

# UPLAND HEATHLAND (UK BAP PRIORITY HABITAT)



## Summary

Upland heathland is dominated by stands of dwarf shrubs. Dry and wet Upland heathland also include a sparse array of other species such as grasses, sedges and their allies, and herbs. Upland heathland is the characteristic vegetation of podsolised, free-draining, acid mineral soils and also shallow peat up to about 50 cm deep. The habitat is widespread as secondary vegetation in the cool, wet climate of the uplands, where it generally occupies land which was once woodland. It is common throughout the uplands of Scotland, from a few metres above sea level to over 600 m in the eastern Highlands.

A few uncommon species grow in Upland heathland communities, some in both dry and damp heaths. Liverwort-rich damp *Calluna* and *Vaccinium* heaths in the west Highlands, however, include an array of rare oceanic liverworts.

The traditional management of heathland vegetation in many areas is by rotational burning, either in small, well-controlled patches to encourage red grouse or in large swathes designed to produce a flush of new growth for sheep and deer. Done in a controlled way on dry heaths which are not on steep or fragile slopes, this may be sustainable. However, in damp heaths burning can initiate soil erosion on steep ground and thin soils, can impoverish the flora of wet heaths and is positively damaging to the rich bryophyte element. The characteristic species seem to be very slow colonisers, and after being eliminated by a fire their place is almost always taken by larger, faster-growing mosses.

Light grazing is generally the most appropriate form of management for Upland heathland communities, apart from dry heaths on grouse moors.

## What is it?

Upland heathland is unwooded habitat dominated by the dwarf shrubs ling *Calluna vulgaris*, bilberry *Vaccinium* spp., crowberry *Empetrum nigrum*, bell heathers *Erica* spp., bearberry *Arctostaphylos* spp. or (in U8) gorse *Ulex* spp., either alone or in mixtures. It occurs on substrates that range from thin, stony, well-drained mineral soils to peat up to half a metre deep.

Dry Upland heathlands occur on mineral soils and the common dominant species are *Calluna vulgaris* either alone (H9) or with bell heather *Erica cinerea* (H10), *Vaccinium myrtillus* (H12) or western gorse *Ulex galli* (H8). Bearberry *Arctostaphylos uva-ursi* can be common in regularly-burnt heaths (H16) in the eastern and central Highlands, and in exposed coastal sites. *Empetrum nigrum* is a common associate and may be abundant in exposed coastal sites in the far north, Orkney and Shetland. Pure *Vaccinium myrtillus* heaths (H18) below the tree-line are generally the result of repeated burning followed by heavy grazing, a treatment that favours *V. myrtillus* over *C. vulgaris*.

In all these heaths the canopy of shrubs is interleaved with species such as tufted hair-grass *Deschampsia flexuosa*, green-ribbed sedge *Carex binervis*, tormentil *Potentilla erecta* and heath bedstraw *Galium saxatile* and there is an underlayer of bryophytes in which the most common species are the large mosses *Hypnum jutlandicum*, *Pleurozium schreberi*, *Hylocomium splendens*, *Rhytidiadelphus loreus* and *Racomitrium lanuginosum*.

Damp Upland heathlands H21 (a form of dry heath) is a community of damp humic soils on rocky slopes and is distinguished easily by the large conspicuous red cushions of *Sphagnum capillifolium* under the sward of shrubs.

Wet Upland heathlands M15 and M16 are communities of shallow peat up to half a metre deep. They have a mixed, patchy sward of *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, purple moor-grass *Molinia caerulea* and deergrass *Trichophorum cespitosum*. *Erica cinerea* and *Vaccinium myrtillus* can occur in the drier examples of these communities, and common cottongrass *Eriophorum angustifolium* and bog-myrtle *Myrica gale* are common in the wetter stands. There are occasionally small species such as bog asphodel *Narthecium ossifragum*, heath spotted-orchid *Dactylorhiza maculata*, carnation sedge *Carex panicea* and *Potentilla erecta*. The bryophyte layer includes species such as *Sphagnum capillifolium*, *S. compactum*, *Campylopus atrovirens* and *Breutelia chrysocoma*, with *Racomitrium lanuginosum* and *Hypnum jutlandicum* on drier peats. Some examples are lichen-rich and the ground is covered with a pale frosting of *Cladonia* species such as *C. arbuscula*, *C. portentosa*, *C. rangiferina* and *C. uncialis*.

