

7. Mires

7.1 Description

Blanket mire and wet heath

Found in the sub-montane zone above the unenclosed agricultural land, ombrotrophic mires (fed exclusively from precipitation) are a post-glacial climax vegetation formation found particularly in western and northern areas.

Blanket bog is typified by sphagnum, dwarf shrubs, sedges and grasses. Although this habitat is found in thirteen out of eighteen Natural Areas it shows considerable ecotypic variation in terms of the range and composition of NVC communities, altitude and oceanicity. Surface patterning (repeated and distinctive arrangement of vegetation and peat features) is an important manifestation of climatic irregularities.

NVC description for blanket mire and wet heath

M17
M19
M20
M18
M21
M15
M16

Bog pools and poor fens

M1
M2
M3
M4
M5
M6

Sedge dominated rich fens

M9
M10
M11
M13

Molinia and rush pastures

M22
M23
M26
M25
M27

Soakways and springs

M29
M32
M35
M37
M38

7.2 Status

Blanket bog is internationally rare because of the restrictive climatic conditions which give rise to its formation and survival. In the northern hemisphere it can be found in Norway, Newfoundland, Alaska, Kamchatka, and Japan, whilst its range is confined in the southern hemisphere to Tierra del Fuego, the Falkland islands, Tasmania and New Zealand.

Britain is thought to contain about 2 million hectares, some 10-15% of the total global area of blanket mire (Lindsay et al 1988).

The international importance of blanket bogs and the species and communities they support are recognised by

- a) The EC Directive on the Conservation of natural and semi-natural habitats and of wild fauna and flora (Directive 92/43/EEC)
- b) The United Nations Conference on Environment and Development Convention on Biological Diversity was ratified by the UK Government on 1st September 1994
- c) Ramsar Convention on Wetlands
- d) The Convention on the conservation of European Wildlife and Natural Habitats - The Bern Convention
- e) The EC Directive on the Conservation of Wild Birds (Directive 79/409/EEC)

In England blanket bog still remains, in some form, across its original range. However its condition has been variously modified from that which we would consider to be its natural climax condition. It is possible to find reasonable quality active blanket bog in each blanket bog region.

The link between variation in climate and bog types can be used to identify localities (Natural Areas or NA groupings) which could be considered nationally and possibly, internationally significant. These have been derived by considering climatic zone data and the distribution of deep peat soils:

The Border Uplands including the Cheviot
North Pennines
Southern Pennines (Central Pennines)
Cumbrian Fells and Dales (Lake District/Shap)
North York Moors
Bowland Fells (Lancashire Uplands)
The Dark Peak
Dartmoor

In addition, 'intermediate' mires, those which have upland blanket bog and lowland raised mire characteristics, are of exceptional importance (eg Border Mires).

8. Grasslands

8.1 Description

Grassland habitat found above the line separating enclosed from unenclosed land in England are of two types; swards with a calcifuge flora (acid or acidic grasslands) and grasslands where calcicoles are the prominent feature. Both are anthropogenic, plagioclimax communities where the impact of grazing stock (wild and domesticated) has particular biotic influence.

Acid (calcifuge) grasslands

Generally, acid grasslands are derived from woodland clearance followed by the heavy grazing of the resulting dwarf shrub communities. Although acid grasslands are the most extensive grassland type in England, they have largely been overlooked by vegetation specialists due to their relative lack of species diversity. However, acid grasslands are now being increasingly recognised for their invertebrate and vertebrate interest. Agriculturalists are also concerned with these swards as they provide more palatable grazings of higher nutritional value, especially in the spring, than the ericaceous communities from which they are derived.

There are five major acid grassland communities which are found on moorlands in England:

U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland.

This is the most widespread of all acid grasslands in England and associated with better-drained, base poor mineral soils throughout north-west Britain. It is of great agricultural importance as it is the major contributor to rough grazing land and higher, enclosed but unfertilised allotment pastures. The sward is characteristically tight, and sometimes tussocky, dominated by sheep's fescue (*Festuca ovina*), common bent (*Agrostis capillaris*) and sweet vernal-grass (*Anthoxanthum odoratum*).

U3 *Agrostis curtisii* grassland.

