



ENGLISH
NATURE

The vegetation of the mountains and moorlands of England

A review of national significance and
objectives for each upland Natural Area

No. 203 - English Nature Research Reports



working today
for nature tomorrow

CONTENTS

Acknowledgements

Part 1

1. Introduction

2. Methodology

- 2.1 Definition Number 203
- 2.2 Sources of information
- 2.3 Natural Area profiles
 - Name & description
 - Significance
 - Key habitat types
 - NVC type present
 - extent in NA
 - significance
 - Nationally rare & scarce plant species
 - Key issues

**The vegetation of the mountains and moorlands of England:
a review of the significance and some objectives for each
upland Natural Area**

3. Analysis

Part 2

Conservation Status (recognised by statute and other statutory provisions) of the mountains and moorlands of England

- 5. Moorland
 - Description/Status
- 6. Upland Heath
 - Description/Status
- 7. Blanket Moss & Wet Heath
 - Description/Status
- 8. Grasslands
 - Description/Status
- 9. Scrub
 - Description/Status
- 10. Rock faces & screes
 - Description/Status

V J Manley
A Drewitt

CONTENTS

Acknowledgements

Part 1

1. Introduction
2. Methodology
 - 2.1 Definitions
 - 2.2 Sources of information
 - 2.3 Natural Area proforma
 - Name & description
 - Significance
 - Key habitat types
 - NVC type present
 - extent in NA
 - significance
 - Nationally rare & scarce plant species
 - Key issues
 - Key objectives
 - Overall significance
3. Analysis and Results
4. References

Part 2

Conservation Status (recognised by statute and non-statutory priorities) of the mountains and moorlands of England.

5. Montane
Description/Status
6. Upland Heather
Description/Status
7. Blanket Mire & Wet Heath
Description/Status
8. Grasslands
Description/Status
9. Scrub
Description/Status
10. Rock faces & screes
Description/Status

11. Limestone Pavement
Description/Status

Part 3

Mountain and moorland profiles for England's upland Natural Areas.

1. Introduction

The concept of dividing England into Natural Areas based ecological and topographical integrity has been developed within English Nature. The Natural Area map (Figure 1) has been produced outlining the boundaries of 118 characteristic areas which inspire a sense of place and are recognisable to those who live and work within them.

Eighteen Natural Areas with upland character have been identified by English Nature ie, whose boundaries lie predominantly within or are equivalent to the Less Favoured Area boundary. These Natural Areas are the framework within which the English Nature's upland work will be delivered. EN is producing a *core* profile for each Natural Area, describing key nature conservation features and issues and *full* profiles which will include Nature Conservation objectives.

English Nature is also working with the Countryside Commission and English Heritage to produce a Joint Character Map which will describe conservation, landscape and cultural interests.

This report forms part of a series of overview reports covering habitats (eg grasslands (Jefferson, 1996)), species (eg birds (Grice et al.)) and Earth Heritage features (King et al 1996). These will inform locally-generated core profiles of national priorities and has been produced to provide a national overview of the vegetation found within the mountain and moorlands of England. It describes each habitat, provides a summary of national status and European significance of each vegetation community, identifies key issues and suggests broad objectives.

2. Methodology

2.1 Eighteen upland Natural Areas have been identified (Figure 1):

Bodmin Moor;
Border Uplands;
Black Mountains and Golden Valley;
Central Marches;
Cumbrian Fells and Dales;
Dark Peak;
Dartmoor;
Exmoor and the Quantocks;
Forest of Bowland;
North York Moors;
North Pennines;
Oswestry Uplands;
Shropshire Hills;
Southern Pennines;
South West Peak;
Staffordshire Uplands;
White Peak;
Yorkshire Dales;

This report outlines the interest of the following semi-natural vegetation found above the "moor" or "fell" wall: montane; upland heath; mires; grasslands; scrub; rock faces and screes and limestone pavement. Table 1 gives a list of all the NVC communities recorded in these habitats.