## How do I recognise it?

### *Differentiation from other Priority Habitats*

This priority type is distinguished from *Lowland heathland* when it occurs in the uplands. Examples of H12, H18 and M15 occurring above the tree-line are classed as the *Mountain heaths and willow scrub* priority type. Heathlands, especially wet heathlands, on peat more than 50 cm deep are classed as *Blanket bog*.

*Definition in relation to the National Vegetation Classification (NVC)*

The Upland heathland priority habitat in Scotland is defined by the following NVC communities:

<b>Classification</b>	<b>Habitat types belonging to this UK BAP priority habitat</b>
NVC	All examples of H8abce, H9, H10, H12, H16, H18 and H21 in unenclosed uplands (but excluding H12 and H21 above the tree-line), all examples of M15-16 on peat <50 cm deep in unenclosed uplands, and all examples of certain heaths not identified in the NVC: <i>Vaccinium myrtillus-Sphagnum capillifolium</i> heath (widespread), calcicolous <i>Arctostaphylos uva-ursi</i> heath (rare, in Breadalbane hills), <i>Calluna</i> heath with tall mesotrophic herbs (scarce, in Highlands), <i>Calluna-Empetrum</i> dry heath and <i>Calluna-Eriophorum angustifolium-Empetrum</i> wet heath (these last two recorded in Orkney).  (All of the above heathland communities except the <i>Vaccinium-Sphagnum</i> , <i>Calluna-Empetrum</i> and <i>Calluna-Eriophorum-Empetrum</i> heaths are included in the Scottish Biodiversity List.)
Phase 1	D1-3, D5-6 (all examples in unenclosed upland situations)
UK BAP broad habitat	All examples of this priority habitat belong to the broad habitat - Dwarf shrub heath

*Definition in relation to legislative classifications*

<b>Classification</b>	<b>Habitat types belonging to this UK BAP priority habitat</b>
Habitats Directive Annex I	H4010 and H4030 (all examples in unenclosed upland situations).
SNH SSSI habitat features	Subalpine dry heath, Subalpine wet heath (all examples of both).  This priority habitat can form part of a mosaic of two or more SSSI habitats grouped together as components forming the Upland assemblage SSSI habitat feature.

**Where is it?**

This habitat occurs on acid substrates in a cool upland climate. The dry and damp heaths characteristically occur on free-draining, nutrient-poor, podsolised mineral soils, but can also clothe rankers, brown earths and brown podsollic soils. They are common on moderate to steep slopes, on crags and ledges (to which they may be confined in areas with heavy grazing), and among scree and boulders. The wet heaths, in contrast, are communities of shallow acid peat, again on slopes that vary from moderate to steep, and are wet or intermittently waterlogged, though the upper layers can dry out in hot weather.

Upland heathland occurs in mosaics with blanket bog, acid and calcicolous grasslands, flushes and springs. It can also occupy woodland glades; and with increasing altitude it gives way to montane heaths and snowbeds. Upland heathland

can extend to the edge of open water and occur adjacent to limestone pavement where there is a layer of acid humus or peat over the bedrock. Fragmentary stands of Upland heathland are very common on the ledges of acid cliffs and among scree and boulders.

Upland heathland is one of the most extensive of all the upland habitats in Britain, though the component vegetation types vary in their distribution. H10 and H12 are the most common forms of dry heaths in Scotland, and M15 the most extensive form of wet heath. Together they cover substantial areas of upland ground and are the predominant element in many upland landscapes. In addition M16 is most extensive in the northern and eastern Highlands and is the wet heath most commonly encountered in the lowlands throughout Britain. H9 is an uncommon community in the Southern Uplands and the northern and eastern Highlands, generally on grouse moors that have been severely and frequently burned. It is most common in the English Pennines, with their long history of intensive management for grouse rearing and atmospheric pollution. H8 is a southern community confined in Scotland to a few sites along the Solway coast of south-west Scotland. The Upland heathland habitat occurs from just above sea-level in the far north and west up to the tree line, which is above 600 m in the eastern Highlands. It has been estimated to cover between 1,700,000 and 2,500,000 hectares in Scotland (UK BAP 2008).

