

BEN ALDER AND AONACH BEAG SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE



Slopes above Loch an Sgoir, Geal-Chàrn © NatureScot, Anne Elliott

Site Details

Site name: Ben Alder and Aonach Beag

Map: <https://sitelink.nature.scot/site/8200>

Location: Highlands and Islands

Site code: UK0012951

Area (ha): 6,653.48

Date designated: 17 March 2005

Qualifying features

Qualifying feature	Assessed condition	SCM visit date	UK overall Conservation Status
Wet heathland with cross-leaved heath	Unfavourable No change	23 August 2013	Unfavourable - Bad
Dry heaths	Favourable Maintained	2 August 2009	Unfavourable - Bad
Alpine and subalpine heaths	Favourable Maintained	2 August 2009	Unfavourable - Bad
Mountain willow scrub	Unfavourable No change	28 August 2013	Unfavourable - Bad
Montane acid grasslands	Favourable Maintained	2 August 2009	Unfavourable - Bad
Alpine and subalpine calcareous grasslands	Unfavourable No change	25 August 2013	Unfavourable - Bad
Tall herb communities	Favourable Maintained	28 August 2013	Unfavourable - Bad
Blanket bog*	Unfavourable No change	17 July 2009	Unfavourable - Bad
High-altitude plant communities associated with areas of water seepage*	Unfavourable No change	2 August 2009	Unfavourable - Bad
Acidic scree	Favourable Maintained	28 September 2004	Unfavourable-Inadequate
Plants in crevices on acid rocks	Favourable Maintained	2 August 2009	Unfavourable - Bad
Plants in crevices on base-rich rocks	Favourable Maintained	17 July 2009	Unfavourable-Inadequate

Notes:

Assessed Condition refers to the condition of the SAC feature assessed at a site level as part of NatureScot's [Site Condition Monitoring \(SCM\)](#) programme.

Conservation status is the overall condition of the feature throughout its range within the UK as reported to the European Commission under Article 17 of the Habitats Directive in 2019.

* Indicates a Habitats Directive Priority Habitat

Overlapping Protected Areas:

[Ben Alder and Aonach Beag SSSI](#), [Ben Alder SPA](#)

Key factors affecting the qualifying features

Wet heathland with cross-leaved heath

This site is mountainous, remote and very large, at 6653 ha. It is located in the central Highlands and the wet heath is intermediate between eastern and western types. Wet heath occurs on acidic, nutrient-poor substrates, such as shallow peats. They occur most frequently between dry heath or other dry, acid habitats, and blanket bogs. At high altitudes, wet heaths occur in mosaics with Alpine and Boreal heaths; in these situations lichens and northern or montane species are well-represented.

There are areas of purple moor-grass *Molinia caerulea*-dominated wet heath in the southern part of the site. The high cover of grasses may be the results of historical management such as burning, but dwarf shrubs are still being restricted by high grazing levels. There has been a reduction in grazing pressure, but this may not be sufficient to restore the wet heath habitat in this area which is currently at unfavourable condition due to overgrazing by red deer. Continued effort to reduce the grazing pressure from red deer and also continuing to avoid burning of this habitat is key to its management. Water levels are also an important factor for this habitat and avoiding draining areas of wet heath, or interfering with natural drainage, is important. Other key issues which can affect this habitat are ATV use, vehicle tracks, and afforestation.

European dry heaths

European dry heath is widely distributed on this site and can dominate the landscape. It typically occurs on freely-draining, acidic to almost neutral soils with generally low nutrient content. Heather and other ericaceous dwarf-shrubs dominate the vegetation but it varies in the flora and fauna according to climate, altitude, aspect, soil conditions (especially base-status and drainage), and management.

Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. The dry heath is managed as extensive grazing for red deer and, on part of the site, low numbers of livestock – mainly sheep. Dwarf shrub cover is high, with moderate species diversity, and herbivore impacts can be noticeable. Browsing on heather *Calluna* can be obvious in many areas and some areas are obviously tracked and grazed. Other key issues which can affect this habitat are ATV use, vehicle tracks, and afforestation.