Bristle bent (*Agrostis curtisii*) is occasionally found within U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland in the warmer oceanic climate of the south-west of England. However, it can come to dominate swards on free draining podzolised soils moistened by high rainfall. It seeds prolifically and is seemingly fire resistant. In these situations, especially in the early years following a burn, bristle bent can become temporarily dominant. However, where burning is used judiciously with grazing it can be more permanent. Exmoor, Dartmoor and Bodmin Moor are its strongholds in the UK.

U2 *Deschampsia flexuosa* grassland.

Wavy hair-grass can become dominant on free draining, drought free mineral soils and drier peats leading to the appearance of this distinctive community. This grassland is more important agriculturally as wavy hair-grass provides a better bite than bristle bent. Although mainly a lowland grassland type it is common in the upland fringes of northern England.

- U5 *Nardus stricta-Galium saxatile* grassland.
On rough grazing land at higher altitudes on impoverished mineral soils, mat grass can become dominant with common bent, sweet vernal-grass and wavy hair-grass as subordinates. Mat grass is a nutritionally poor grass with a tight tillering habit. Its wiry tussocks standing proud of the surrounding sward are characteristic of the poorer *Nardus stricta-Galium saxatile* grasslands of the north and west of Britain.
- U6 *Juncus squarrosus-Festuca ovina* grassland.
Heath rush (*Juncus squarrosus*) is one of the few species able to compete with mat grass and, unlike that species, is able to survive in non-mineral soil. It therefore thrives in the moister peats in the cooler and wetter parts of northern and western Britain. When most abundant, this grassland can contain mat-grass (*Galium saxatile*) and common bent (*Potentilla erecta*) on drier areas and heath bedstraw (*Eriophorum vaginatum*), tormentil (*E. angustifolium*) with hair's-tail cotton-grass (*Sphagnum recurvum*) and common cottongrass (*S. capillifolium*) in wetter situations degrading into wet heath and mire.

Calcareous grassland

Calcareous grasslands are inherently more species rich than grasslands on acidic substrate. The major resource is at lower altitudes. In both the uplands and lowlands these grasslands are under threat from agricultural improvement and reclamation, inappropriate grazing regimes and neglect. The only area where there are extensive Carboniferous outcrops in the UK is the Craven Pennines and Upper Teesdale. Elsewhere these parent materials are of limited and local occurrence and are sometimes mantled by lime-poor drift including peat. There are two NVC communities which characterise these areas:

- CG10 *Festuca ovina-Thymus praecox* grassland.
This tight and often close-cropped grassland is one of the most widespread forms of calcareous grassland in England. It occurs in locations throughout the British uplands on calcareous bedrocks. The two grasses which form the basis of the sward are common bent, and sheep's fescu, with sweet vernal-grass, mat grass and heath grass (*Danthonia decumbens*) being locally distributed. Sedges are frequently found including, glaucous sedge (*C. flacca*) and spring sedge (*C. caryophyllea*) and sometimes flea sedge (*C. pulicaris*), carnation sedge (*C. panicea*) and pill sedge (*C. pilulifera*) on drier areas. Thyme (*Thymus praecox*) is the most common dicotyledon present, occurring with rock-rose (*Helianthemum nummularium*), common violet (*Viola riviana*), ribwort plantain (*Plantago lanceolata*), hare bell (*Campanula rotundifolia*) and self-heal (*Prunella vulgaris*).
- CG9 *Sesleria albicans-Galium sternerii* grassland.
This is confined to the Carboniferous Limestone of Morecombe Bay, the Craven District of North Yorkshire, and the borders of Cumbria, Durham, North Yorkshire and Upper Teesdale. However, although very localised, this is probably the most extensive form of calcareous grassland in the uplands of England. Its structural characteristics vary considerably with location, occurring as open and closed swards, in rocky situations such as on rock ledges and over limestone pavement clints. It can be tall and tussocky in appearance or short and closely cropped. The most prominent grass species in this community is blue moor-grass (*Sesleria albicans*) occurring with crested hair-grass (*Koeleria macrantha*) and

sheep's fescue, and occasionally quaking-grass (*Briza media*) and meadow oat-grass (*Avenula pratensis*).

