Scottish Natural Heritage
All of nature for all of Scotland

CAIRNGORMS
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 288

SOUTH HIGHLAND:
Address: Achantoul,
Aviemore,
Inverness-shire
PH22 1QD

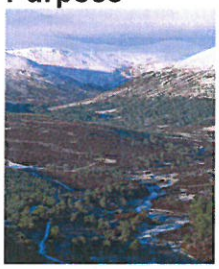
Tel: 01479 810477
Email: south_highland@ snh.gov.uk

MORAY:
Address: Alexander Fleming House, 8 Southfield Drive, Elgin, Moray
IV30 1QH
Tel: 01343 541216
Email: tayside_grampian@snh.gov.uk

ABERDEENSHIRE:
Address: Inverdee House, Baxter Street, Torry, Aberdeen
AB11 9QA

Tel: 01224 266500

Purpose



This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is designated as an SSSI and provides guidance on how its special natural features should be conserved or enhanced. This statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement.

Description of the site

The Cairngorm mountains, of which the Cairngorms SSSI forms the western section, is the most important mountain area in Britain for biological and geological/geomorphological conservation. The Cairngorms include the greatest area of high land in Britain, and this, combined with their relatively continental position, make low winter temperatures, cool summers and a short growing season notable features of the environment. As such the Cairngorms may be regarded, climatically, geomorphologically and biologically, as the most extensively 'arctic' area in Britain. A wide range of habitats and animal and plant species are found here, including many which are rare or scarce in Britain or Europe as a whole.

The whole area is thus of considerable national and European importance, which is partly recognised through the Natura designations of the SAC and SPAs. The Cairngorms SPA, Cairngorms Massif SPA and Cairngorms SAC are considerably more extensive than the SSSI. The Cairngorms SSSI also overlaps with the River Spey and River Dee SACs.

Geology

The Cairngorm mountains is one of most outstanding geomorphological sites in Britain, demonstrating the finest assemblage of landforms, tors and erosion surfaces associated with glaciation processes in the country and are internationally recognised for scientific research and education on such processes. Many of the individual features are classic examples of their type. It is, however, the scale and total assemblage of features, developed in a relatively compact area, which makes the site so remarkable.

There are some excellent examples of active river systems, where the sand and gravel deposits are reworked during extreme floods, and floodplains with numerous examples of ancient meanders. The Luibeg Burn provides an excellent example of a steep, boulder-bed mountain torrent which has a documented history of large-scale sediment mobilisation during extreme flood events, as recorded in 1829 and 1956.

The cliffs on the east side of Loch Avon and the gravels of the River Avon are known to yield blue topaz, which is not found anywhere else in Britain, smoky quartz (known as 'cairngorm'), and beryl (colloquially known as 'green cairngorm').

Habitats

Ranging from 260 - 1309 metres above sea level, the Cairngorms SSSI contains the full range of submontane and montane habitats characteristic of the eastern Highlands, from native Scots pine woodland to subalpine and alpine heathland and grassland habitats. In addition, the massive summit plateaux and broad watersheds, with a considerable land mass above 1100 metres, allow prolonged snow cover in a variety of situations and in turn give rise to a greater range and extent of late snow-influenced vegetation than in any other mountain system in Britain. Examples of some of the most natural plant habitats in Britain are found on the mountains. Individual habitats and species are of national and/or European importance in their own right, but the value of the Cairngorms is accentuated by the range of habitats associated with the range of altitude, aspect, soils etc.

As the bedrock is primarily acidic granite, and as the glacial drift which covers many of the lower hillsides is derived from such, the Cairngorms' vegetation is dominated mainly by acid-tolerant plant species.

The Glen Feshie sector on the western side of the Cairngorms includes another major geological system, the Moine Schist, which contrasts with the granite in giving soils of higher base-status and fertility. These rich soils in this area locally support, on cliffs, and in screes, springs, flushes and grasslands, a wide range of base-loving plants, including many local or rare species.

Aquatic habitats are present in the glacial trough and corrie lochs, and along streams and rivers.

More detailed accounts of these habitats can be found in Appendix 1.

