<i>Hylocomium splendens</i>	
<i>Hypericum humifusum</i>	trailing St John's-wort
<i>Hypericum pulchrum</i>	slender St John's-wort
<i>Jasione montana</i>	sheep's bit
<i>Juncus squarrosus</i>	heath rush
<i>Lathyrus linifolius</i>	bitter vetch
<i>Luzula multiflora</i>	heath wood-rush
<i>Lycopodium clavatum</i>	stag's-horn clubmoss
<i>Moenchia erecta</i>	upright chickweed
<i>Nardus stricta</i>	mat grass
<i>Ophioglossum vulgatum</i>	adder's-tongue
<i>Ornithopus perpusillus</i>	bird's-foot
<i>Pedicularis sylvatica</i>	lousewort
<i>Pilosella officinarum agg.</i>	mouse ear-hawkweed
<i>Pleurosium schreberi</i>	
<i>Polygala serpyllifolia</i>	heath milkwort
<i>Polytrichum formosum</i>	
<i>Potentilla anglica</i>	trailing tormentil
<i>Potentilla erecta</i>	tormentil
<i>Rumex acetosella</i>	sheeps sorrel
<i>Senecio sylvaticus</i>	heath groundsel
<i>Solidago virgaurea</i>	goldenrod
<i>Spergularia rubra</i>	sand spurrey
<i>Stachys officinalis</i>	betony
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Trifolium scabrum</i>	rough clover
<i>Trifolium striatum</i>	knotted clover

**Table 4. Indicator Species for Acid Grasslands**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Vaccinium myrtillus</i>	bilberry
<i>Veronica officinalis</i>	heath speedwell
<i>Viola canina</i>	heath dog-violet
<i>Viola lutea</i>	mountain pansy
<i>Vulpia bromoides</i>	squirreltail fescue

## H7) MARSHY GRASSLANDS

The following will be selected:

- All areas of:           blunt-flowered rush - marsh bedstraw fen meadow (M22)  
                                  purple moor-grass - meadow thistle fen meadow (M24)  
                                  meadowsweet - wild angelica mire (M27)
- All examples of species-rich M23 over 0.2 ha, which include 12 species in Table 5 and all stands of moderately species-rich M23 (8 species from Table 5) over 0.5 ha
- All examples of species-rich M25 over 0.2 ha, which include 12 species in Table 5 and all stands of M25 (8 species from Table 5) over 0.5 ha
- All stands of marshy grassland (and associated dry grassland habitats), which have been identified as potential, suitable or good condition marsh fritillary habitat
- Smaller areas of marshy grassland if they form an integral part of a larger SINC designation or complex habitat mosaics (including wet heath) or fulfil a strategic linking function between SINC

‘Marshy grassland’, and land known colloquially as ‘marsh’, refers to a diffuse category of wetland habitats where the water table is predominantly below ground level for most of the year. A wide range of soils may be involved, but they do not usually occur on peat deeper than 0.5m. The vegetation is usually grass or rush dominated and may include dense swards of purple moor-grass (*Molinia caerulea*), as well as rush (*Juncus* spp.) or sedge (*Carex* spp.) meadows, and forb-rich wet meadows and pastures.

A list of the vascular plant species indicative of species-rich communities is given in Table 5. A site should be considered species-rich if 12 or more species from this table are recorded.

Marshy grassland habitats mainly comprise varying combinations of communities M22 - M25 of the NVC, often in combination with elements of M15 wet heathland. These are commonly known locally as ‘rhos pastures’, although this term can also extend to include associated dry grassland and heathland elements as well. Some other mire communities of the NVC are also involved, in particular M27 meadowsweet – wild angelica mire.

M22 blunt-flowered rush-marsh thistle fen-meadow is an uncommon community nationally and is regionally rare, usually occurring as small patches on base-rich or mesotrophic, moist soils. It is mainly found in the Vale of Glamorgan, but small areas may occur in the Mid-Valleys area. The community is typically characterised by a dominance of blunt-flowered rush (*Juncus subnodulosus*) with species such as marsh thistle (*Cirsium palustre*), marsh horsetail (*Equisetum palustre*), meadowsweet (*Filipendula ulmaria*), Yorkshire fog (*Holcus lanatus*), and water mint (*Mentha aquatica*).

M23 soft/sharp-flowered rush-marsh bedstraw rush-pasture is more widespread in the north and west of Britain, and is extremely variable in composition and species-richness. Species-rich examples are particularly associated with the edges of the South Wales coalfield, and typically support high frequencies of forb species such as wild angelica (*Angelica sylvestris*), meadowsweet, ragged robin (*Lychnis flos-cuculi*), skullcap (*Scutellaria galericulata*), lesser

spearwort (*Ranunculus flammula*), marsh-orchids (*Dactylorhiza* spp.), marsh-marigold (*Caltha palustris*), marsh-thistle (*Cirsium palustre*) and greater bird's-foot trefoil (*Lotus pedunculatus*). In certain circumstances M23 marshy grassland can be mistaken for rush infested improved or semi-improved grassland, or MG10 grassland (see Neutral Grasslands section).

M24 purple moor-grass-meadow thistle fen-meadow is rare nationally but reasonably widespread, if localised in South Wales, on moist, nutrient-rich circum-neutral soils, often peaty but with base-rich flushing. It tends to occur in localised patches amongst other marshy grassland communities and is usually markedly richer in species. Meadow thistle (*Cirsium dissectum*), a scarce species, is often present, with species such as purple moor-grass, devil's-bit scabious (*Succisa pratensis*), carnation sedge (*Carex panicea*), flea sedge (*C. pulicaris*) and tawny sedge (*C. hostiana*). Other species of interest may include whorled caraway (*Carum verticillatum*), globeflower (*Trollius europaeus*), petty-whin (*Genista anglica*) and marsh valerian (*Valeriana dioica*).