Table 1:

UPLAND NVC COMMUNITIES IN ENGLAND

MONTANE	H13	1	
	H19	1	
	H18	3	Submontane also
	H22	1	
	M8	1	
	M31	1	
	M32	1	Submontane also
	U7	1	
	U10	1	Largely montane
	U15	1	Largely montane
	U16	1	Largely montane in England
	U17	1	Largely montane in England
CG11	1		
DRY HEATH	H4	1	
	H8	3	
	H9	3	
	H10	2	
	H12	3	
	H16	1	
	H18	3	Montane also
	H21	2	
GRASSLAND AND TALL HERB	U1	1	
	U2	2	
	U3	1	
	U4	4	
	U5	4	
	U6	3	
	U13	1	
	U19	1	
	U20	3	
	U21	1	
	U22	1	
	U23	1	
	CG2	1	
	CG9	1	
	CG10	2	
	MG8	1	
	MG9	1	
MG10	1		

MIRES	Blanket Mires	M17	1	
		M18	2	
		M19	3	
		M20	3	
	Wet heaths	M15	3	
		M16	3	
	Bog pools	M1	1	
		M2	2	
		M3	2	
	Small sedge & bryophyte fens	M4	2	
		M5	1	
		M6	4	
		M9	1	
		M10	2	
		M11	1	
	Valley mire	M13	1	
		M21	2	
	Molinia and Juncus fens	M22	1	
		M23	2	
		M25	3	
M26		1		
Tall-herb fen	M27	1		
Springs, flushes and soakways	M29	1	Montane also	
	M32	2		
	M35	1		
	M37	1		
	M38	1		
SCRUB	W19	1		
	W20	?		

Total number of Natural Areas where community occurs:

1 = 1 to 5; 2 = 6 to 10; 3 = 11 to 15; 4 = 15 to 18

2.2 Sources of Information

The mountain and moorland overviews were compiled from a variety of information sources, published material and databases:

- *National Vegetation Classification* (Rodwell, 1991,1992)
- National Moorland NVC database
- *Scarce Plants Atlas and Red Data Book* (Stewart, Pearman and Preston 1994, Perring and Farrell 1983)
- SSSI Schedules
- Author knowledge
- Local Team surveys
- Information used to score *Significance* were prepared following discussions with Drs David Horsfield and Des Thompson, Scottish Natural Heritage and Marcus Yeo, Countryside Council for Wales, ?.
- Local Team *Core Profiles*

2.3 Natural Area Proforma

Natural Areas are referred to by name, their boundaries are presented in Figure 1.

Mountain and Moorland Significance

- *outstanding, considerable, notable, some*
- *will be determined once information in proforma is correct*
- *will depend on the number of internationally and nationally significant NVC communities present and their extent in each NA*

Key Habitat Types

National Vegetation Communities present in each Natural Area have been listed by habitat. Extent is indicated based on three categories, fragmented, frequent or extensive. Significance is based on national and international importance using the following guidelines:

- I - found in the UK but internationally scarce
- UK - found elsewhere in Europe by especially well developed/unique in the UK
- L - found in the UK and also widely found in similar form in Europe

Nationally Rare and Scarce Plant Species

Nationally Rare and Scarce Plant Species are listed using Latin names. Common names are given in Appendix 1. Plant species restricted to mountain and moorland habitats are listed first. Those species largely found associated with mountain and moorlands but also found elsewhere are listed in brackets. Biodiversity Action Plan species are indicated with an asterisk.

Key Issues

These are the issues which are considered to have the greatest impact on land management and enhancement for each habitat type. They are derived from the Natural Area core profiles, author knowledge and Local Team experience.

Key Objectives

Objectives are derived from national priorities for each habitat. There are derived from analysis of the significance, distribution, extent and condition of NVC types within each Natural Area. Appropriate mechanisms to achieve objectives are not identified.