Invertebrates

Many common and rare invertebrate species occur in the Cairngorms with several species known only from these mountains and others that are restricted to areas of high ground such as the flies *Wiedemannia simplex* and *Rhamphomyia albosegmentata*. The area has the second highest number of Red Data Book species for any Scottish site including rare species of beetle, fly, spider and moth. The invertebrate fauna of the Cairngorms pinewoods is extremely rich, ranging from frequent and widespread species such as the Scotch argus and dark green fritillary butterflies to rare and local species of beetle. Sixteen species of beetle that are considered "ancient woodland indicators" have been recorded.

Fish

The fast-flowing rivers in the main glens of the Cairngorms, which are otherwise very sparse in animal and plant life, are the spawning grounds of salmon for the Spey and to a lesser degree the Dee. The Spey and Dee salmon populations are of European importance. Although not of qualifying interest, the presence of Arctic charr in a number of lochans is noteworthy.

Birds

The Cairngorms is of outstanding importance for its Caledonian pine woodland, moorland and mountain bird fauna, including the best example of a montane bird community in Britain.

Many typical and rare mountain birds are found within the Cairngorms, which hold significant proportions of British populations of dotterel and snow bunting. The Cairngorms also support nationally important populations of golden eagle, merlin, peregrine and ptarmigan.

Within the pinewoods, the SSSI contributes to nationally important populations of Scottish crossbill, capercaillie osprey and crested tit.

Mammals

Many species of mammal breed in or use the area including an important population of otter. Although not of qualifying interest, red deer are frequent and other characteristic mammals include roe deer, wildcat, badger, red squirrel and mountain hare.

Results of Site Condition Monitoring, Cairngorms SSSI

Natural Features of Cairngorms SSSI	Feature Condition (date monitored)	Other relevant designations
Breeding bird assemblage	Favourable, maintained (July 2006)	Cairngorms SPA
Bryophyte assemblage	Favourable, maintained (August 2005)	
Dotterel (*Charadrius morinellus*), breeding	Favourable, maintained (June 1999)	Cairngorms SPA
Fluvial Geomorphology of Scotland	Favourable, maintained (April 2003)	
Fungi assemblage	Favourable, maintained (October 2010)	
Golden eagle (*Aquila chrysaetos*), breeding	Favourable, maintained (October 2007)	Cairngorms SPA, Cairngorms Massif SPA[1]
Invertebrate assemblage	Favourable, maintained (August 2003)	
Mineralogy of Scotland	Favourable, maintained (August 2006)	
Native pinewood	Unfavourable, declining (January 2009)	Cairngorms SAC
Dystrophic and oligotrophic lochs	Favourable, maintained[2] (July 2004)	Cairngorms SAC & Cairngorms Ramsar[3]
Ptarmigan (*Lagopus muta*), breeding	Favourable, maintained (July 2004)	
Quaternary of Scotland	Favourable, maintained (August 2003)	
Snow bunting (*Plectrophenax nivalis*), breeding	Favourable, maintained (July 2004)	
Upland assemblage	Not yet assessed	
Vascular plant assemblage	Favourable, maintained (October 2006)	
Lichen assemblage	Not yet assessed	

[1] Equivalent features for SPAs also Favourable, maintained (2003)
[2] Dystrophic lochs not assessed in 2004
[3] Equivalent features for Cairngorms SAC & Ramsar also Favourable, maintained (June 2010).

SCM results for Cairngorms, River Spey and River Dee SACs and Cairngorms SPA of which the Cairngorms SSSI is a part