M25 purple moor grass-tormentil mire occurs on moist, peaty soils throughout the lowland and submontane areas of northern and western Britain. Its main characteristic is the dominance of purple moor-grass, but species-rich examples also include forbs such as tormentil (*Potentilla erecta*), saw-wort (*Serratula tinctoria*), lousewort (*Pedicularis sylvatica*), cross-leaved heath (*Erica tetralix*), bog asphodel (*Narthecium ossifragum*), meadowsweet, marsh thistle and wild angelica.

M27 meadowsweet-wild angelica mire occurs throughout lowland Britain on moist circum-neutral soils protected from grazing, especially at the margins of silted, slow-moving streams, pools, damp hollows and soakaways, as well as in artificial habitats such as dykes and roadside ditches. In addition to an abundance of meadowsweet, this community is often characterised by the presence of numerous other species such as common valerian (*Valeriana officinalis*), sorrel (*Rumex acetosa*), ragged robin and wild angelica, together with rushes (*Juncus* spp.) and purple moor-grass at low frequencies. Meadowsweet can also dominate long abandoned damp pastures, but this form of M27 community, whilst still of interest, tends to be of relatively low vascular plant diversity.

The conservation significance of these habitats has only been recognised comparatively recently. They are now recognised as being of Europe-wide significance, with the British Isles (Wales in particular) supporting a substantial proportion of the global resource. The Mid-Valleys area supports a significant area of marshy grassland with about 2,600 ha of purple-moor grass and rush pasture (Jones *et al.*, 2003) representing ~5% of the total UK resource.

The marshy grasslands of South Wales are typically of the M25 and M23 communities, with M25 probably the more extensive overall, especially in the valleys. The M24 fen-meadow community is considerably rarer, and in the Mid-Valleys area often occurs as small stands within larger areas of M25 marshy grassland. M27 is typically present as small stands only. Unimproved and well-managed examples of these communities may be very species-rich and the M23 - M25 communities are important in supporting the rare and protected marsh fritillary butterfly (*Eurodryas aurinia*) and the double-line moth (*Mythimnia turca*) and narrow-bordered bee-hawk moth (*Hemaris tityus*), which are UK Priority species. The Mid-Valleys area is of national significance for the marsh fritillary butterfly.

**Table 5. Indicator Species for Marshy Grasslands**

Scientific Name	Common Name
<i>Achillea ptarmica</i>	Sneezewort
<i>Agrostis canina</i>	velvet bent
<i>Agrostis curtisii</i>	bristle bent
<i>Anagallis tenella</i>	bog pimpernel
<i>Angelica sylvestris</i>	wild angelica
<i>Apium graveolens</i>	Celery
<i>Apium inundatum</i>	lesser marshwort
<i>Apium nodiflorum</i>	fool's-water-cress
<i>Bidens cernua</i>	nodding bur-marigold
<i>Bidens tripartite</i>	trifid bur-marigold
<i>Briza media</i>	quaking grass
<i>Calamagrostis epigejos</i>	wood small-reed
<i>Caltha palustris</i>	marsh marigold
<i>Cardamine pratensis</i>	cuckoo flower
<i>Carex acuta</i>	slender tufted-sedge
<i>Carex acutiformis</i>	lesser pond-sedge
<i>Carex binervis</i>	green-ribbed sedge
<i>Carex disticha</i>	brown sedge
<i>Carex echinata</i>	star sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex hostiana</i>	tawny sedge
<i>Carex laevigata</i>	smooth-stalked sedge
<i>Carex montana</i>	soft-leaved sedge
<i>Carex nigra</i>	common sedge
<i>Carex ovalis</i>	oval sedge
<i>Carex pallescens</i>	pale sedge
<i>Carex panicea</i>	carnation sedge
<i>Carex paniculata</i>	greater tussock-sedge
<i>Carex pendula</i>	pendulous sedge
<i>Carex pseudocyperus</i>	cyperus sedge
<i>Carex pulicaris</i>	flea sedge
<i>Carex riparia</i>	greater pond-sedge
<i>Carex rostrata</i>	bottle sedge
<i>Carex vesicaria</i>	bladder sedge
<i>Carex viridula</i>	common yellow-sedge
<i>Carum verticillatum</i>	whorled caraway
<i>Cirsium dissectum</i>	meadow thistle
<i>Dactylorhiza spp.</i>	spotted or marsh orchids
<i>Dipsacus pilosus</i>	small teasel
<i>Drosera rotundifolia</i>	round-leaved sundew
<i>Dryopteris carthusiana</i>	narrow buckler-fern
<i>Eleocharis spp.</i>	spike-rush spp.
<i>Epipactis palustris</i>	marsh helleborine
<i>Equisetum palustre</i>	marsh horsetail
<i>Equisetum sylvaticum</i>	wood horsetail
<i>Equisetum telemateia</i>	great horsetail
<i>Erica tetralix</i>	cross-leaved heath
<i>Eriophorum angustifolium</i>	common cottongrass
<i>Eriophorum latifolium</i>	broad-leaved cottongrass
<i>Eupatorium cannabinum</i>	hemp agrimony
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Galium palustre</i>	common marsh-bedstraw
<i>Galium uliginosum</i>	fen bedstraw
<i>Genista anglica</i>	petty whin