3. Analysis and Results

a) Key Issues Analysis and Summary by Natural Area

- *to be completed once profiles have been agreed*

Conservation Status (general and recognised by statute) of the mountains and moorlands of England

5. Montane

5.1 Description

The montane zone is found above the altitude at which trees occur naturally (the tree-line). Generally in England, this is found at about 600 metres, although this depends on local variations in temperature, shelter and humidity. The altitudinal zonation of mountain vegetation is a result of a decrease in temperature and an increase in wind speed and snow cover with increasing height above sea level. Natural montane vegetation communities are generally climax types and as such require minimal management. The diverse vegetation found at high altitudes includes prostrate dwarf-shrub heath, moss and lichen heath, grassland and upland herb and fern communities and low growing juniper and willow scrub.

In England, montane habitats can be found in the Cumbrian Fells and Dales and the North Pennines. These Natural Areas are significant because, along with examples in North Wales, they are southern outliers of vegetation communities whose representation in the UK is almost solely in Scotland (90%). Refer to Table 1 which lists NVC communities associated with this habitat.

H13 *Calluna vulgaris-Cladonia arbuscula* heath

Stands of this community have a grey or yellowish hue from a distance due to the contribution of lichens found in a co-dominant mosaic with climatically suppressed ericeaceous shrubs. The sub-shrub mat, generally between 5 - 8 cm in depth, varies in cover depending on wind and frost exposure.

H19 *V. myrtillus-Cladonia arbuscula* heath.

The bilberry - lichen heath consists essentially of a very low mat of sub-shrubs with an abundance of lichens. It is typical of base-poor soils on what are usually moderately sheltered and snow-bound slopes at high altitudes. Overall the vegetation can be considered a climatic climax and it occurs mostly over 650 m. At such levels the climate is generally harsh, and this is reflected in the strongly montane character of the vegetation, with a number of arctic-alpine plant species. In Cumbria, this community was found to occur on more steeply sloping ground below the mountain summits (Jerram 1992). This community is confined to the highest peaks of Cumbria, the Border Uplands, the North Pennines and the Yorkshire Dales.

H22 *Vaccinium myrtillus-Rubus chamarmorus* heath

This community characteristically is a mixed cover of sub-shrubs overlying a moist, bryophyte carpet. Heather varies in cover depending on community and bilberry usually has the greater cover of the two. Wavy hair grass and cloudberry occur infrequently. Generally this community is found at high altitudes in the central and north-west highlands, although similar types have been recorded at high altitudes in England.