Features of overlapping Natura sites that are not individually notified as SSSI natural features	**Feature condition (date monitored)**	**Designation (SAC or SPA)**
Acidic scree	Favourable, maintained (April 2007)	Cairngorms SAC
Alpine and subalpine heaths	Unfavourable, no change (April 2007)	Cairngorms SAC
Blanket bog	Unfavourable, no change (April 2007)	Cairngorms SAC
Bog woodland	Favourable, maintained (September 2002)	Cairngorms SAC
Dry grasslands and scrublands on chalk or limestone	Unfavourable, no change (April 2007)	Cairngorms SAC
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable, maintained (June 2010)	Cairngorms SAC
Dry heaths	Unfavourable, no change (April 2007)	Cairngorms SAC
Hard-water springs depositing lime	Favourable, maintained (April 2007)	Cairngorms SAC
Montane acid grasslands,	Unfavourable, recovering (July 2006)	Cairngorms SAC
Mountain willow scrub	Unfavourable, no change (April 2007)	Cairngorms SAC
Plants in crevices on acid rocks	Favourable, maintained (April 2007)	Cairngorms SAC
Plants in crevices on base-rich rocks	Unfavourable, no change (April 2007)	Cairngorms SAC
Species-rich grassland with mat -grass in upland areas	Unfavourable, no change (April 2007)	Cairngorms SAC
Wet heathland with cross-leaved heath	Unfavourable, no change (April 2007)	Cairngorms SAC
Tall herb communities	Favourable, maintained (April 2007)	Cairngorms SAC
Otter (*Lutra lutra*)	Favourable, maintained (September 2004)	Cairngorms SAC
Capercaillie (*Tetrao urogallus*), breeding	Not yet assessed	Cairngorms SPA
Peregrine (*Falco peregrinus*), breeding	Favourable, maintained (June 2001)	Cairngorms SPA
Osprey (*Pandion haliaetus*), breeding	Favourable, maintained (June 2006)	Cairngorms SPA
Merlin (*Falco columbarius*), breeding	Not yet assessed	Cairngorms SPA
Scottish crossbill (*Loxia scotica*), breeding	Not yet assessed	Cairngorms SPA
Atlantic salmon (*Salmo salar*)	Unfavourable, recovering (October 2004)	River Spey SAC
Otter (*Lutra lutra*)	Favourable, maintained (September 2004)	River Dee SAC

An assessment of the native pinewood in January 2009 recorded the condition as Unfavourable declining, mainly due to the lack of regeneration. Management measures have been put in place to address this on the Speyside side of the site and, in recent years, have also begun on the Deeside part.

Between August 2004 and April 2007 a sample-based survey of upland habitats was carried out across the Cairngorms SAC including the Cairngorms SSSI. The samples indicated that more than 90% of the SAC's dry heath and alpine heath was in favourable condition but both habitats' condition were both recorded as Unfavourable, mainly due to muirburn in sensitive areas in the adjoining Eastern Cairngorms SSSI. Moss heath and associated vegetation was also generally found to be in good condition with only localised signs of trampling and disturbance along the more popular ridge walks and summits but failed due to the abundance of undesirable grasses in one sample from the Moine Mhor. The blanket bog and higher altitude base-rich flushes on the Glen Feshie side mostly failed due to trampling and disturbance, associated with deer grazing. The grassland and crevices habitats of base-rich rocks in Glen Feshie generally appeared to be in good condition.

SCM of golden eagle and dotterel for the SSSI and peregrine and osprey for the Cairngorms SPA found these to be in favourable condition. Capercaillie has not been formally monitored but populations in Scotland have generally been in decline including in the Cairngorms. Principal factors are poor chick survival due to: overgrazing of habitat, poor brood habitat with low invertebrate numbers, as well as egg and chick predation. Disturbance by people, habitat fragmentation and climate change also contribute to a complex set of inter-relationships.

The Fluvial geomorphology of Scotland and the Quaternary of Scotland features were in favourable condition in 2003, though some surface damage caused by erosion from walkers and vehicles was noted. The feature Mineralogy of Scotland feature's condition was assessed as favourable in the last site condition monitoring visit in 2006. Not all the minerals mentioned in the citation were found. It is likely that they are still present, but could not be located because of lack of accurate information.

Past and present management

Traditionally, the Cairngorms has been managed for a combination of livestock grazing and for sport shooting of deer and grouse.

From the second half of the 18th century to the second half of the 19th century human settlements expanded in the Cairngorm glens, with permanent or summer occupation of shielings, small-scale cultivation or extensive summer grazing of cattle. Remains of these settlements can still be seen in Glens Feshie and Derry. This period also coincided with cattle droving and the already well used routes through the Lairig Ghru and Lairig an Laoigh saw drives of cattle from and through the Cairngorms to the markets at Falkirk and Crieff.

In the early 19th century, as elsewhere in the Highlands, extensive sheep farming replaced the more subsistence agriculture. However, sheep were never very successful and summer grazing by cattle lingered in Glen Einich until the late 19th century. Overlapping this period, and up to the 20th century, the native pinewoods were exploited for timber.