There is heathland similar to H8 in western France, Portugal and Spain, and impoverished heaths resembling H9 occur in western Europe. There is vegetation similar to H10, H12, H18 and H21 in Ireland and western Norway – and similar to H10 and H21 in the Faroe Islands. In Norway, Sweden and Denmark there are *Calluna-Arctostaphylos* heaths resembling H16. Wet heaths with affinities to M15 and M16 occur in western Europe from Sweden to Spain, but extensive stands of those communities are unknown there.

### What is special about it?

Species of special conservation status recorded in this priority habitat in Scotland are listed below.

Group	Common name	Latin name	UK BAP priority list	EC Habitats Directive Annex II	Scottish Bio-diversity List	Red Data List	Wildlife and Countryside Act (1981)
bees, wasps and ants	red-shanked carder-bee	<i>Bombus ruderarius</i>	y		y		
bees, wasps and ants	northern osmia	<i>Osmia inermis</i>	y		y		
bees, wasps and ants	tormentil mining bee	<i>Andrena tarsata</i>	y		y		
bees, wasps and ants	moss carder-bee	<i>Bombus muscorum</i>	y		y		
beetles	violet oil-beetle	<i>Meloe violaceus</i>	y		y		
birds	arctic skua	<i>Stercorarius parasiticus</i>	y		y	y	
birds	red grouse	<i>Lagopus lagopus subsp. scotica</i>	y		y		
birds	Eurasian curlew	<i>Numenius arquata</i>	y		y		
birds	ring ouzel	<i>Turdus torquatus</i>	y		y	y	
birds	skylark	<i>Alauda arvensis subsp.</i>	y		y		

Group	Common name	Latin name	UK BAP priority list	EC Habitats Directive Annex II	Scottish Bio-diversity List	Red Data List	Wildlife and Countryside Act (1981)
		<i>arvensis/scotica</i>					
birds	red-backed shrike	<i>Lanius collurio</i>	y		y	y	y
birds	black grouse	<i>Tetrao tetrix subsp. britannicus</i>	y		y		
birds	lesser redpoll	<i>Carduelis cabaret</i>	y		y	y	
birds	twite	<i>Carduelis flavirostris subsp. bensonorum/pipilans</i>	y		y		
birds	common cuckoo	<i>Cuculus canorus</i>	y		y	y	
birds	St Kilda wren	<i>Troglodytes troglodytes subsp. hirtensis</i>	y		y	y	
birds	hebridean song thrush	<i>Turdus philomelos subsp. hebridensis</i>	y		y	y	
butterflies	pearl-bordered fritillary	<i>Boloria euphrosyne</i>	y		y		y
butterflies	marsh fritillary	<i>Euphydryas aurinia</i>	y	y	y		y
butterflies	small pearl-bordered fritillary	<i>Boloria selene</i>	y		y		
butterflies	small heath	<i>Coenonympha pamphilus</i>	y		y		
butterflies	large heath	<i>Coenonympha tullia</i>	y		y		y
butterflies	mountain ringlet	<i>Erebia epiphron</i>	y		y		y
flowering plants	twinflower	<i>Linnaea borealis</i>	y		y		
flowering plants	glandular eyebright	<i>Euphrasia anglica</i>	y		y	y	
flowering plants	Arran whitebeam	<i>Sorbus arranensis</i>	y		y	y	
flowering plants	Arran service-tree	<i>Sorbus pseudofennica</i>	y		y	y	
flowering plants	hawkweed	<i>Hieracium sect. Alpestris</i>	y		y		
flowering plants	juniper	<i>Juniperus communis</i>	y		y		
flowering plants	small cow-wheat	<i>Melampyrum sylvaticum</i>	y		y	y	
flowering plants	pyramidal bugle	<i>Ajuga pyramidalis</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium backhousei</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium calvum</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium graniticola</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium grovesii</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium insigne</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium kennethii</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium larigense</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium leptodon</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium macrocarpum</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium notabile</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium optimum</i>	y		y	y	
flowering plants	a hawkweed	<i>Hieracium pseudocurvatum</i>	y		y	y	