8.2 Status

Acid (calcifuge) grasslands

Acid grasslands are especially well developed in the UK. Although, in general, acid grasslands are of a lower conservation status than the ericaceous communities from which they are derived, they are an important component of the mountain and moorland mosaic of communities.

Of particular note in the UK is U3, *Agrostis curtisii* grassland which is confined to the south-west of England where it is especially well developed.

U6, *Juncus squarrosus*-*Festuca ovina* grassland is also well developed in the UK with no community counterparts outside the UK (Thompson et al 1995).

Biodiversity: The UK Steering Group Report contains an acid grassland habitat statement.

Calcareous grassland

Calcareous grasslands are thought to have been widespread at a European scale, at the turn of the century (Dijk 1991). However as calcareous grasslands are particularly sensitive to changes in management, these grassland types are now rare in Europe.

The international importance of calcareous grasslands found in the uplands are recognised by the UK Biodiversity Action Plan which contains a calcareous grassland habitat statement to be followed within the next three years by a costed action plan.

9. Scrub

9.1 Description

'Scrub' is used widely by conservationists generally to refer to tree and shrub growth (excluding ericoid and prostrate dwarf shrubs) less than five metres in height.

Barkman (1990) identified some 27 types of scrub based on structural elements:

- alpine and sub-alpine scrub - at and above the altitudinal limit of tree growth
- sub-montane scrub - where soil conditions or exposure limit tree growth
or
- natural succession from open land through scrub to woodland including some scrub types prevented from succession because of lack of seed or appropriate germination conditions.

Scrub is thought to have been more widespread in the uplands in the past than it is today. Alpine scrub has probably suffered the severest reduction (Hester 1995).

Scrub can be found throughout the uplands and lowlands of England as scattered bushes and isolated, continuous or sometimes dense stands. There is a dearth of information about scrub community types and their status. However there are certain species which are known to be scrub forming:

- Dwarf Birch (*Betula nana*), is widespread in the north of Britain, generally in an altitude range of between 250 to 850 metres, but with localised populations of low plant number. In England, outlying populations are located in the North Pennines and Border Uplands Natural Areas.
- *Betula pendula* and *Betula pubescens*, are pioneer species. *B. pendula* is prevalent throughout the south and east of England (Kinnaird 1968) on drier soils whilst *B. pubescens* can be found in the north and west and is able to tolerate more exposed conditions with impeded drainage. Birch scrub and woodland is found throughout the uplands (Kirby 1984)
- Rowan, (*Sorbus aucuparia*), is native throughout Britain and can grow at higher altitudes (over 1000 metres in Scotland) than any other tree.
- Juniper (*Juniperus communis* ssp. *communis*), has the most extensive worldwide range of any tree, and is the only tree that can be found growing in the wild on both sides of the Atlantic (Mitchell, 1979). It grows on chalk and limestone in England in open and sunny locations and is tolerant of poor soils. In the UK its headquarters are in the Eastern and Central Highlands of Scotland. In England it is found in scattered locations in the south and the north. Indications are that stands are being fragmented to the point where only isolated individuals remain. The recruitment and establishment of seedlings is low thus inhibiting the ability of existing colonies to regenerate naturally. These factors have been attributed to grazing pressure especially in the north of England where the juniper population consists almost entirely of old bushes of similar age. These are under threat from being grazed out completely and are vulnerable to disease.

W19 *Juniperus communis* ssp. *communis*-*Oxalis acetosella* woodland where Juniper is always the most abundant woody species, sometimes with an over-canopy of birch. Other common species within this community are ericaceous shrubs (usually bilberry, cowberry and heather), ferns, herbs and bryophytes. This undershrub cover is affected by variation in soil and grazing. W19 is found at high altitudes, commonly at 300-650 m in the colder but relatively dry parts of north-west Britain (Rodwell 1991). (Distribution map from Rodwell)

- Willows (*Salix* spp), form scrub with a localised distribution in the English uplands.

9.2 Status

Scrub is part of the natural altitudinal sequence of vegetation types found within Great Britain which are of importance partly because of the British climate. It is also of significance because its presence increases the diversity of structure of upland vegetation especially when found on close proximity to grassland, heaths and woodland.