By the mid 19th century, deer stalking and grouse shooting became popular and the associated management of heather burning, winter feeding of deer and increased deer numbers was paralleled by a reduction in both domestic livestock numbers and regeneration in the native woodlands. By the mid 20th century, the extent of heather burning had reduced, partly as a consequence of the decline in the post-war rural population

Although recreational pursuits such as hill walking and the appreciation of wild landscapes began in Victorian times, the second half of the 20th century saw a major expansion in both formal and informal recreation as well as the area's use for military and other training.

Today, sport-shooting of red deer continues as an important economic activity and the shooting of red grouse continues at a reduced level, as does associated muirburn. Deer Management Groups play an active role in the co-ordination and integration of the management of deer across the site.

A number of tracks have been constructed in the past to facilitate vehicle access for sport shooting. While the main impact is upon landscape and wild land quality, poorly built tracks caused localised damage to adjacent habitats. Some track modification works have been undertaken in Glen Feshie. It is accepted that in many areas the retention of tracks is required for deer management purposes. In several parts of the site there are publicly-funded management schemes in place to expand or improve the condition of native woodlands and open ground habitats. These involve the management of deer impacts by reductions in deer populations and/or the use of fencing.
Fences to protect against deer browsing have been marked to reduce the risk of collision to woodland birds, especially capercaillie and other grouse species. Some fences have been removed to reduce the risk of collision.

There are a small number of garrons (ponies) that graze on the flats at Glen Feshie and a captive reindeer herd based in the adjacent Northern Corries SSSI. Some reindeer are present in the Cairngorms SSSI in the summer months, often on the northern slopes of Ben Macdui. A small number of Highland cattle were recently summered in Gleann Einich. There are no other domestic stock on the site.

Informal recreation, such as walking, climbing and skiing, remains very popular and is a major element of the local economy. In 1999, the Cairngorm Mountain Survey estimated 123,000 mountain visitors per year, accessing the site from various points. Access by summer visitors from the top station of the Cairngorm Mountain funicular is carefully managed. Loch an Eilean is a major focus of visitor use in Strathspey.

In recent years footpath repair work has been undertaken along a number of the well-used routes across the site.

Apart from day visitors, there are several open bothies within the SSSI and the site is also used by wild campers. The cliffs of the Loch Avon basin, Coire Etchachan and Coire Sputan Dearg are some of the most popular sites for winter and summer climbing in Scotland. Ski-touring is popular in winter, mostly by Nordic skiers, and to a lesser extent ski-mountaineers, and the wider Cairngorms area is the most important area in Britain for this sport.

Many of the climbers, skiers and walkers are part of instructed groups and the wider Cairngorms area is one of the most important areas in the Britain for training in various aspects of mountain craft and is still used for military training.

Land at Invereshie and Inshriach, Upper Glen Avon, Glen Feshie and Mar Lodge is managed primarily with natural heritage objectives and the site as a whole is extensively used for scientific teaching and study by various scientific and academic institutions. The Cairngorms are also part of the national and international network of sites monitoring climate change.

Loch Einich was used until recently as a water supply for Strathspey, but this supply has been replaced by a scheme to abstract potable water from alluvial gravels along the River Spey.

Objectives for management (and key factors influencing the condition of natural features)

We wish to work with the owners and occupiers to protect the site and to restore, maintain and where necessary enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate, to increase our knowledge and understanding of the site and its natural features and to monitor the effectiveness of the management agreement.

The EU Habitats and Birds Directives oblige Government to avoid, in SACs and SPAs, the deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the areas have been designated, where such disturbance could be significant in relation to the objectives of these Directives. The objectives below have been assessed against these requirements. All authorities proposing to carry out or permit to be carried out operations likely to have a significant effect on the European interests of this SSSI must assess those operations against the relevant Natura conservation objectives (which are listed on our website through the SNHi – SiteLink facility).

1. **To maintain the site's important landforms and habitats and the flora and fauna that these support**

   - Natural processes should be allowed to operate in order to maintain the geomorphological and fluvial features in favourable condition.

   - SNH, the Scottish Government, Deer Management Groups and estates should continue to work to encourage the regeneration of woodland and montane scrub, especially to restore a more natural altitudinal range and also to improve the condition of upland, and in particular montane, habitats by management of deer populations in accordance with an agreed Deer Management Plan.