Alpine and Boreal heaths

Alpine and Boreal heaths occur on acid rocks on high ground, both on exposed lower summits and ridges and on sheltered slopes. Exposure or snow-lie, which suppress the growth of dwarf-shrubs, also favour the growth of characteristic lichens and bryophytes.

Alpine heaths develop above the natural altitudinal tree-line. Boreal heaths develop below the tree-line in gaps among scrubby high-altitude woods or as replacements for those subalpine woods lost due to grazing and burning. On lower slopes, Boreal heaths may grade into floristically-similar European dry heaths.

Alpine and Boreal heaths are rich in bryophytes and lichens. Lichen-rich heaths are susceptible to damage by fire or trampling. Rocky ground can be important in protecting heaths from fire.

Key management issues include grazing and trampling. Tracking does occur, but not to any great extent and not enough to impact on the feature, and browsing is generally very low. Burning would impact on the habitat but this site is not currently burnt. Raised nutrient levels from rain and snow could affect this habitat, as could climate change.

Climate change may also impact on the very rare Blue heath *Phyllodoce caerulea*, and this species is also susceptible to burning.

Mountain willow scrub

Mountain willow scrub is the UK's highest-altitude shrubby vegetation, occurring on moist, relatively base-rich soils in rocky situations on mountains. It is predominantly a natural habitat, with succession prevented by the harsh climate at the high altitudes at which it is found. It tends to be associated with the more sheltered areas of the upper subalpine and low alpine zones of mountains, and there may be a positive association with moderately late snow-lie.

This site has an exceptional area of woolly willow *Salix lanata* and it is one of the highest altitude stands of *Salix* scrub in the UK at 950m. It occurs on steep rocky ground, which unusually, is accessible to deer. Other stands occur on ungrazed ledges and, more rarely, on other lightly grazed, steep rocky slopes or boulder fields, occurring only as small, discrete stands or more scattered bushes.

The key management issues for this habitat are grazing/trampling pressure from red deer above the low levels appropriate for this habitat, on naturally unstable soils. This has reduced and restricted the occurrence of willows causing the feature to be in unfavourable condition. There is more than one population of montane willows on this site, but not all locations have enough plants to be ecologically functioning, i.e., flowering and setting seed, so the populations are not all self-sustaining.

Montane acid grasslands

Montane acid grasslands are the most extensive type of vegetation in the high mountain zone, i.e. above an altitude of about 750 m. This site has the largest area of land above 1000m outside the Cairngorms. The grasslands characteristically

forms large continuous tracts, covering summit plateaux and the tops of the higher summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by contrasting extremes of exposure and snow-lie.

The habitat is vulnerable to nutrient inputs and physical damage such as occur due to dunging and urination by grazing animals, acid deposition, human and animal trampling, and use of all-terrain vehicles. On this site, there is localised tracking especially along ridges with the main walking routes and also some deer tracks, but the total area affected is small. Other factors which may impact on these grasslands over time are climate change, reduced snow cover and atmospheric deposition.

Alpine and subalpine calcareous grasslands

Ben Alder and Aonach Beag has high altitude alpine and subalpine calcareous grassland. They are small areas, owing to the limited occurrence of calcareous rocks, but extremely high quality. The habitat occurs on lime-rich soils and consists of short, often grazed, species-rich mixtures of arctic-alpine cushion herbs, grasses and sedges across a broad range of altitudes. This is one of the most important upland habitats in the UK for rare arctic-alpine plants and other rare montane or northern plants and animals. At high altitude the grasslands are maintained by the harsh climate, though grazing, trampling or unstable ground may also alter species abundance and composition.

This habitat is relatively palatable to grazing animals such as deer, and they graze it preferentially. It benefits from low to moderate levels of grazing, which suppresses the more vigorous species and creates niches for the rare plants to germinate and grow.

Key management issues for this habitat are trampling by red deer leading to disturbed bare ground along distinct and clearly defined paths and tracks. Following from this, overgrazing by red deer is the next contributor to this feature being at unfavourable condition. When addressing this issue it is important to remember that too low a level of grazing will lead to undergrazing of the habitat which is potentially as problematic.