**Table 5. Indicator Species for Marshy Grasslands**

<i>Geum rivale</i>	water avens
<i>Glyceria declinata</i>	small sweet-grass
<i>Glyceria fluitans</i>	floating sweet-grass
<i>Glyceria maxima</i>	reed sweet-grass
<i>Glyceria notata</i>	plicate sweet-grass
<i>Hydrocotyle vulgaris</i>	marsh pennywort
<i>Hypericum elodes</i>	marsh St John's-wort
<i>Hypericum tetrapterum</i>	square-stalked St John's-wort
<i>Iris pseudacorus</i>	yellow flag-iris
<i>Isolepis setacea</i>	bristle club-rush
<i>Juncus acutiflorus</i>	sharp-flowered rush
<i>Juncus articulatus</i>	jointed rush
<i>Juncus conglomeratus</i>	compact rush
<i>Juncus squarrosus</i>	heath rush
<i>Juncus subnodulosus</i>	blunt-flowered rush
<i>Lotus uliginosus</i>	greater bird's-foot-trefoil
<i>Luzula multiflora</i>	heath wood-rush
<i>Lychnis flos-cuculi</i>	ragged robin
<i>Lycopus europaeus</i>	Gypsywort
<i>Lysimachia nemorus</i>	yellow pimpernel
<i>Lysimachia nummularia</i>	creeping-jenny
<i>Lysimachia vulgaris</i>	yellow loosestrife
<i>Lythrum portula</i>	water purslane
<i>Lythrum salicaria</i>	purple loosestrife
<i>Mentha aquatica</i>	water mint
<i>Menyanthes trifoliata</i>	Bogbean
<i>Molinia caerulea</i>	purple moor-grass
<i>Montia fontana</i>	Blinks
<i>Myosotis laxa</i>	tufted forget-me-not
<i>Myosotis scorpioides</i>	water forget-me-not
<i>Myosotis secunda</i>	creeping forget-me-not
<i>Myrica gale</i>	bog myrtle
<i>Narthecium ossifragum</i>	bog asphodel
<i>Oenanthe aquatica</i>	fine-leaved water-dropwort
<i>Oenanthe crocata</i>	hemlock water-dropwort
<i>Oenanthe fistulosa</i>	tubular water-dropwort
<i>Osmunda regalis</i>	royal fern
<i>Pedicularis palustris</i>	marsh lousewort
<i>Pedicularis sylvatica</i>	Lousewort
<i>Persicaria amphibia</i>	amphibious bistort
<i>Persicaria bistorta</i>	common bistort
<i>Phalaris arundinacea</i>	reed canary-grass
<i>Phragmites australis</i>	common reed
<i>Pinguicula vulgaris</i>	common butterwort
<i>Polygala serpyllifolia</i>	heath milkwort
<i>Potentilla erecta</i>	Tormentil
<i>Potentilla palustris</i>	marsh cinquefoil
<i>Pulicaria dysenterica</i>	common fleabane
<i>Ranunculus flammula</i>	lesser spearwort
<i>Ranunculus sceleratus</i>	celery-leaved buttercup
<i>Rumex conglomeratus</i>	clustered dock
<i>Rumex hydrolapathum</i>	water dock
<i>Sagina nodosa</i>	knotted pearlwort
<i>Salix repens</i>	creeping willow
<i>Scirpus sylvaticus</i>	wood club-rush
<i>Scrophularia auriculata</i>	water figwort

**Table 5. Indicator Species for Marshy Grasslands**

<i>Scutellaria galericulata</i>	Skullcap
<i>Scutellaria minor</i>	lesser skullcap
<i>Senecio aquaticus</i>	marsh ragwort
<i>Serratula tinctoria</i>	saw-wort
<i>Sibthorpia europaea</i>	cornish moneywort
<i>Stachys officinalis</i>	Betony
<i>Stachys palustris</i>	marsh woundwort
<i>Stellaria alsine</i>	bog stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Thalictrum flavum</i>	common meadow-rue
<i>Thelypteris palustris</i>	marsh fern
<i>Trichophorum cespitosum</i>	Deergrass
<i>Triglochin palustre</i>	marsh arrowgrass
<i>Trollius europaeus</i>	globeflower
<i>Vaccinium oxycoccos</i>	Cranberry
<i>Valeriana dioica</i>	marsh valerian
<i>Valeriana officinalis</i>	common valerian
<i>Veronica anagallis-aquatica</i>	blue water-speedwell
<i>Veronica beccabunga</i>	Brooklime
<i>Veronica catonata</i>	pink water-speedwell
<i>Veronica scutellata</i>	marsh speedwell
<i>Viola palustris</i>	marsh violet
<i>Wahlenbergia hederacea</i>	ivy-leaved bell-flower



## H8) FLOODPLAIN GRAZING MARSH

The following will be selected:

- All examples of floodplain grassland, which are extensive, subject to frequent inundation and/or support semi/unimproved grassland communities or populations of characteristic species

Floodplain grasslands occur in flat valley-floor situations and may be ditched or bordered by flood banks. Although the area of floodplain grassland in the Mid-Valleys area is relatively small, with *Priority Habitats in Wales* (CCW, 2003) recording only 290 ha, the proportion of this grassland, which is unimproved, is significantly higher than the national Welsh average. Usually a result of agricultural improvement, Welsh floodplain grassland support improved grassland. Nationally unimproved floodplain grasslands are rare and of high conservation value. Notably an important proportion of the floodplain grazing marshes in the Mid-Valleys area are still subject to low-intensity farming practices and consequently retain a rich variety of marshland and wet-meadow plants and invertebrates. These species-rich floodplain grasslands are therefore a feature of the area. Open water, swamp and wet woodland are often important components in the habitat mosaics of floodplain grazing marshes.

Such sites provide important habitats for a range of plants and animals, particularly birds. Floodplain grasslands with seasonal flooding or in rare cases permanent lagoons and pools can support locally important assemblages of wintering waterfowl, breeding wetland birds, dragonflies and amphibians and hunting grounds for otter (*Lutra lutra*). Grazing marshes are also important for many nationally rare, scarce and local plant species. Examples in the Mid-Valleys area include narrow leaved water plantain (*Alisma lanceolata*), water avens (*Geum rivale*), marsh cinquefoil (*Potentilla palustris*) and tufted loosestrife (*Lysimachia thyrsiflora*).

The recent decline in the extent of floodplain grazing marsh can be attributed to causal agents that include drainage, agricultural improvement and intensification, nutrient-enrichment of watercourses, development pressure and flood prevention measures.