     Recently it has been agreed to favour woodland expansion in the Cairngorms over a 20-year period, while retaining the Cairngorms SAC's ranking as the foremost site in Britain for dwarf-shrub heath. To prevent adverse effects on certain dwarf-shrubs heaths, in particularl lower altitude heath with bearberry, grasslands, active positive management may need to be included in forthcoming woodland expansion plans.

   - The Capercaillie Species Action Group will continue to encourage and assist further action to safeguard capercaillie populations (building on work undertaken in the LIFE – Natura project – Urgent Conservation Management for Scottish Capercaillie, 2002-2007).

   - A network of footpaths should be maintained to facilitate access to key areas and minimise the impacts of erosion and damage. The management/removal of hill tracks should continue to be investigated.

   - The S49a/50 Agreement relating to the funicular development, the associated Visitor Management Plan and Monitoring Scheme will continue to be implemented, monitored and reviewed.

   - The long-term habitat monitoring work, under the Environmental Change Network, at Invereshie should continue to be carried out.

2. **To encourage appropriate enjoyment, research, interpretation, education and wildlife tourism**

   - Recreational disturbance may affect a number of sensitive habitats and species. The Scottish Outdoor Access Code and responsible public use of the site should continue to be promoted, with suitable interpretation and provision of ranger services. Continued

support for the partnership group consisting of ranger services and other visitor services operating in the Cairngorms massif is to be encouraged.

Other factors affecting the natural features of the site

- The upper reaches of the River Dee and its tributaries the Geusachan, Luibeg and Derry Burns form part of the River Dee SAC. The River Feshie and several of its tributaries and two tributaries of the River Druie, the Am Beanaidh and the Allt Druidh, form part of the River Spey SAC. Works along or adjacent to these watercourses, for example along the tracks and paths in Glens Feshie, Einich and Dee, could affect the River Spey and Dee SACs. SNH will work with the landowners to ensure that these river SACs are not affected by any such works.

- Increased attention is being given to the management of flooding in response to climate change and as reflected in European Directives and Government Policies. Developing approaches to flood management of the rivers Spey and Dee and their catchments are particularly relevant to the future management of this site.

- The management of areas of woodland and moorland outside the SSSI influences moorland and woodland habitats and fauna and flora inside the site.

Other factors, such as climate change are likely to have a significant effect on some of the key populations, such as ptarmigan and dotterel and montane plants. While there is little that can be done to directly mitigate this in the context of management within the site, its likely significance and impact are being investigated.

Date last reviewed: 25 April 2013.

Appendix 1: More detailed account of the Cairngorms habitats and species

Woodland

The pinewoods on the lower slopes of the Cairngorms are part of a once-continuous tract of Caledonian pine woodland which covered much of the Eastern Highlands. The remaining areas of pine woodland on Speyside form one of the most extensive areas of native woodland still existing in Britain, and these combined with those on Deeside form the largest area of native pine woodland, the most local of all major forest types, in Britain. The Cairngorms pinewoods are thus of considerable national and European importance.

The Cairngorm pinewoods are mainly of the more eastern type of Caledonian pine woodland, which is characterised by a well-developed moss layer of 'feather' mosses, and few if any Atlantic bryophytes. In damp microclimates, especially along the upper margins of the pinewoods, for example in Rothiemurchus Forest and at Luibeg, sphagnum mosses become abundant in the moss layer.

The Cairngorm pinewoods contain a complete range of variation in age class and individual growth form of trees, and in forest structure and density. Birch and juniper are widespread and locally abundant, and there is also a good deal of rowan, some aspen, and, on damp, richer soils, especially alluvium, an abundance of alder, and a little holly. The Cairngorm pinewoods' field layers are not floristically rich but they have a very characteristic flora, comprising widespread woodland species such as wavy hair-grass and common cow-wheat combined with a more distinctive northern element represented by species such as lesser twayblade and ostrich feather-moss, and more locally by twinflower and serrated wintergreen. The pine woodland flora is diversified by the addition in the more open pine stands at higher altitudes of arctic-alpine species such as mountain crowberry and interrupted clubmoss.