Tall herb communities

Tall herb habitat is found on ungrazed upland cliff ledges, occasionally extending on to open ground, and is restricted to base-rich substrates and somewhat sheltered situations. It provides a refuge for rare, grazing-sensitive, montane plants.

Variation within the habitat type is related chiefly to geographical position, altitude, and soil conditions and rock type. On this site, the habitat is small scale and localised. It is most abundant in Coire Cheap. There are also scattered stands on the cliffs above Loch an Sgoir, in Coire na h Iolaire and on the north-facing cliffs of Ben Alder.

The key management issue is ensuring only low/no grazing from red deer. Domestic stock do not currently graze this habitat on this site but could become an issue if numbers were to significantly increase.

Blanket bogs

Blanket bogs are found in areas of moderate to high rainfall and a low level of evapotranspiration, allowing peat to develop over large expanses of undulating ground. Blanket bogs are considered active when they are supporting a significant area of vegetation that is peat-forming. This is a Habitats Directive Priority habitat.

Key management issues on this site that are causing the feature to be in unfavourable condition are over-grazing and/or trampling by red deer, and associated peat erosion.

High altitude plant communities associated with water seepage

High-altitude plant communities associated with areas of water seepage is a type of flush mire that occurs only at high altitude. The characteristic plant communities colonise open substrates that are constantly flushed by surface seepage of cold, base-rich water. They are amongst the few remaining natural plant communities in the UK and are maintained by harsh climatic and soil conditions. On this site Alpine flushes are widespread but local.

The vegetation consists of mixtures of small sedges, rushes, small herbs and bryophytes, and includes many arctic-alpine species.

The key factors affecting the habitat at this site and causing the feature to be in unfavourable condition is trampling pressure from red deer leading to bare ground, This is particularly concentrated at flushes in corries.

Other key management issues on this site, include inappropriate levels of grazing by red deer, above low levels, and atmospheric pollution adding nitrogen to the system. These other management issues are not responsible for the feature failing to be at favourable status however.

Acidic scree

Scree consist of rock fragments covering the frost-shattered summits of mountains or accumulating on slopes below cliffs. Scree is intrinsically unstable and rocks will frequently move meaning that this habitat is vulnerable to disturbance naturally. Acidic screes are made up of siliceous rocks such as quartzite, granite and sandstone. They may occur at any altitude, but screes in the lowlands are excluded from the Annex I definition.

This feature is widespread within the site, both on steeper slopes below cliffs and on summit plateaux. The vegetation is most often a montane acid grassland or alpine heath type.

There is little that affects this community as grazing animals tend not to access scree, especially where it is steep and unstable.

Siliceous rocky slopes with chasmophytic vegetation

Chasmophytic (grows in the crevices of rocks) vegetation is plant communities in the cracks and fissures of rock faces. The habitat is widespread in upland areas but is

localised and fragmentary in its occurrence. The type of plant community that develops is largely determined by the base-status of the rock face. Siliceous communities develop on acid rocks, which are widespread throughout this site

The plants in crevices are found in harsh and sometimes extreme conditions with limited soil development, but where there is some shelter and moisture, and so plants are sparse and scattered. Chasmophytic plant species are adapted to the stresses of drought and low nutrient availability. They can be sensitive to overgrazing and trampling although most sites are protected by inaccessibility.

The key management issue for this habitat is grazing and trampling by red deer, although their effect is restricted to locations they can reach. The only other issue is natural events such as rock fall or landslips.

Calcareous rocky slopes with chasmophytic vegetation

Chasmophytic (grows in the crevices of rocks) vegetation consists of plant communities in the cracks and fissures of rock faces. The habitat is widespread in upland areas but is localised and fragmentary in its occurrence. The type of plant community that develops is largely determined by the base-status of the rock face. Calcareous sub-types develop on lime-rich rocks such as limestone and calcareous schists.

This feature is restricted to the northwest part of this site. Much of it consists of angled limestone slabs, though steeper cliffs are present in upper Coire Cheap.