## H9) FFRIDD COMMUNITIES

The following will be selected:

- All large stands of ffridd over 10 ha
- Smaller stands of species-rich bracken habitat, including violet-rich fritillary butterfly habitat
- Smaller areas of ffridd if they form an integral part of a larger SINC designation or complex habitat mosaics or fulfil a strategic linking function between SINC

The designation of ffridd may be supported by the presence of associated species. Associated species are likely to include grassland fungi, bryophytes and lichens, flora, invertebrates, reptiles, birds and mammals. The *South Wales Guidelines* identified bracken as an individual habitat criterion. These criteria are widened to include the characteristic valley side habitat mosaic called 'ffridd'. In the Mid-Valleys area, the ffridd is often represented by extensive mosaics of habitats composed of mixtures of bracken, heath, acid grassland, woodland, scrub and coal spoil, which form near continuous corridors of often diverse and species-rich habitat mosaics running along the length of the main river valleys. In many cases the constituent parts of these large ffridd areas would also qualify as SINC on individual habitat grounds.

The urban boundaries of ffridd are often degraded by rubbish tipping, and support rank vegetation such as bramble thickets or tall un-managed grassland. Such features will be included within the SINC, if they contribute to the species and habitat diversity of the SINC and form an obvious and defensible SINC boundary.

Most of the constituent habitats of the ffridd are described elsewhere in this document. Bracken is the exception and requires some further description. Species-rich bracken habitat often supports a moderately dense and deep litter layer, and beneath the fern canopy shade-tolerant ground flora can thrive, including species such as common dog violet (*Viola riviniana*), bluebell (*Hyacinthoides non-scripta*), climbing corydalis (*Ceratocarpus claviculata*), wood anemone (*Anemone nemorosa*), lesser celandine (*Ranunculus ficaria*) and wood sorrel (*Oxalis acetosella*). These areas are not only of botanical interest; they may also provide habitat for rare, specialist invertebrates such as the high-brown fritillary (*Argynnis adippe*) and other fritillary butterflies. Distinctive communities of nesting birds such as tree pipit, whinchat, wheatear, yellowhammer and cuckoos are often associated with the ffridd, and are contributory features for SINC selection.

Bracken (*Pteridium aquilinum*) is an important part of the Mid-Valleys landscape, but as a highly invasive species it can become a problem when it colonises and takes over more vulnerable habitats, such as heathland and species-rich grasslands. Formerly, bracken was kept in check by traditional cattle grazing or cutting and the reinstatement of cattle and pony grazing on the ffridd would help to increase the diversity of bracken dominated sites. Grazing is also the most effective means of reducing the risk of the early spring grass and 'fern' fires, which damage many ffridd sites. Positive management of the ffridd would therefore have enormous positive biodiversity benefits and would significantly reduce anti-social activities of costly grass-fire control.

## H10) HEATHLANDS AND GRASS-HEATH COMMUNITIES

The following will be selected:

- All examples of unmodified wet heathland and wet grass-heath, and where cross-leaved heath is still present even though reduced in its cover due to grazing pressure
- All examples of unmodified dry heathland
- All examples of degraded heathland, secondary heathland, coal spoil heaths (including lichen/bryophyte/heath) and grass-heath mixtures which either meet the guidelines for designation as acid grassland (and are thus designated as such) or which have at least 10% dwarf shrub heath cover

The designation of heathland sites is supported by the presence of associated species and associated species are likely to include heathland fungi, bryophytes and lichens, flora, invertebrates, reptiles, birds and mammals, and amphibians in wet heath.

Lowland heathlands have become enormously reduced in extent through various human impacts, with an increasingly rapid decline in the period since the 1960's. The decline in the UK of lowland heath is estimated to be of the order of 85% in the last 200 years. Heathland and grass-heath vegetation can be more extensive in the uplands, but large un-degraded blocks are now uncommon. Overgrazing, agricultural improvement, afforestation, land reclamation and opencasting have all reduced the extent of upland heathland and grass heath in South Wales. Old colliery spoil is now recognised as a significant habitat for wet and dry including very characteristic and valuable lichen-bryophyte heaths (refer to Mineral Spoil/Post-Industrial Land Criteria). The Phase 1 habitat survey manual (NCC 1990) stipulates that 25% dwarf shrub heath cover is required for habitat to be considered heathland. However, the 10% threshold for degraded heathland has been chosen with respect to these criteria for SINC selection due to the importance of the habitat, and its growing rarity.

The most characteristic features of the dry heaths of the Mid-Valleys area are common heather (*Calluna vulgaris*), and wimberry (*Vaccinium myrtillus*). Western gorse (*Ulex galli*) and bell heather (*Erica cinerea*) are less frequent, but widespread features of dry heath sites, while cross-leaved heath (*Erica tetralix*) is the characteristic ericoid of wet heaths. A wide assemblage of other flora occurs in heathlands. Drier heaths often have significant acid grassland components, and wet heaths support mire or bog communities. The lichen-heaths of coal spoil support particularly characteristic lichen and bryophyte communities.

Heathland fauna is equally distinctive. Grayling butterflies are often associated with heaths, together with the mountain bumblebee, *Bombus monticola*. Strong reptile populations include common lizards, slow worms and adder, and characteristic birds species include stonechat, and meadow pipit.

## H11) FENS, REEDBEDS AND OTHER SWAMPS

The following will be selected:

- All examples of fen habitat, providing they are not grossly modified by agricultural improvement.
- All examples of reedbed and other tall swamps over 0.2 ha
- Smaller stands of reedbed and swamp if they form an integral part of a larger SINC designation or complex habitat mosaics, or fulfil a strategic linking function.

The designation fens, reedbeds and swamp sites are supported by the presence of associated species. Associated species are likely to include bryophytes and lichens, flora, invertebrates, reptiles, amphibians, birds and mammals. 'Fens' are defined here as mire vegetation occurring on peat or mineral soils  $\geq 0.5$ m deep, where the water level is at or just below the surface for most of the year. The water level in the mire is maintained either as a result of containment by the surrounding topography, or as a result of water running in from surrounding land. Bog moss (*Sphagnum* spp.) and/or sedges (*Carex* spp.), are usually important vegetation components. Due to the rarity of fens, with only 110 ha of basin and valley mire mapped by CCW Phase I and in the *Priority Habitats Guide* (CCW, 2003) degraded fens, where bog moss and sedges are greatly reduced in their abundance, will be selected for SINC designation.