The pine woodland shows interesting transitions to a wide range of peatland and heathland vegetation types, including bog woodland and subalpine scrub.

The forest extends to over 450 m in Rothiemurchus Forest and in most of the remnants of the Deeside pinewood, the former Forest of Mar, in Glens Lui and Derry. However, the upper limits of pine woodland are mostly artificially depressed as the natural limit is thought to be generally more than 600m. An exceptional, apparently natural altitudinal limit is still evident at 640 m on Creag Fhiaclach, where there is stunted growth of pine admixed with juniper of a similar stature.

Juniper scrub is a feature of the Cairngorm pinewoods and some areas of grassland and moorland beyond the present extent of woodland, for example in Glen Derry and near to Loch Avon. At higher altitudes, the juniper is progressively stunted, becoming transitional to the dwarfed subspecies (*nana*). The Cairngorms is of European importance for its juniper formations.

Areas of pine are present on bogs within the Cairngorm pinewoods. Those on small bogs within the Cairngorms SSSI are less extensive than the areas of bog woodland within the adjacent SSSIs.

Dwarf-shrub heath and grassland

The Cairngorms has the largest extent of dry heathland in Britain and the full range of sub-montane heaths characteristic of the Eastern Highlands, characterised by ling heather, blaeberry and bearberry, including some of the largest areas of bearberry-rich sub-montane heath in Britain, and the most extensive snow-bed forms of blaeberry heath in the Eastern Highlands.

The calcareous schists in Glen Feshie support species-rich calcareous grassland. Both of the two main types of this habitat, characterised by wild thyme and alpine ladies'-mantle, are present, and there are interesting transitions to alpine calcareous grassland at high altitudes.

Species which thrive on lime-rich soils (calcicoles) include a number of arctic-alpines such as alpine cinquefoil, yellow mountain saxifrage, hair sedge and alpine meadow rue.

Areas of alpine calcareous grassland characterised by mountain avens are found locally along Glen Feshie including on the steep crags and ledges of Coire Garbhlach, with very small areas are also present at the head of Glen Einich. Glen Feshie supports a number of rare arctic-alpine herbs, including rock whitlow grass, alpine saxifrage, alpine mouse-ear, rock speedwell, rock sedge and black alpine sedge. A number of montane willow species are also found here, including whortle-leaved, downy and the rare woolly willow. The calcicolous bryophyte flora of Coire Garbhlach is very rich with several very rare species are present, including the mosses *Saelania glaucescens*, *Ctenidium procerrimum*, *Schistidium artofuscum* and *Weissia controversa var. wimmerana*. *S. glaucescens* is an especially protected species, as listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

Wet heath, bog, springs and flushes

The Cairngorms has the largest extent of wet-heath in north-east Scotland, mainly of the more heathy eastern type characterised by *Sphagnum compactum*, with the more herbaceous western type on some of the more strongly flushed soils. The occurrence of undisturbed lichen-rich wet-heath alongside sub-alpine and alpine heath on high altitude, windswept slopes is of particular importance. Wet-heath is also present alongside bog and dry heath in open areas within the upper parts of the pine forest, giving a variety of ecological transitions.

The Cairngorms has a wide range of bog types from basin, valley and terrace mires to high level watershed mires, and the full range of bog vegetation types characteristic of the Eastern Highlands, and also small areas of mire very closely resembling Western blanket bog. The bogs at lower altitudes, in basins and valleys and on terraces within the forest, are mainly dominated by or rich in sphagnum species. Above the forest, in the glens, on some of the valley sides, and on the watersheds, the blanket bog is generally dominated by various dwarf shrubs and cotton grasses with a lower diversity of sphagnum mosses. Ling heather and to a lesser degree cross-leaved heath are the most abundant dwarf-shrubs in the glens and on the lower watersheds, with blaeberry and common cowberry becoming abundant in some areas, particularly on the valley sides. On the highest watersheds which have any significant development of peat, these latter species become dominant as ling heather fades, forming another distinctive sub-type, often referred to as high-level blanket mire. At over 900 m, Moine Mhor, above Glen Feshie, probably has the largest extent of high-altitude blanket mire in Britain, set amongst snow-bed grassland and sedge communities.