The plants in crevices are found in harsh and sometimes extreme conditions with limited soil development, but where there is some shelter and moisture, and so plants are sparse and scattered. Chasmophytic plant species are adapted to the stresses of drought but can be sensitive to overgrazing, above low levels, and trampling although many sites are protected by inaccessibility. The base-richness of calcareous rocks may encourage competition from more vigorous native species, or non-native invasives such as New Zealand willowherb.

The key management issue is grazing and/or trampling which can impact on the more accessible areas of this habitat, as can naturally unstable rock faces. Further information about this SAC's protected habitats can be found on the [JNCC website](#).

Conservation Priorities

Priority habitats, found on this site are:

- High-altitude plant communities associated with areas of water seepage
- Blanket bog

These are the highest priority habitats and so should management conflicts arise they should be given priority over other habitats.

The next highest priorities are those habitats which were the primary reason for site selection, these are: Mountain willow scrub, Montane acid grasslands, Alpine and subalpine heaths, Alpine and subalpine calcareous grasslands, Acidic scree

and, Plants in crevices on base-rich rocks.

Following on from these habitat types would be those present as qualifying features but not a primary reason for selection of this site, these are: Plants in crevices on acid rocks, Tall herb communities, Dry heaths and Wet heathland with cross-leaved heath.

The Ben Alder and Aonach Beag SAC habitats have a range of differing grazing requirements. However, the majority of habitats (by number and by extent) present on these sites require Low to Low-Moderate impacts to promote favourable condition. These habitats are also the main reasons for the selection of the site as an SAC. With regards to managing grazing, a key factor in this SAC's qualifying features being unfavourable, herbivore management should be directed towards achieving generally Low to Low-Moderate impacts.

The grassland and flush habitats that require low-moderate levels of grazing, are expected to be preferred for grazing and hence may still attract the required levels under generally low levels of impacts.

The montane willows and tall herbs are likely to require Low impacts to allow populations to expand, hence may require further specific measures. However, further monitoring of all habitats will be required to assess and adapt future herbivore management.

This SAC overlaps with the Ben Alder SPA. Any pro-active management for the SAC or assessment of plans or projects will also need to take account of the SPA interests.

Overarching Conservation Objectives for all qualifying habitat features

1. To ensure that the qualifying features of Ben Alder and Aonach Beag SAC are in favourable condition and make an appropriate contribution to achieving favourable conservation status.

Favourable Conservation Status (FCS) is considered at a European biogeographic level. When determining whether management measures may be required to ensure that the conservation objectives for this site are achieved, the focus should be on maintaining or restoring the contribution that this site makes to FCS.

When carrying out appraisals of plans and projects against these conservation objectives, it is not necessary to understand the status of the feature in other SACs in this biogeographic region. The purpose of the appraisal should be to understand whether the integrity of the site (see objective 2) would be maintained. If this is the case then its contribution to FCS across the Atlantic Biogeographic Region will continue to be met. Further details on how these appraisals should be carried out in relation to maintaining site integrity is provided by objective 2 (including parts a, b and c). If broader information on the feature is available then it should be used to provide context to the site-based appraisal.

Note that "appropriate" within this part of the conservation objectives is included to indicate that the contribution to FCS varies from site to site and feature to feature.

2. To ensure that the integrity of Ben Alder and Aonach Beag SAC is restored by meeting objectives 2a, 2b and 2c for each qualifying feature.

The aim at this SAC is to restore or maintain the habitats in a favourable condition as a contribution to its wider conservation status. Therefore any impacts on the objectives, for each feature, shown in 2a, 2b, or 2c below must not persist so that they prevent the achievement of this overall aim.

When carrying out appraisals of plans or projects the focus should be on restoring site integrity, specifically by meeting the objectives outlined in 2a, 2b and 2c. If these are met then site integrity will be restored. Note that not all of these will be relevant for every activity being considered. Any impacts on the objectives shown in 2a, 2b or 2c below must not persist so that they prevent the restoration of site integrity. Temporary impacts on these objectives resulting from plans or projects can only be permitted where there is certainty that the features will be able to quickly recover.

This objective recognises that the qualifying habitats are exposed to a wide range of drivers of change. Some of these are natural and are not a direct result of human influences. Such changes in habitat's extent, distribution or condition within the site which are brought about by natural processes, directly or indirectly, are normally considered compatible with the site's conservation objectives. An assessment of whether a change is natural or anthropogenic, or a combination of both, will need to be looked at on a case by case basis.