Three main types of fen are usually recognised, determined primarily by topographic features. These are 'valley mire' (fed by an obvious water flow), 'basin mire' and 'floodplain mire' (both formed as a result of impeded drainage), although in practice these may be difficult to distinguish. Fens may support vegetation more usually characteristic of other habitats such as marshy grassland, swamp and reedbeds.

'Swamp' comprises tall wetland vegetation occurring in situations where the water level is usually distinctly above the surface for much of the year. Swamps occur on a range of soils, but seldom on deep peat. The category includes reedbeds and tall marginal/emergent vegetation. The CCW Phase I Survey recorded only 17 ha of reedbeds and 13 ha of other swamp in the Mid-Valleys area.

Reedbeds and other swamps are particularly important for birds, amphibians, reptiles and invertebrates, the former including uncommon and declining nesting species such as reed warbler, reed bunting and water rail, and wintering species such as snipe and bittern. 'Secondary' swamps in disturbed locations often develop substantive conservation significance, for example in supporting key nesting birds.

A wide range of NVC communities may occur in fens, including the tall herb communities S25-S28 and the mires M9-10, M13-14, M21 and M27 (see Rodwell 1991 for further details). The relative frequency of different fen NVC communities in the Mid-Valleys area has not been established.

A wide range of NVC communities may occur in swamps, although the commonest is S4 common reed (*Phragmites australis*) swamp ('reedbed'). S12 bulrush (*Typha latifolia*), S14 branched bur-reed (*Sparganium erectum*), S5 reed sweet-grass (*Glyceria maxima*), S10 water horsetail (*Equisetum fluviatile*) and S3 greater tussock-sedge (*Carex paniculata*) swamps.

## H12) BOG HABITATS AND FLUSHES

The following will be selected:

- All examples of un-degraded bog habitats
- All degraded bog habitats with the potential for restoration or which support some distinctive features of the habitat type
- Individual neutral, basic or acid flushes of any size, providing they are not grossly modified by agricultural improvement

The designation of bogs sites may be supported by the presence of associated species. Associated species are likely to include bryophytes and lichens, flora, invertebrates, amphibians, birds and mammals.

‘Bog’ is a generic term covering mire vegetation occurring on peat  $\geq 0.5\text{m}$  deep, where the water level is at or just below the surface and is maintained principally by rainfall rather than by groundwater sources. The main vegetation component is usually bog moss (*Sphagnum* spp.), with members of the sedge family and sometimes with ericoid (heath family) species.

Lowland raised bog is a scarce habitat in Britain, but important sites do occur in the Mid-Valleys area. It should be noted that differentiating lowland bogs from ‘fen’ sites such as valley mire and basin mire can be very difficult and require expert interpretation. Upland blanket-bog and raised bog are restricted to upland plateaus and although sites can be large, the distribution and area of upland bog has been much reduced in the Mid-Valleys area, by afforestation and agricultural improvement. Recent work by the Glamorgan Biodiversity Advisory Group has identified the potential for bog restoration in forestry plantations.

The most common types of ‘flush’ in Wales are M6 acidic flushes, which in most cases occur in close association with larger mire, wet heath and marshy grassland complexes. Basic or neutral flushes are scarcer, containing a number of specialised communities, including M10 base-rich flushes which can occur in both uplands and lowlands, but which are invariably small in size. Most smaller sites will probably fall within larger areas of surrounding habitats which also qualify for selection, however the nature conservation importance of flushes, with the range of higher plant, bryophyte and invertebrate interest that is likely to be present, justifies all unmodified flushes being considered for SINC designation.

Flushes normally occur on shallow mineral soils or peat  $< 0.5\text{m}$  deep, and have a distinct flow of water passing through them at or immediately below the surface. In many cases flushes form part of a larger mosaic of related habitats and could be included with these. However, isolated examples of interest may also be encountered, especially in the lowlands where base-rich influences are present.

## H15) WATERCOURSES

The following will be selected:

- All examples of stretches of main river where the riverbed and banks remain comparatively unmodified and the water is not grossly polluted
- All examples of stretches of smaller watercourses (i.e. streams, canals, brooks etc.), which are comparatively unmodified within the last 100 years, which support good aquatic, emergent or bank side plant communities, and the water is not grossly polluted
- All examples of systems of reens and/or ditches with a diverse aquatic flora and/or fauna (including the associated habitat, e.g. field systems on river floodplains)
- All stretches of watercourses which support protected species, including otter and water vole

The designation of watercourses will be supported by the presence of associated species. Associated species are likely to include bryophytes and lichens, flora, invertebrates, fish, birds and mammals.

'Good' aquatic, emergent or bank side communities are taken in this context to mean diverse semi-natural plant communities dominated by combinations of characteristic native species.

Important river features and habitats include riffles and pools, meanders, eroding soft cliffs, exposed bedrock, and exposed riverine sediments (gravel bars, etc). There is often little or no vascular plant interest to such features, but they are good indicators of the physical naturalness of watercourses and the overall quality.

Canals provide a different habitat type, usually with slow flowing water, and steep, straight banks. Canals, and drainage ditches can support diverse aquatic, emergent, and fringing vegetation, and can be particularly valuable as invertebrate habitats.

Watercourses designated as SINC's should comprise as much of the river corridor as possible, including adjacent semi-natural habitats at least up to 7m from either bank top, although this may be narrower locally where the land alongside is developed or otherwise degraded by human activities. Adjacent semi-natural habitat directly associated with and adjacent to qualifying watercourses should be included, even if these do not merit designation as a SINC in their own right. This may include tree lines, flood meadows, semi-improved grassland, woodland, marsh and pollard willows.