Notable species on the Cairngorms blanket bogs include dwarf birch and small cranberry, which are both scattered above 450m, and northern bilberry, which is frequent on many of the high-level bogs.

The Cairngorms supports a wide range of soft-water spring vegetation types. At moderate to high altitudes these springs are generally dominated by either the moss *Philontis fontana*, or, more locally, especially at higher altitudes in the western corries, by dense cushions of the liverwort *Anthelia julacea*. At high altitudes, where the snow-lie is longest, and the irrigating waters from the snow beds are the coldest, the spring-heads are dominated by spongy carpets of the moss *Pohlia wahlenbergii* var. *glacialis*. Arctic-alpines herbs associated with these springs include chickweed willow herb, alpine foxtail and alpine timothy grass. Rare bryophytes include the mosses *Pohlia ludwigii*, *Haplomitrium hookeri* and *Hygrohypnum molle*.

The Cairngorms supports the full range of mires associated with base-poor flushes at medium and high altitudes and rare species such as rare-flowering sedge and the moss *Sphagnum lindbergii*.

Due to the local occurrence of suitable rocks, base-rich flushes are not widespread in the Cairngorms but are present in Glen Feshie with smaller areas elsewhere (Glens Lui and Slochd Mor). Despite their restricted distribution, these base-rich flushes are well developed, supporting vegetation types and species associated with both low to moderate and particularly high altitudes. These communities support arctic-alpine species such as Scottish asphodel, three-flowered and alpine rushes and are of national and European importance.

All these wetland habitats are of national or European importance.

Montane habitats dominated by dwarf shrubs, herbs, sedges, rushes and/or mosses

The Cairngorms has the most extensive tracts of sub-alpine and alpine heath in Britain and the full range of sub-alpine and alpine heaths characteristic of the Eastern Highlands. Snow-bed heaths are better developed than on any other site and there is superlative development of wind-pruned and patterned lichen-rich heath, including fine examples of "wave vegetation". An unusual feature of the lichen-rich heath is the large area in which bearberry is co dominant with ling heather. Lichen-rich heather-dominated heath is more extensively developed on the Cairngorms than anywhere else in Britain.

Heaths dominated by blaeberry and/or cowberry and rich in lichens and/or woolly hair-moss are also extensive, reaching the highest altitude of heathland in Britain. The lichen-rich heaths dominated by blaeberry and cowberry feature unusually abundant trailing azalea. Damp heath associated with snow beds or other damp micro-climates, such as the upper margins of pinewoods, and dominated by either heather or blaeberry, is more extensive than on any other site in Britain. Other snow-bed types of blaeberry heath are also well developed. There is an extensive development of heath on solifluction terracing. In addition, there are extensive transitions to lichen-poor heather-dominated heath types, and to wet-heath, blanket bog, montane acid grassland, late snow-bed vegetation and, more locally, to juniper scrub.

The heath of windswept slopes and summits above 750 m supports the majority of the British population of the lichen *Alectoria ochroleuca* (alpine sulphur tresses), a characteristic species of Scandinavian lichen heaths, which is rare and declining in Britain (classified as Vulnerable and listed on Schedule 8), possibly as a result of climate change.

The Cairngorms has the largest tracts of alpine communities dominated by combinations of grasses, sedges, rushes and mosses in Britain. These alpine communities, developed largely on granite, and to a lesser extent, on base-poor schists, comprise the full range of montane acid grassland communities, their combined extent being greater than that of any other site in Britain.

The three-leaved rush community is particularly well developed, with the full range of subtypes varying from co-dominant woolly fringe-moss to open tussocky, lichen-rich areas. The extent of this community on the Cairngorm mountains far exceeds that any other area in Britain.

Extensive areas of the plateau are dominated by stiff sedge and woolly fringe-moss, particularly on the western spurs and ridges. Due to the predominance of base-poor granites and schists, this community is largely species poor and overwhelmingly dominated by woolly hair-moss, but locally, on more base-rich outcrops, as at the head of the Slochd Mor and at Glean Einich, there are also small areas of moss-heath which are rich in dwarf herbs, principally alpine lady's mantle and dwarf campion. The rare lichen *Cladonia pleurota* is found in moss-heath.