- M8 *Carex rostrata-Sphagnum warnstorffii* mire
The bottle sedge-sphagnum moss mire has a dominant cover of sedges over an extensive carpet of base-tolerant *Sphagna* and a fairly numerous and diverse assemblage of herbs. It is generally confined to altitudes between 400 and 800 m and is not well developed in Britain.
- M31 *Anthelia julacea-Sphagnum auriculatum* spring.
Anthelia julacea is a fine but conspicuous hepatic found in tufts, cushions and carpets. This community is species poor with limited contributions from vascular plants. The commonest vascular plant in the community is wavy hair grass, typically as small tufts within the bryophyte cushions. This community is found in the north-west of Britain, over permanently wet (from acid and oligotrophic water typically as snow-melt) skeletal mineral or organic soils.
- M32 *Philonotis fontana-Saxifraga stellaris* spring.
These are springs flushes and rills of striking appearance due to the dominant fresh-green, *Philonotis fontana*, golden green *Dicranella palustris* and green to reddish purple *Scapania undulata*. This is one of the most common and widespread types of spring vegetation in the uplands of north-west Britain.
- U7 *Nardus stricta-Carex bigelowii* grass heath.
The mat-grass, stiff-sedge grass-heath is generally dominated by mat-grass and is characteristically a short, closed sward. It includes varying amounts of stiff-sedge (*C. bigelowii*), woolly hair moss (*Racomitrium lanuginosum*) and other bryophytes, lichens, heath bedstraw (*Galium saxatile*) and bilberry. It is a community of snow-bound slopes at higher altitudes, occurring over gentler ground where irrigation by rain and melt-water enhance drainage impeded by peaty mineral soils. It occurs mainly above 600 m, and arctic-alpine plants, well adapted to such conditions, are characteristic of this community. Essentially the edaphic and climatic conditions maintain the community as a climax.
- U10 *C. bigelowii-R. lanuginosum* moss heath.
The stiff sedge - woolly hair moss heath includes both continuous carpets of mossy heath and much more open vegetation. Closed swards often form a thick mat, but there is a gradation through more patchy carpets on rocky ground to stony surfaces on which small clumps of woolly hair moss are virtually the only cover. Grasses, bilberry, lichens and mosses are the commonest associates, and the community is characteristic of windswept, cloud-ridden plateaus at moderate to very high altitudes. In Cumbria, this community was found to occur on the summit plateaus (Jerram 1992).
- U15 *Saxifraga aizoides-Alchemilla glabra* banks.
The yellow saxifrage - lady's mantle banks occur on steep, rocky or earth slopes, that typically form a dripping, wet carpet of plants in which yellow saxifrage (*S. aizoides*) is generally the most abundant. Grasses, sedges, mosses and a variety of small herbs add to the luxuriant growth of this community. It provides an important locality for some rare arctic-alpine plants restricted to high ground in Britain. The community is confined to steep, continuously irrigated, calcareous cliff faces and earth banks at moderate to high altitudes, mostly between 300-800m.

- U16 *Luzula sylvatica-V. myrtilus* tall herb community.
Both woodrush and bilberry occur in a tall, vigorous form, with grasses, ferns and few other associates. It is confined to inaccessible ground where there has been protection from grazing and burning. It occurs in a variety of base-poor rocky habitats and on more isolated open slopes which are often shaded or have some modest flushing.
- U17 *Luzula sylvatica-Geum rivale* tall herb community
A species-rich assemblage of plants, this community is luxuriant in appearance where the taller and bulkier herbs predominate. When on rock ledges and crags it has been likened to "hanging gardens". Woodrush is constant in a very variable plant assemblage and in this situation is large and usually flowers profusely. The condition of this community depends on protection from grazing and burning. Its restricted occurrence is also due to its dependence on base-enrichment from calcareous rocks or water flushing from them. Its headquarters are in Scotland but there are outliers of this community in the southern uplands and in the Lake District.
- CG11 *Festuca ovina-Agrostis capillaris-Alchemilla alpina* grass heath.
The calcareous grass-heath community is dominated by Alpine lady's mantle (*A. alpina*) and grasses. Other common species include tormentil (*Potentilla erecta*), heath bedstraw (*G. saxatile*), thyme (*Thymus praecox*) and bilberry. It is most typical of free-draining, though often moist, brown earths of moderate base status, developed over calcareous bedrocks in a generally montane climate.

5.2 Status

The GB montane zone is of international significance by virtue of there being a good representation of arctic alpine species and communities at the southern most extent of their range and due to the presence of local ecotypes.

The international importance of this habitat has been recognised by;

a) the EC Directive on the Conservation of Natural and Semi-natural Habitat and of Wild Fauna and Flora (Directive 92/43/EEC). This lists: alpine and sub-alpine heaths, alpine calcareous grasslands and alpine pioneer formations of *Caricion bicoloris-atrofuscae*.

b) The United Nations Conference on Environment and Development Convention on Biological Diversity was ratified by the UK Government who published the UK Biodiversity Action Plan in 1994. The production of a montane habitat statement will be followed by a costed action plan.