Species contributing to a watercourse SINC can include native wild fish, aquatic invertebrate assemblages indicative of good water quality, or the presence of rare, scarce or uncommon invertebrate species in the river corridor. In addition contributory features may include aquatic, emergent or bank-side flora (see Table 15 in Species Criteria) or the presence of key riparian bird species and/or priority mammal species (including water vole and otter).

Freshwater habitats are difficult to conserve, being greatly subject to physical and chemical modification arising from artificial disturbance within their catchments. Land-use changes and human disturbance can provoke profound alterations in many aspects of riverine ecology, and is

especially notable in rivers with lowland catchments (NCC 1989). Due to their linear nature, their importance as habitat corridors and their extensive influence, a blanket 'linear' designation is used in the Mid-Valleys area for the selection of river and stream SINC<sup>s</sup>. This can be modified by professional judgement to ensure the protection of the widest range of riparian features and the fullest expression of habitat transitions and successions within the catchment. These linear SINC<sup>s</sup> should reflect the habitat continuity provided by the watercourse itself, whilst taking in adjacent habitats of high value, which are linked to, or influenced, by, the watercourse.

## H16) STANDING OPEN WATER

The following will be selected:

- All examples of lakes and ponds which have largely unmodified, semi-natural beds and banks, good water quality and/or which support good aquatic, emergent or bank side plant communities
- All examples of ponds which score 'High' or 'Very High' when assessed using methodology set out in the *National Pond Survey* (Pond Action, 1998)
- All ponds which qualify under individual relevant Species Criteria (flora, invertebrates, amphibians, or birds)
- All less valuable ponds if they occur as integral features larger mosaic SINC

In this context, 'good' aquatic, emergent or bank side communities are taken in this context to mean diverse semi-natural plant communities dominated by combinations of characteristic native species.

SINC designation will include an appropriate area of terrestrial habitat around any selected ponds and lakes, which would be sufficient to protect the water body from incidental pollution or disturbance should be included within the designated site. This should typically be a minimum of 10m wide from the water's edge.

The definition of a pond is 'a body of standing water 0.0025 ha (25m<sup>2</sup>) to 2.0 ha in area which usually holds water for at least four months of the year' (Williams *et al*, 1998). The *National Pond Survey* (Pond Action, 1998) provides a methodology recommended for pond surveying. Above this size threshold, standing water is described as a lake (or reservoir).

SINC designations will be supported by the presence of associated species, including aquatic or marginal invertebrates, amphibians, reptiles, birds and mammals.

In some cases there may be networks of small ponds, which qualify individually on species-based guidelines, especially where these support the rare and protected great crested newt (see Species Criteria S4). In order to allow for natural migration by this and other species of note both between ponds (e.g. during the breeding period) and into terrestrial habitats around ponds (e.g. during the late summer period and winter hibernation period), it may also be necessary for the SINC to include linking terrestrial habitat corridors.

Lakes, reservoirs and ponds can also be important feeding areas for otter and bats, while larger water bodies often support wintering and breeding waterfowl. For reasons of habitat and species connectivity, habitat links between ponds, watercourses (rivers and streams), hedgerows and woodlands should also be included within larger SINC designations.



## H17) HEDGEROWS

The following will be selected:

- All sites that support close networks of interlinked hedges of which the majority (i.e.  $\geq 50\%$ ) score grade 2 or higher when evaluated using the HEGS methodology (Clements & Tofts, 1992)
- All sites that support close networks of interlinked hedges of which the majority contain 5 or more native woody shrubs in a 30 metre sample and which qualify as 'Important Hedgerows', as defined in the Hedgerow Regulations (HMSO, 1997). N.B. 'close networks' in this context refers to sites in which the average field size is about 4.0ha or less.
- All those hedges that score grade 1 (including -1) when evaluated using the HEGS methodology (Clements & Tofts, 1992) and/or are linked to woodlands, ponds or other locally important habitats, and/or are known to support rare or protected species.
- All other hedgerows and hedgerow networks which form important links to woodlands, ponds or other locally important habitats, and/or are known to support rare or protected species (see Species Criteria).

The designation of hedgerow SINC may be supported by the presence of associated species. Associated species are likely to include fungi, flora, invertebrates, reptiles, amphibians, birds and mammals.

Hedgerow systems and their associated standard trees are often remnants of ancient field boundary layouts and may be of critical value both as linear habitats and as habitat corridors, supporting very large and diverse populations of flora and fauna, and providing an important linking function between other valuable habitats. For species such as dormouse and great crested newts, and as foraging corridors for bats, hedgerows can be vital in maintaining habitat connectivity. This connectivity role can be particularly important in areas of lower biodiversity value e.g. agriculturally improved landscapes or certain urban environments.

Hedgerows may often be included incidentally in SINC's which are designated for other reasons (e.g. grasslands) and where the hedges are of high conservation value this should be noted in the reasons for selection. However, good systems of hedges may also be a reason for selection in their own right.

## H18) MINERAL SPOIL TIPS AND OTHER POST-INDUSTRIAL LAND

The following will be selected:

- All examples of species-rich mineral spoil tips/post-industrial land that have naturally re-vegetated with a diverse range of native and archaeophyte non-woody plant species. The constituent habitats will be assessed against individual habitat criteria as set out in this document or as part of large mosaic SINC.
- All examples of lichen-heath on mineral spoil tips which support the 8 key lichen-heath species identified in the *Strategic Conservation Assessment of Heathland and Associated Habitats on the Coal Spoils of South Wales* (Miller HS, Clarkson, B and Smith, PL., 2007)

The designation mineral spoil sites may be supported by the presence of associated species. Associated species are likely to include fungi, bryophytes and lichens, flora, invertebrates, reptiles, amphibians, birds and mammals.

A diverse range of post-industrial sites are found throughout South Wales, with areas of colliery spoil, slag and old quarries being common in the coalfield, and a range of derelict land and demolition sites occurring in and around towns and cities. Other post-industrial sites (in the broadest sense) include disused railway lines, cuttings, rubbish tips and embankments.