Conservation Objectives for Northern Atlantic wet heaths with *Erica tetralix* [H4010] (Wet heathland with cross-leaved heath)

2a. Maintain the extent and distribution of wet heath within the site

Maintain approximately 1197 ha. The area figure has been taken from the Standard Data Form, and is an estimate. This is because wet heath typically covers large areas, forming complex mosaics with areas of blanket bog, and in dryer areas dry heaths and grassland. Baseline surveys will include smaller areas of other habitats. The vegetation is very variable in composition. Dwarf shrub cover and structure is variable, similar to dry heath in some areas, and to blanket bog in other, usually wetter areas, particularly on degraded bog. At high altitudes wet heath can be found in mosaics with Alpine and Boreal Heath, usually in areas with some topographic shelter. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

At Ben Alder and Aonach Beag wet heath is widespread but local, predominantly on the gentle western and southern slopes of Ben Alder, the Bealach Beithe and the lower slopes of Carn Dearg, especially around Culra.

2b. Restore the structure, function and supporting processes of wet heath

The structure and function of wet heath needs to be restored because in some areas there is an over-dominance of purple moor-grass *Molinia caerulea*, indicating high levels of grazing, or past grazing. High levels of browsing is occurring as shown by impacts on heather and other heathy species. It should be noted that species composition is persistent and may be maintained for some years after the number of grazing animals is decreased.

The structure of the habitat is based around the presence of:

- at least 25% (up to 90%) cover of dwarf-shrub heath species.
- less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*) should show signs of browsing.
- less than 10% of the Sphagnum cover should be crushed, broken, and/or pulled-up.
- less than 10% of the ground cover should be made up from disturbed ground (i.e. bare ground is where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks.
- less than 10% of the total feature area should show signs of active (i.e. facilitates the movement of water away from the site) drainage, resulting from ditches or heavy trampling or tracking.
- less than 20% of vegetation cover should be made up of scattered native trees and scrub (excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*). There are some exclosures for native tree regeneration and these are appropriate in location and scale.
- less than 10% of vegetation cover should be made up of bracken.
- less than 1% of vegetation cover should be made up of non-native species.

Therefore the predominant requirement for wet heath is the appropriate low levels of grazing and burning; such levels will vary according to a number of factors such as altitude, aspect, location (i.e. montane, etc.). Grazing and burning will amend the factors listed above, leading to a dominance, for example of purple moor-grass *Molinia caerulea* or a lack of dwarf shrub cover. Areas which are used by red deer for shelter are likely to experience higher impacts than more exposed areas. The management of red deer is required to improve or maintain the condition of wet heath. Maintaining the hydrology is also important, for example, avoiding ditches and other man-made drainage.

Management effort should therefore be directed to maintain species composition, vegetation mosaics and ground/soil structure and integrity. This should also avoid surface erosion and deposition, introduction of alien and invasive species and scrub and habitat fragmentation.

2c. Restore the distribution and viability of typical species of wet heath

In places the habitat needs to be restored to reduce the dominance of grasses in the wet heath, by lowering grazing and browsing, as outlined above.

Wet heath is an important habitat for a range of vascular plant and bryophyte species. Generally the vegetation is dominated by mixtures with cross-leaved heath *Erica tetralix*, although the normally defining cross-leaved heath is absent at higher levels, such as those found at Ben Alder above 700m. Other species include heather, grasses, sedges and *Sphagnum* bog-mosses listed below.

Common heather *Calluna vulgaris*
 Cross-leaved heath *Erica tetralix*
 Deer grass *Trichophorum cespitosum*
 Purple moor-grass *Molinia caerulea*
 Bog asphodel *Narthecium ossifragum*
 Common cottongrass *Eriophorum angustifolium*

Bog-mosses *Sphagnum* spp.

Typical non plant species of this habitat include red deer *Cervus elaphus* and bird species such as red grouse (*Lagopus l. scotica*), golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina schinzii*) and greenshank (*Tringa nebularia*) golden eagle (*Aquila chrysaetos*), merlin (*Falco columbarius*) and hen harrier (*Circus cyaneus*).