9.3 Management Objectives

Some scrub species and vegetation communities are significant in their own right.

- Where possible management of these communities should be tailored to restoring stand condition representation of plants of un-even ages within their population, across their natural geographical distribution and altitudinal range.

Scrub represents the natural succession of dwarf shrub communities to broad-leaved woodland. These communities are also valuable for wildlife.

- The management of dwarf shrub communities should be relaxed to include areas where natural succession are allowed to develop these should be targeted at the outer areas of the moor, at areas adjoining broad-leaved woodland and in gills and steep valley sides.

10. Rock Faces and Screes

10.1 Description

Rock faces and screes support a variety of vegetation types. The development of vegetation is influenced by several factors including type and stability of rock, slope, aspect and shelter. Steep, unstable and exposed cliff faces and scree slopes support a range of plants that are poorly competitive or sensitive to grazing. These plant communities are thus rather specialised and unique.

These rocky habitats are widespread throughout upland areas. Calcareous rock faces and scree, especially consisting of limestone, are particularly well represented in northern England. Relevant NVC communities are U15 on flushed calcareous rock faces, U16 on acidic ledges and U17 on more mesophytic ledges. U21 is an acidic scree community.

Rock Faces

The plant communities that develop on these habitats are described as *chasmophytic* vegetation. Calcareous chasmophytic vegetation on limestone or other base-rich rocks is characterised by brittle bladder fern (*Cystopteris fragilis*), green spleenwort (*Asplenium trichomanes-ramosum*) and maidenhair spleenwort (*A. trichomanes*). In montane areas there is often also a range of characteristic and rarer arctic-alpine species. The plants

associated with acidic rock faces include black spleenwort (*Asplenium adiantum-nigrum*), common scurvygrass (*Cochlearia alpina*), stiff sedge and fir club-moss (*Huperzia selago*).

Scree

These habitats consist of rock fragments that cover the frost-shattered summits of high mountains or where they have accumulated on steep slopes below cliffs. The scree is colonised by a range of pioneer species and provides shelter from grazing. Both calcareous (*eutric*) and acidic (*siliceous*) screes can support important plant communities. Calcareous screes are widely distributed in upland areas and characteristic species are herb robert (*Gymnocarpium robertianum*), wall lettuce (*Mycelis muralis*) and limestone fern (*Geranium robertianum*), with a range of rarer and more localised species at higher altitudes. The vegetation of acidic scree of sandstone, shales and granite is often dominated by ferns including parsley fern (*Cryptogramma crispa*).

10.2 Status

The international importance of rock faces and scree is recognised by the EC Directive on the Conservation of Natural and Semi-natural Habitats and of Wild Fauna and Flora (Directive 92/43/EEC).

11. Limestone Pavement

11.1 Description

In some Natural Areas, flat expanses of limestone characterise the upland landscape. These *pavements*, formed during three geological periods (Carboniferous in England and Wales, Dalradian in Perthshire and Cambrian in the north-west of Scotland) stand proud of the surrounding moor vegetation. Glacial movement during the pleistocene period has caused considerable erosion and localised weakening of these pavements which have since been subjected to weathering; water has dissolved the rock leading to the formation of fissures. The pavement has an irregular surface typified by *clints*, surface rock, *grikes* or deep fissures and *runnels*, shallower less eroded channels which drain into the grikes.

In England pavements are found in the Cumbrian Fells and Dales, Yorkshire Dales and Morecambe Bay.

The conservation importance of this habitat is two-fold in that it has both geological and biological interest. Limestone pavements have been formed over thousands of years. The geological importance of each Natural Area is described in (King et.al. 1996). This report describes their biological importance.

The surface characteristics of the rock, principally the depth and shape of the fissures vary enormously both between and within pavements. These features influence moisture availability, humidity, wind speed and light available to plants as well as protection from grazing. Grike flora can be similar to the vegetation surrounding the pavement or in the case of the deeper grikes can be very different and of greater floristic interest.