6. Upland Heath

Dry, sub-montane, dwarf (ericaceous) shrub heath

6.1 Description

Dry heaths

Botanically heath communities form a continuum throughout the uplands, lowlands and coasts of the UK. They are generally found on free draining acidic mineral soils or thin peat, usually of low nutrient content. The major component of the dry heaths are the ericaceous dwarf shrubs, particularly ling (also called heather) *Calluna vulgaris*. This heathland exists in a wide range of different communities which are the result of geographical and altitudinal conditions, soils and variation in management. Dry heath communities are separated into lowland (including *Erica vagans* -rich heath), maritime (including dune heath), upland and montane (including alpine and sub-alpine) heath. This report covers the distribution, status and objectives for upland dry heath and montane heath (see 1.1).

Upland dry heath

The upland dry heaths are found above the limit of enclosed land and below the natural tree line, generally between 300 or 400 m to 600 or 700 m. This habitat covers approximately 2344km² of England (ITE, 1984). These anthropogenic communities are a result of woodland and scrub clearance followed by rotational burning and grazing and are therefore semi-natural habitats whose composition is made up mainly of native species.

Floristically heather is the dominant and characteristic species in all the upland dry heath NVC communities. Found throughout north-west Europe, its major strongholds are in western and southern Norway and in the UK and Ireland. Other dwarf shrubs which are found in association with heather include bell heather (*Erica cinerea*) and, on wetter ground, cross-leaved heath (*Erica tetralix*), bilberry, crowberry (*Empetrum nigrum*) and bearberry (*Arctostaphylos uva-ursi*).

Rodwell (1991) described eight upland heath National Vegetation Communities.

H12 *Calluna vulgaris* - *Vaccinium myrtillus* heath.

The commonest type of heather-dominated vegetation, this community is found in the west (more oceanic) and north of England. It makes an important contribution to the moorland within the Natural Areas of the south west (Exmoor, Dartmoor) those of the Pennines (Cumbrian Fells and Dales, North Pennines) and the North York Moors. Although it is generally found on free draining soils, the rainfall in these areas is high enough such that the soils are almost always wet. Its distribution is thought to have been greater in the past, particularly in the Southern Pennines where pollution has given rise to H9 *Calluna-Deschampsia* heath (Rodwell 1991). This heath is most extensive in areas which suffer severe winter conditions which favours sub-shrubs such as bilberry, crowberry and cowberry (*Vaccinium vitis-idaea*).

H10 *Calluna vulgaris* - *Erica cinerea* heath.

This community occurs mainly in Scotland although stands without gorse occur in locations throughout northern England and in the south-west. It is again heather-dominated but with bell heather as a subordinate and shade tolerant undershrub which makes a varied contribution depending on management. After burning in areas where there is little grazing bell heather can become locally abundant. The frequency of grasses is more significant in this community. Wavy hair-grass (*Deschampsia flexuosa*) is most often present although brown bent-grass (*Agrostis canina*) and mat-grass (*Nardus stricta*) can also be seen. Sedges, especially ribbed sedge (*Carex binervis*) and pill sedge (*Carex pilulifera*) are characteristic and many of these species become locally abundant after burning. The other feature of this community is the abundance of lower plants particularly *Polytrichum* and lichens *Cladonia* spp.

H9 *Calluna vulgaris* - *Deschampsia flexuosa* heath.

This community is found at low to medium altitudes through the Midlands (Southern Pennines Natural Area) and northern England (North York Moors, Yorkshire Dales and North Pennines Natural Areas) and is characterised by dominant heather, associated with bilberry and wavy hair-grass. Frequent burning, high grazing pressures and atmospheric pollution are thought to be the major influence over the floristics of this vegetation type.

H8 *Calluna vulgaris*- *Ulex gallii* heath.

Heather, western gorse (*Ulex gallii*), and bell heather are the characteristic, often co-dominant, species of this lower altitude heath community. The climate is the key determinant of the species composition; the vigour of the sub-shrubs being dependent on warm summers and mild winters. Therefore this community is generally confined to extensive stands throughout the south-west of England and Wales.