Conservation Objectives for European dry heaths [H4030]

2a. Maintain the extent and distribution of dry heath within the site

Maintain to approximately **1091** ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that European dry heaths can form complex mosaics with habitats such as grasslands, wet heaths and bogs. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

The habitat is found on freely-drained, nutrient-poor, acidic soils. This can determine the extent and distribution of the habitat throughout the SAC, although it is also dependant on heathland management to maintain its extent including:

- appropriate low level of grazing and muirburn.
- avoidance of any loss of habitat through increased extent of successional or adjacent natural habitats, afforestation or invasion by alien species.
- avoidance of negative effects of access and recreation, or developments such as hill tracks unless deemed appropriate under a Habitats Regulations Appraisal.

2b. Maintain the structure, function and supporting processes of dry heath

European dry heaths can form a long term stable community where there is no seed source for trees and shrubs. Trees and shrubs can readily establish in this community where a seed source does exist, and natural processes would result in a climax vegetation of woodland or scrub. This site has few seed sources close to dry heath.

The structure of the habitat is based around the presence of at least 25% cover of dwarf shrub heath species, but can be up 90%. In particular heather *Calluna vulgaris*, as a dominant species, should be present in all phases of growth (pioneer, building, mature and degenerative) to provide a wide range of ecological variety and conservation benefit to a variety of species. At least 10% of the heather cover should be in the late mature/ degenerative phase. Burning is not required to maintain this community.

Further targets to achieve suitable habitat structure include:

Grazing/browsing

- less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*) should show signs of browsing.

Trampling/disturbance

- less than 10% of the ground cover should be made up from disturbed bare ground (i.e. where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks. The emphasis is on 'disturbed' rather than

'bare'.

Invasive native and non-native species

- non-native species should be absent from the habitat, with less than 1% of vegetation cover should be made up of non-native species.
- bracken coverage should be minimised, making up less than 10% of the vegetation cover.
- less than 20% of the vegetation cover should be made up of scattered native trees and scrub (exclude *Betula nana* and *Myrica gale*). There are some exclosures for native tree regeneration and these are appropriate in location and scale.

Note that interaction of burning and grazing can be an important cause of loss of dwarf shrub cover. Any burning on Ben Alder and Aonach Beag SAC should follow the Muirburn Code to avoid damage to the structure, function and supporting processes of dry heath.

2c. Maintain the distribution and viability of typical species of the dry heath

On this site the sub-montane heaths are dominated by heather *Calluna vulgaris*, blaeberry *Vaccinium myrtillus* and crowberry *Empetrum nigrum*. Dry heath on this site is restricted to steeper, well-drained lower slopes. The most widespread dry heath community is *Calluna vulgaris* – *Vaccinium myrtillus* heath but there are also areas of *Calluna vulgaris* – *Vaccinium myrtillus* – *Sphagnum capillifolium* heath, especially on steeper north-facing slopes and in transitions to blanket bog. *Calluna vulgaris* – cross-leaved heath *Erica cinerea* heath is found locally on well-drained, south-facing slopes, mostly the woolly fringe-moss *Racomitrium lanuginosum* sub-community.

Typical species:

Heather *Calluna vulgaris*
Blaeberry *Vaccinium myrtillus*
Crowberry *Empetrum nigrum*
Bell heather *Erica cinerea*
Cowberry *Vaccinium vitis-idaea*
Bearberry *Arctostaphylos uva-ursi*

Typical associated vertebrates of upland heaths are red deer (*Cervus elaphus*) and mountain hares (*Lepus timidus*), red grouse (*Lagopus l. scotica*), black grouse (*Tetrao tetrix*), golden plover (*Pluvialis apricaria*), twite (*Carduelis flavirostris*), hen harriers (*Circus cyaneus*), merlin (*Falco columbarius*) and golden eagle (*Aquila chrysaetos*).