A scheme to characterise the biological conservation interest of pavements was devised

by Ward and Evans. The value of limestone pavement species was based on two considerations: firstly, whether the species is dependent on the pavement for its survival or can be found in open sites surrounding the rock i.e., grassland, heathland and bracken and secondly the distribution of plant species. Four groupings were identified:

nationally rare species

nationally uncommon species, or with marked regional distribution

nationally common species

species where the pavement is incidental to their occurrence (regardless of national status)

11.2 Status

Limestone pavement is a non-renewable resource.

The area of British limestone pavement is small; the cartographic area being some 2150 ha whilst the area of pavement unaffected by stone removal and displacement has been estimated as 813 ha (Ward and Evans 1976). 88% percent of the British pavement is found in England.

Limestone pavement is a scarce resource globally. It has been estimated that Britain holds more than 40% of the NW European area of pavement.

The international significance of the pavements in Britain are recognised by:

- a) the EC Habitats Directive where it holds the status of a priority habitat.
- b) Under section 34 of the Wildlife and Countryside Act 1981 pavements can be protected, in addition to the normal SSSI provisions, by Limestone Pavement Orders, which are conferred by Local Authorities whereby it is criminal offence to remove rock thus damaging the special interest of the site.
- c) The United Nations Conference on Environment and Development Convention on Biological Diversity was ratified by the UK Government on 1st September 1994. *Biodiversity: The UK Steering Group Report, Volume 2: Action Plans* describe a costed action plan for limestone pavement.

Natural Area: Black Mountains and Golden Valley

Mountain and Moorland Significance:

Description: The Black Mountains form a striking plateau bounded to the northwest by the River Wye, to the south by the River Usk and to the east by the Herefordshire Plain. They are largely composed of sandstones which form the highest scarps at over 800 metres. The Black Mountain plateau is deeply dissected by southward flowing streams with the ridges supporting open heath, commons and woodland.

Habitat	NYC present	Extent in Natural Area (1-fragmented, 2-frequent, 3-extensive)	Significance (1-internationally scarce with U.K. representation, UK-well developed in U.K. but represented elsewhere, L-Widely developed in Europe)
Blanket mire and wet heath (including Bog pool and flush & valley mires)	M6c	1	I
	M10	1/2	UK
	M15a	1/2	UK
	M16	1/2	I
	M18	1	UK
	M19	1	UK
	M20	1	UK
Dry heath	H8	2	I
	H10	1	UK
	H12	1	UK
Grassland and tall herb communities	CG10	2	UK
	U4	2	L
	U5	2	L
	U6	2	I
	U20	2	I
Scrub			

Nationally Rare and Scarce Plant Species:

None recorded

Key Issues	
Habitat	Issue
Blanket mire and wet heath	Inappropriate grazing, accidental fires.
Dry heath	Inappropriate grazing, lack of controlled burning, accidental fires, bracken invasion, habitat fragmentation.
Grassland and tall herb communities	Agricultural improvement.
Scrub	

Objective	
Habitat	Objective
Blanket mire and wet heath	
Dry heath	
Grassland and tall herb communities	
Scrub	

Significance: Geographical/communities present/associated interest.

Natural Area: Bodmin Moor

Mountain and Moorland Significance:

Description: Bodmin Moor is the largest area of semi-natural habitat in Cornwall and the most south-westerly upland area in Britain. The geology is dominated by the Bodmin granite with slates and shales around the fringe. The granite tors and surrounding clitter which cap many of the moorland summits are a distinctive feature of this Natural Area. The high moor has extensive tracts of open grassland separated by shallow valleys, fragmented heathland and rocky outcrops. The moorland fringe supports scrub, bracken, enclosed grassland and steep river valleys.

Habitat	NVC present	Extent in Natural Area (1-fragmented, 2-frequent, 3-extensive)	Significance (1- internationally scarce with U.K. representation, UK - well developed in U.K. but represented elsewhere, L - Widely developed in Europe)
Blanket mire and wet heath (including Bog pool and flush & valley mires)	M4	2	L
	M6c	2	I
	M15a, M15b	2	UK
	M16a, M16b	2	I
	M21a, M21b	3	L
	M25	3	I
Dry heath	H4a, H4b, H4c	1	I
	H8	1	I
	H12	1	UK
	H18	1	L
Grassland and tall herb communities	U3	3	I
	U4	3	L
	U5	2	L
	U6	1	I
	U20, U20a	2	I
Scrub			

Nationally Rare and Scarce Plant Species:

None recorded

Key Issues	
Habitat	Issue
Blanket mire and wet heath	Inappropriate burning, inappropriate grazing, off road vehicles.
Dry heath	Inappropriate burning, inappropriate grazing, off road vehicles, habitat fragmentation.
Grassland and tall herb communities	
Scrub	Inappropriate management.