In areas of the plateau where snow lies a little deeper there are beds of dense, short matt-grass. These support two very rare lichen species, *Cladonia maxima* and *C. sticta*, the latter of

which is restricted to the Cairngorms in Britain and is listed on Schedule 8. The rare lichen *Cetraria delisei* is also present in these snow-bed grasslands, particularly in areas of sedge-heath dominated by stiff sedge, where the snow lies later into the summer.

Dwarf-willow and moss-dominated communities of late snow-beds are the most extensive and well-developed in Britain. Rare arctic-alpine herbs found here include starwort mouse-ear and drooping woodrush. The areas of late snow-lie also support rare bryophytes such as the mosses *Polytrichum sexangulare* (*norvegicum*) and *Andreaea nivalis*, and the liverworts *Moerckia blyttii* and *Pleuroclada albescens* and the very rare *Marsupella arctica* and *Gymnomitrion apiculatum,* the latter of which is listed on Schedule 8. Some northern Atlantic bryophytes are also found in this habitat, including rare species such as the liverworts *Scapania umbrosa* and *Anastrophyllum donnianum*.

Wet ground and melt-water streams associated with areas of late snow lie support a number of very rare bryophytes and lichens, including the moss *Hygrohypnum molle*, the liverwort *Marsupella sparsifolia,* and the lichens *Staurothele areolata* and *Bellemerea alpina*, the latter in its only British station.

Herb-dominated vegetation of slopes irrigated by melt waters, characterised by alpine lady's-mantle and least cinquefoil, is also finely developed.

All the montane communities are of national or European importance.

Scree and rocks

There are extensive areas of scree on granite at a range of altitudes in the Cairngorms and these support diverse and representative examples of high-altitude acidic scree communities which are characteristic of the Eastern Highlands of Scotland. Of particular interest is the flora of high-altitude screes in the snowy corries, with parsley fern, alpine lady-fern and wavy meadow-grass.

Rare bryophyte species, on rocks and in and around snow-beds, are well represented and include the moss *Dicranum glaciale* and the liverworts *Tetralophozia setiformis* and *Marsupella adusta*.

High-altitude crevice habitats occur widely on the acidic granites of the Cairngorms and support an abundance of characteristic species. Rare species found here include Highland cudweed, spiked wood-rush and hare's-foot sedge.

Lochs and open water

Among the Cairngorm lochs are the highest standing water bodies in Britain. Fringed with ice polished boulders, those over 600 m are oligotrophic and arctic/alpine in character, with a very impoverished fauna and flora and have continuous ice cover from December to May in most winters. Winter populations of phyto- and zoo- plankton develop below the ice while diatom growth occurs only after the ice has melted.

The corrie and plateau lochs, on rocky substrates above 900 m, suffer the harshest climate and the lowest levels of nutrient, leading to low species diversity of flora and fauna, mainly phytoplankton with a few zooplankton and invertebrates, but no aquatic plants (macrophytes) or fish.

The larger glacial trough lochs in Glens Einich and Avon enjoy more sheltered conditions. The occurrence of finer sediments in Loch Einich allows the limited establishment of higher plants such as shore-weed, six-stamened waterwort and bulbous rush, and several species of fish are also found, including salmon, sea trout and Arctic charr.

The upper sections of the streams comprise bare rocks and stones with bryophytes and support invertebrates typical of arctic-alpine streams, in the absence of macrophytes and fish. The fast-flowing rivers in the main glens of the Cairngorms are very sparse in animal and plant life but are the main spawning grounds of many of the salmon for the Spey and Dee.

Key plant species

By a narrow margin the Cairngorm mountains are the second richest area in Britain for montane vascular plants, supporting 77 out of a possible 118 species. It is the richest area for acid-tolerant montane plants in Britain. Rare vascular plant species include alpine and Highland saxifrages, hare's-foot sedge and alpine foxtail. The long lists of mosses, lichens and liverworts included several species which are unknown elsewhere in Britain. The population of Green shield-moss, found on damp logs at one location in pinewood habitat is of European importance. Several are also listed on Schedule 8 of the Wildlife and Countryside Act.

The SSSI includes the "Cairngorms Mar Lodge" Important Fungus Area, with a number of species first recorded in Britain in the Cairngorms, e.g. *Cortinarius rufostriatus*.