H4 *Ulex gallii*- *Agrostis curtisii* heath.

Again this is a lower altitude community confined to the south-west and maintained by burning and grazing in Exmoor, Dartmoor and on Bodmin Moor. Deer-grass (*Scirpus cespitosus*) and fescue (*Festuca*) sub-communities are the most common in these upland situations.

H18 *Vaccinium myrtillus* - *Deschampsia flexuosa* heath.

The bilberry - wavy hair-grass heath includes a variety of moss-rich and grassy sub-shrub vegetation in which bilberry is the most frequent and generally the most abundant ericoid, with heather (*Calluna vulgaris*) usually having a rather inconspicuous role. It is typical of moist but free-draining, base-poor to neutral soils over steeper slopes at moderate to high altitudes. Although mostly confined to altitudes above 400 m, it often extends up to 800 m. The generally cold and damp character of the climate here is often locally enhanced by a sunless aspect and snow-lie in sheltered situations. At higher altitudes this kind of vegetation is probably natural but towards the sub-montane zone it may be derived from burning and grazing. This community is frequently seen in sub-montane habitats and is consequently widespread throughout the upland Natural Areas.

H21 *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath.
Heather, bilberry and, almost always, crowberry are the species which characterise this community. The other significant feature of this community is a luxurious damp layer of bryophytes. The headquarters of this community is in Scotland, however there are outlying localities in the Cumbrian Fells and Dales and the North Pennines Natural Areas.

H16 *Calluna vulgaris - Arctostaphylos uva-ursi* heath
This community has a variegated woody cover. Heather is frequently dominant with bearberry reaching modest abundance in the gaps in the heather cover. It occurs at moderate altitudes and is largely confined to the east central Highlands of Scotland. There is a record for this community in the Lake District.

Variation in upland heath is the result of:

climate and altitudinal trends (north-south);
oceanic trends (east-west);
hydrological trends (dry-wet);
developmental phases of the Callunetum;
management.

6.2 Status

Dwarf shrub communities are mainly confined to the UK, Ireland, and the Western seaboard of Europe. Those communities found in the UK and England are therefore of global significance as they represent the main area of this habitat type.

The international importance of this habitat has been recognised by;

a) the EC Directive on the Conservation of Natural and Semi-natural Habitat and of Wild Fauna and Flora (Directive 92/43/EEC) listing dry heath as an annex 1 habitat type. All the NVC communities listed above are included in the "dry heath - all subtypes" category.

b) The United Nations Conference on Environment and Development Convention on Biological Diversity was ratified by the UK Government who published the UK Biodiversity Action Plan in 1994. The production of a upland heathland habitat statement will be followed by a costed action plan.

c) A series of Environmentally Sensitive Areas, part of a UK package of measures implemented under the agri-environment regulation 2078/92 (originally under Article 19 of the EC Regulation 797/85 but superseded by Article 21 of the EC Regulation 2328/91) have been designated, from 1987 onwards. Upland ESAs include Exmoor, Dartmoor, North Peak, Shropshire Hills and the Lake District. All include prescription tiers to encourage the sympathetic moorland management especially sustainable grazing management.

The following table substantiates the recognised international importance conferred by the Habitats and Species Directive (Thompson et. al. 1995).

Table 2:

NVC code	Community Name	Only found in the UK and Ireland or rarely found elsewhere	Found outside the UK but especially well developed in the UK
H12	<i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath		✓
H10	<i>Calluna vulgaris</i> - <i>Erica cinerea</i> heath		✓
H9	<i>Calluna vulgaris</i> - <i>Deschampsia flexuosa</i> heath		✓
H8	<i>Calluna vulgaris</i> - <i>Ulex gallii</i> heath	✓	
H4	<i>Ulex gallii</i> - <i>Agrostis curtisii</i>	✓	
H21	<i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> - <i>Sphagnum capillifolium</i> heath	✓	