Group	Common name	Latin name	UK BAP priority list	EC Habitats Directive Annex II	Scottish Bio-diversity List	Red Data List	Wildlife and Countryside Act (1981)
flowering plants	a hawkweed	<i>Hieracium pseudopetiolatum</i>	y		y	y	
flowering plants	lesser butterfly-orchid	<i>Platanthera bifolia</i>	y		y	y	
flowering plants	small-white orchid	<i>Pseudorchis albida</i>	y		y	y	
fungi	lousewort rust	<i>Puccinia clintonii</i>	y		y		
liverworts	Lindenberg's featherwort	<i>Adelanthus lindenbergianus</i>	y		y	y	y
mammals	wildcat	<i>Felis silvestris</i>	y	y	y		y
mammals	mountain hare	<i>Lepus timidus</i>	y		y		
mammals	red deer	<i>Cervus elaphus</i>			y		
mosses	rusty fork-moss	<i>Dicranum spurium</i>	y		y	y	
moths	northern dart	<i>Xestia alpicola subsp. alpina</i>	y		y		
moths	netted mountain moth	<i>Macaria carbonaria</i>	y		y		
moths	small dark yellow underwing	<i>Anarta cordigera</i>	y		y		
moths	grey mountain carpet	<i>Entephria caesiata</i>	y		y		
moths	narrow-bordered bee hawk-moth	<i>Hemaris tityus</i>	y		y		
moths	argent and sable	<i>Rheumaptera hastata</i>	y		y		
moths	sword-grass	<i>Xylena exsoleta</i>	y		y		
moths	Haworth's minor	<i>Celaena haworthii</i>	y		y		
moths	scarce long-horn moth	<i>Nematopogon magna</i>	y		y		
reptiles	adder	<i>Vipera berus</i>	y		y		y
reptiles	common lizard	<i>Zootoca vivipara</i>	y		y		y
spiders	a mesh-webbed spider	<i>Dictyna pusilla</i>	y		y		
spiders	a money-spider	<i>Monocephalus castaneipes</i>	y		y		
spiders	a money-spider	<i>Saaristoa firma</i>	y		y		

Even the most species-poor dwarf shrub heaths are valuable for nature conservation because they are so rare in the world, and the extensive landscapes where almost all of the vegetation is some form of heathland are more common in Scotland than elsewhere in Europe. Though they tend not to be as species-rich as the calcareous grasslands, flushes or mountain communities, the upland heaths are not without botanical interest. For example, herb-rich forms of H10 can include moss campion *Silene acaulis*, wild thyme *Thymus polytrichus*, northern bedstraw, *Galium boreale*, stone bramble *Rubus saxatilis*, bitter-vetch *Lathyrus linifolius*, field gentian *Gentianella campestris*, mossy saxifrage *Saxifraga hypnoides*, thyme broomrape *Orobanche alba*, kidney vetch *Anthyllis vulneraria* and wood crane's-bill *Geranium sylvaticum*. There is a rare form of herb-rich H12 with tall herbs such as water avens *Geum rivale*, meadow buttercup *Ranunculus acris*, meadowsweet *Filipendula ulmaria* and wild angelica *Angelica sylvestris*. The clubmoss *Lycopodium annotinum* and the lesser twayblade orchid *Listera cordata* grow in dry and damp heaths.