The varied, often mixed soil types, and the frequent occurrence of varied topography and extremes of drainage all promote high floral and faunal diversity on such sites. Past and/or ongoing ground disturbance, and substrate instability, or infertility often leads to patchy or extensive areas of largely bare ground, which can be a positive feature for annual and specialist colonisers, and fauna such as grayling (*Hipparchia semele*) and emerald tiger-beetle (*Cicindela campestris*). Extensive areas of largely bare ground can be important for breeding birds such as lapwing (*Vanellus vanellus*) and little ringed plover (*Charadrius dubius*), whilst sites with varied vegetation structure with bare ground, herbaceous vegetation and scrub in close proximity, are often valuable for reptiles and scarce or rare invertebrates.

Little systematic work has been undertaken in the Mid-Valleys area to classify and interpret post-industrial habitats. Recent attention has been focused on coal spoil sites and in particular distinctive lichen-heath communities, which are a feature of the Mid-Valleys area.

Many post-industrial sites will qualify as SINC as a result of the presence of habitats, which have recognisable semi-natural compositions e.g. grasslands, ponds, heathland or scrub (see relevant section elsewhere in these criteria). However post-industrial habitats usually have distinctive structural and compositional features that portray their origins. These post-industrial elements add a distinctive diversity to such habitats and are a valuable feature.

**Table 6. Indicator Species for Mineral Spoil Tips**

Scientific Name	Common Name
<i>To be added.</i>	

## **H19) SPECIES-RICH TILLAGE FIELDS AND MARGINS**

The following will be selected:

- All examples of fields that contain 8 or more species listed in Table 7.

The designation of SINC may be supported by the presence of associated species. Associated species are likely to flora, invertebrates, reptiles, birds and mammals.

Arable farmland is rare in the Mid-Valleys area. However arable was once an important component of the subsistence, mixed farming, which occurred in this area in the 19<sup>th</sup> century. This may help to explain why arable bird species, including yellowhammer and grey partridge were once well established in the South Wales valleys. Today a little cereal style arable occurs along the southern fringe of the Mid-Valleys area. In the uplands, areas of hillside are occasionally ploughed and sown down with root crops as winter-feeding for sheep.

The flora of arable fields across Europe has seriously declined, mainly as a result of the use of selective herbicides, seed-cleaning techniques and competitive crop variants. In Wales this loss has been compounded by conversion of fields to permanent pasture, and many characteristic species are now either threatened, rare or extinct..

Both un-cropped and unsprayed fields are important for a range of invertebrates and small mammals as well as several species of nesting and over-wintering birds, including skylark (*Aluada arvensis*), grey partridge (*Perdix perdix*) and brown hare (*Lepus europaeus*). Spring sown crops provide valuable breeding sites for lapwing (*Vanellus vanellus*).

**Table 7. Indicator Species for Tillage Fields and Margins**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Agrostemma githago</i>	corncockle
<i>Anagallis arvensis subsp. foemina</i>	blue pimpernel
<i>Anchusa arvensis</i>	bugloss
<i>Anisantha diandra</i>	great brome
<i>Anthemis arvensis</i>	corn chamomile
<i>Anthemis cotula</i>	stinking chamomile
<i>Anthriscus caucalis</i>	bur chervil
<i>Brassica nigra</i>	black mustard
<i>Bromus secalinus</i>	rye-brome
<i>Centaurea cyanus</i>	cornflower
<i>Chenopodium album</i>	fat-hen
<i>Chenopodium ficifolium</i>	fig-leaved goosefoot
<i>Chenopodium murale</i>	nettle-leaved goosefoot
<i>Chrysanthemum segetum</i>	corn marigold
<i>Coronopus squamatus</i>	swine-cress
<i>Descurania sophia</i>	flixweed
<i>Erysimum cheiranthoides</i>	treacle mustard
<i>Euphorbia exigua</i>	dwarf spurge
<i>Euphorbia helioscopia</i>	sun spurge
<i>Euphorbia platyphyllos</i>	broad-leaved spurge
<i>Fallopia convolvulus</i>	black bindweed
<i>Fillago vulgaris</i>	common cudweed

**Table 7. Indicator Species for Tillage Fields and Margins**

<b>Scientific Name</b>	<b>Common Name</b>
<i>Fumaria purpurea</i>	purple ramping-fumitory
<i>Fumaria bastardii</i>	tall ramping-fumitory
<i>Fumaria muralis</i>	common ramping-fumitory
<i>Fumaria officinalis</i>	common fumitory
<i>Galeopsis angustifolia</i>	red hemp-nettle
<i>Galium tricornutum</i>	corn cleavers
<i>Gastridium ventricosum</i>	nit-grass
<i>Hypochaeris glabra</i>	smooth cats-ear
<i>Kickxia elatine</i>	sharp-leaved fluellen
<i>Kickxia spuria</i>	round-leaved fluellen
<i>Lamium amplexicaule</i>	henbit dead-nettle
<i>Lamium hybridum</i>	cut-leaved dead-nettle
<i>Lepidium campestre</i>	field pepperwort
<i>Lithospermum arvense</i>	field gromwell
<i>Lythrum hyssopifolium</i>	grass-poly
<i>Misopates orontium</i>	weasel snout
<i>Papaver argemone</i>	prickly poppy
<i>Papaver dubium</i> (both ssp's)	long-headed poppy
<i>Papaver hybridum</i>	rough poppy
<i>Papaver rheos</i>	common poppy
<i>Petroselinum segetum</i>	corn parsley
<i>Polygonum rurivagum</i>	cornfield knotgrass
<i>Ranunculus arvensis</i>	corn buttercup
<i>Ranunculus parviflorus</i>	small-flowered buttercup
<i>Ranunculus sardous</i>	hairy buttercup
<i>Reseda lutea</i>	wild mignonette
<i>Scandix pecten-veneris</i>	shepherd's-needle
<i>Sherardia arvensis</i>	field madder
<i>Silene gallica</i>	small flowered catchfly
<i>Silene noctiflora</i>	night-flowering catchfly
<i>Spergula arvensis</i>	corn spurrey
<i>Stachys arvensis</i>	field woundwort
<i>Thlaspi arvense</i>	field penny-cress
<i>Torillis arvensis</i>	spreading field parsley
<i>Torillis nodosa</i>	knotted hedge-parsley
<i>Urtica urens</i>	small nettle
<i>Valerianella dentata</i>	narrow-fruited cornsalad
<i>Valerianella rimosa</i>	broad-fruited cornsalad
<i>Veronica agrestis</i>	green field-speedwell
<i>Viola arvensis</i>	field pansy