Objective	
Habitat	Objective
Blanket mire and wet heath	
Dry heath	
Grassland and tall herb communities	
Scrub	

Significance: The most significant upland vegetation of Bodmin Moor is the extensive areas of the internationally scarce M25 and U3. Some additional interest is provided by frequent wet heath (M15 and M16), extensive valley mires (M21) and fragmented heathland (H4).

Natural Area: Border Uplands
Mountain and Moorland Significance:

Description: This Natural Area comprises the rolling moors of Northumberland and northeast Cumbria. The underlying geology, dominated by Carboniferous sandstones, limestones and dolomites, is covered by layers of peat and glacial sediments. The north of the Natural Area is dominated by the Cheviot in the west and the escarpments of the Fell Sandstone ridge to the east. The Cheviot Hills and outlying moors support extensive moorland and blanket bog, while acidic grasslands and grass moors dominate the more intensively managed areas.

Habitat	NVC present	Extent in Natural Area (1-fragmented, 2-frequent, 3-extensive)	Significance (1-internationally scarce with U.K. representation, UK -well developed in U.K. but represented elsewhere, L - Widely developed in Europe)
Montane	U10	1	UK
	U16, U16b, U16c	1	UK
	H18a, H18c	1/2	L
	H19	2	L
	H22	1	UK
Blanket mire and wet heath (including Bog pool and flush & valley mires)	M2	1	L
	M3	1	L
	M4	2	L
	M6, M6a, M6b, M6c, M6d	3	I
	M9	1	L
	M10	2	UK
	M15, M15a, M15b, M15d	1	UK
	M16	1	I
	M17	1	I
	M18a	2	UK
	M19a, M19b, M19c	3	UK
	M20, M20a, M20b	3	UK
	M23	1	I
	M25, M25b	2	I
	M32	1	L
Dry heath	H9, H9b	2	UK
	H10a	1	UK
	H12b	1/2	UK
	H21a	1	I
Grassland and tall herb communities	U2	2	L
	U4a, U4e	3	L
	U5a, U5b, U5c, U5d	3	L
	U6, U6a	2	I
	U17a	1	L
	U20, U20a, U20c	2	I
	U21	1	L
	CG 9	1	I
	CG10a	2	UK
	MG9	1	?
	MG10	1	?
Scrub	W19b	2	L

Nationally Rare and Scarce Plant Species:

Alchemilla glomerulans, Alchemilla gracilis, Alopecurus borealis, Betula nana, Carex magellanica, Euphrasia frigida, E. rostkoviana montana, Myosotis stolonifera, Sedum villosum, (Allium schoenoprasum, Crepis mollis, Dianthus deltoides, Equisetum variegatum, Hammarbya paludosa, Minuartia verna, Sesleria caerulea, Thlaspi caerulescens).*

Key Issues	
Habitat	Issue
Montane	Overgrazing, pollution, acidification, recreation, access, fires.
Blanket mire and wet heath	Inappropriate grazing (including overgrazing), inappropriate burning, moor gripping/drainage, afforestation in the past.
Dry heath	Burning, overgrazing, agricultural reclamation, military use.
Grassland and tall herb communities	Overgrazing.
Scrub	Overgrazing, regeneration

Objective	
Habitat	Objective
Montane	
Blanket mire and wet heath	
Dry heath	
Grassland and tall herb communities	
Scrub	

Significance: Extensive areas of northern heath, blanket bog and flush mire communities. The Border Mires are of special significance. Good representation of vegetation characteristic of Northern England (H9, H20) together with more southern communities (U2, M16) and southern outliers of juniper scrub (W19). Also, southern outliers for montane communities and high-altitude rock communities.