Perhaps the most notable of our heaths, however, is the liverwort-rich form of the *Calluna-Vaccinium-Sphagnum* heath H21b, with its array of rare oceanic liverworts consisting of *Herbertus aduncus* ssp. *hutchinsiae*, *Bazzania pearsonii*, *Plagiochila*

*carringtonii*, *Scapania nimbosa*, *S. ornithopodioides*, *Mastigophora woodsii*, *Anastrophyllum donnianum*, *A. alpinum* and *Pleurozia purpurea* as well as the more widespread *Bazzania tricrenata*, *Mylia taylorii*, *Lepidozia pearsonii*, *Anastrepta orcadensis*, *Plagiochila spinulosa* and *Scapania gracilis*. Many of these species have highly disjunct world distributions, growing only in places where the climate is consistently mild and damp throughout the year such as the coastal forests of Pacific north-west America, the foothills of the Himalayas and the uplands of Britain and Ireland. Though some of these species also occur in the extreme west of Norway, *Anastrophyllum alpinum* and *Bazzania pearsonii* grow nowhere else in Europe apart from Scotland and western Ireland. The community is the home of *Adelanthus lindenbergianus* at its only known British site, and to *Herbertus delavayi*, a species recorded on Beinn Eighe in north-west Scotland and nowhere else in Europe. In the Upland heathland habitat these plants are almost confined to steep, damp, shaded slopes facing between north-west and east, or to boulder-fields. Several of these oceanic liverworts are also able to grow in suitable sites in the wet heath M15, a community that is also home to the uncommon mosses *Campylopus setifolius*, *C. atrovirens* var. *falcatus* and, in the Outer Hebrides and on Skye, *C. shawii*.

Most Upland heathland is important as nesting and feeding habitat for birds. Red grouse *Lagopus lagopus* feed almost entirely on heather shoots, and so vast areas of upland ground are managed by rotational burning to give them an ideal balance of short heather for feeding and long heather to conceal their nests. Other species hunting over or nesting in heaths are black grouse *Tetrao tetrix*, merlin *Falco columbarius*, golden eagle *Aquila chrysaetos*, buzzard *Buteo buteo*, hen harrier *Circus cyaneus*, short-eared owl *Asio flammeus*, raven *Corvus corax*, stonechat *Saxicola torquatus*, meadow pipit *Anthus pratensis*, twite *Carduelis flavirostris* and ring ouzel *Turdus torquatus*.

Mountain hares *Lepus timidus* live in Upland heathland.

Upland heathlands have a rich fauna of invertebrates including emperor moth *Saturnia pavonia* and magpie moth *Abraxas grossulariata*. They are important feeding grounds for honey bees.

### **How do we manage it?**

Upland heathland habitat lies within the theoretical altitudinal range of trees. The drier heaths H8, H10, H12 and H18 are likely to revert to woodland or scrub in the absence of grazing or burning, though if there is no nearby seed-source this can take a long time. The damp and wet heaths may be slower to revert to woodland in the wet Highland climate because of the thick tussocky composition and acid soils.

Most Upland heathland is grazed by sheep and deer, and some also by goats, cattle or ponies. Voles, mountain and brown hares, red grouse and ptarmigan also consume plant material in these communities, and large patches can be defoliated by heather beetle *Lochmaea suturalis*. Light grazing can maintain this habitat, but the shrubs cannot tolerate hard grazing and will die out, mediating a change to some sort of grassland. In damp and wet heaths, trampling by grazing animals can do as much damage to the shrub canopy and the underlayer of bryophytes as the actual consumption of shoots can.

Burning can be beneficial for nature conservation in some *dry* heaths as long as the fire is not too hot and the burning is done on a long enough rotation to allow the vegetation to recover fully between fires. The impoverished heath community H9 is the result of burning too hard or too often or both – a species-poor, even-aged

canopy of *Calluna* with few associated species and almost no bryophyte layer. Burning should be avoided on very steep or rocky slopes where destruction of the canopy may initiate soil erosion. It should most definitely be avoided in the damp heaths, and especially the liverwort-rich forms. A single burn can be enough to destroy the liverworts, and they seem to be unable to recolonise as the heath recovers, their place being taken by large, common, faster-growing mosses. *Calluna* has been shown to rejuvenate by layering into the bryophyte carpet, so is able to maintain itself in damp heaths without any need for burning.

Wet Upland heathland in the Highlands is customarily burned in large, uncontrolled patches in order to initiate a flush of succulent young growth for grazing animals. Although the vegetation appears to recover slowly, burning is likely to lead to impoverishment and possibly peat erosion in the long term.

### References, links and further reading

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Scottish Natural Heritage website: <http://www.nature.scot>

UK BAP information on JNCC website:  
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