## H20) MOSAIC HABITATS AND COMMON LAND

Mosaic sites, comprising of complex mixtures of semi-natural habitats, are one of the key features of the Mid-Valleys area. Generally most mosaic SINC<sup>s</sup> will support a variety of different habitat types, of which the largest or most species-rich would often qualify on individual habitat criteria. Smaller areas of habitat, and/or areas of less species-rich habitat, will be included in mosaic SINC designations where they form an integral part of the ecological functioning of the SINC, fulfil a linking role between areas of higher value or represent important habitat areas for key species.

It is unrealistic to design a criterion for the selection of such sites because of the potential variety of habitats and features that could be involved. The difficulties implicit with mosaic sites mean that expert judgement is likely to be required in individual cases.

However, the following will be selected:

- Any coherent site, which comprises at least 3 distinct habitat types, where at least 1 habitat is approaching SINC selection status in its own right, providing that improved, species-poor or degraded elements of low or negligible conservation interest do not form a significant proportion (>25%) of the total area.
- A 'block designation' of extensive areas of open countryside where semi-natural upland features predominate.

The designation of mosaic SINC<sup>s</sup> may be supported by the presence of associated species.

Parks, gardens and golf courses can support mosaics of comparatively undisturbed habitats, including semi-natural grasslands, large trees, small woodlands and scrub, lakes and ponds, etc. Many wetlands may also qualify as mosaic sites, their importance lying in the continuity and interdependence of the habitats represented, rather than on the individual significance of key habitats or species. As a general rule, it is desirable to aggregate individually qualifying habitats together into single sites where the habitats are adjacent and/or intimately associated.

The present state of survey information for uplands is significantly less detailed than for the lowlands. However, in the Mid-Valleys area, very important and valuable upland habitats still occur in intricate mosaics of bog, moor, marshy and acid grassland and bracken, and collectively form large expanses of open country supporting a wide range of characteristic species, including Common Land. These habitat mosaics often extend into the extensive blocks of upland forestry.

The large size of upland SINC<sup>s</sup> reflects the expanse of un-enclosed habitats and the often very different land-use pressures experienced in comparison with the lowlands (below the enclosure walls). In terms of planning, SINC<sup>s</sup> in upland areas are subject to different development pressures, with particular emphasis on large-scale schemes, such as wind farms, pipelines and power cabling.

## H21) ROCK EXPOSURES

The following will be selected:

- All occurrences of limestone pavement, especially where supporting a rich gryke flora (i.e. mixtures of species characteristic of calcareous woodlands and grasslands within the cracks and furrows)
- Inland cliffs, quarries, crags and associated screes, where these support species of interest

Limestone pavement is very rare in the Mid-Valleys area, with only 1 ha identified by the CCW Phase 1 Habitat Survey and in the *Priority Habitats in Wales Guide* (CCW, 2003) in Merthyr Tydfil county borough. More general rock exposures are a characteristic feature of many uplands sites and can also occur locally in lowland situations. In most cases, rock exposures are likely to fall within mosaics of other surrounding habitats that also qualify for selection. In some cases, the presence of species of interest will also allow selection under the Species Criteria.

Quarries are man-made rock exposures, which often support important biodiversity features. Small pennant sandstone or limestone quarries are a feature of the Mid-Valleys area and can support woodland, acidic heath/fern (sandstone) or calcareous grassland/scrub (limestone). Sunny south or west facing quarries often support warm microclimates and excellent reptile habitat, and many peregrine nesting sites rely on inaccessible quarry ledges.

All rock exposure sites may also qualify as geological RIGS.

## H22) OTHER FEATURES

The following should be considered for selection:

- Continuous sections of disused railway line supporting semi-natural vegetation
- Continuous sections of green lanes and other linear features that have more-or-less continuous semi-natural woodland boundaries or wide flowery verges and/or un-surfaced track ways.
- All examples of areas where there are significant populations of anthills and/or where several are estimated to be in excess of 50 years old

Some linear features include disused railway lines, green lanes; roadside verges and old drove roads. Whilst seldom supporting rare species, unmodified sections of linear features can be important in providing long corridors of semi-natural habitats, especially through built-up areas and intensive agricultural landscapes, often linking together series of smaller sites, which might otherwise be isolated. Such features may have high invertebrate interest and be of special value for reptiles.

Where roadside verges are under consideration for selection, the grassland Habitat Criteria (H4 to H7) should be consulted and the appropriate thresholds met for SINC qualification. Any artificially created grassland verges that meet the grassland Habitat Criteria should also be shown to have retained their nature conservation interest for a period of 10 years or more.

Other features may also include those areas with anthill populations. Anthills are a feature of ancient semi-natural grasslands and indicate their lack of any recent intensive farming practices, such as ploughing. Not only are such features important for their invertebrate interest, they are also a historic feature, with some anthills often being in excess of 50 years old. The presence of anthills should be a contributory factor to SINC designation. Where the anthill population is of a significant density, size and/or number, this should be one of the primary reasons for designation. It is known that those mounds of the yellow meadow ant (*Lasius flavus*) generally add roughly 1 litre of soil per year (Pickles, 1942); therefore estimating the volume of soil in a mound can give the age of an anthill. In old meadows some such anthills can contain 100 litres of soil and therefore can be estimated to be 100 years old.