Conservation Objectives for Alpine and Boreal heaths [H4060] (Alpine and subalpine heaths)

2a. Maintain the extent and distribution of Alpine and Boreal heaths within the site

Maintain to approximately **405** ha. The area figure for this SAC has been taken from the Standard Data Form, and is an estimate based on the fact that both Alpine and Boreal heaths can grade into other heath types, especially the latter into floristically-similar European dry heaths. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

Alpine and subalpine heaths are found on this site on thin stony soils at higher altitudes, on hill tops and ridges below 1000m and on dry ridges within corries. These areas are where the dominant plants can cope with harsh climatic conditions such as high winds and prolonged snow cover. These conditions will largely determine the extent and distribution of the habitats throughout the SAC, although the habitats' long-term existence will also be affected by:

- an appropriate low level of grazing
- habitat loss through increased extent of adjacent natural habitats, afforestation or invasion by non-native species.

2b. Maintain the structure, function and supporting processes of the Alpine and Boreal heath

Alpine and Boreal heaths are climax vegetation in exposed and extreme conditions which result in slow growth; they are therefore very sensitive to disturbance and are slow to recover. Alpine heath is generally intact with closed vegetation cover and good species diversity. These heaths are most likely to be affected by trampling, whether by hill walkers or deer. Burning causes long term impacts because recovery is so slow and this habitat should not be burnt.

The structure of the habitat is based around:

- the presence of at least 25% cover of dwarf shrub heath species, but can be up to 90%.
- less than 10% of live leaves should show signs of grazing (of any of stiff sedge *Carex bigelowii*, wavy hair-grass *Deschampsia flexuosa*, sheep's fescue *Festuca ovina*, viviparous fescue *Festuca vivipara*, three-leaved rush *Juncus trifidus*)
- less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively) should show signs of browsing
- no signs of burning inside the feature boundaries
- less than 10% of the ground cover should be disturbed bare ground (i.e. where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks. The emphasis is on 'disturbed' rather than 'bare'.

2c. Maintain the distribution and viability of typical species of Alpine and Boreal heath

On this site, alpine heath occurs on thin stony soils at higher altitudes, on hill tops and ridges below 1000m and on dry ridges within corries. The main community is *Calluna vulgaris* – *Cladonia arbuscula* heath and there are also areas of *Vaccinium myrtillus* – *Rubus chamaemorus* heaths, and *Vaccinium myrtillus* – *Racomitrium lanuginosum* heath at the highest elevations. The rockier heaths provide suitable habitat for northern Atlantic liverworts.

This habitat comprises a wide range of heath types, with variation related to climate, local exposure and snow-lie. The dominant plants in UK examples of Alpine and Boreal heaths, on this site as elsewhere, are usually dwarf-shrubs of heather *Calluna vulgaris* and blaeberry *Vaccinium myrtillus*, which are low-growing or prostrate owing to exposure to high winds or prolonged snow cover at moderately high altitudes.

On less-exposed, more sheltered ground at the lower altitudinal range of the habitat, *Calluna* generally dominates. *Calluna* is usually accompanied by other dwarf-shrubs, such as *V. myrtillus*, bell heather *Erica cinerea*, bearberry *Arctostaphylos uva-ursi* and crowberry *E. nigrum* ssp. *nigrum*. On more exposed and windswept ground, a range of dwarf-shrubs may dominate, forming an altitudinal progression. The first in the progression, and often the most extensive, are heaths dominated by *Calluna* growing in a prostrate form. At higher

altitudes, where conditions are too extreme for heather, short or prostrate *Vaccinium* spp. and *E. nigrum* ssp. *hermaphroditum* dominate. On sheltered slopes where snow lingers, the dominant shrub is *V. myrtillus*, which is either the sole dominant or grows with *E. nigrum* ssp. *hermaphroditum*, dwarf cornel *Cornus suecica* and cloudberry *Rubus chamaemorus*. Some of the sub-types of the habitat have a restricted distribution in the UK.

In some stands of Alpine and Boreal heaths the action of solifluction (by creating unstable soils, which provide more plant nutrients and maintain open conditions) favours the growth of certain plants. These include mountain everlasting *Antennaria dioica*, carnation sedge *Carex panicea*, pill sedge *C. pilulifera*, fir clubmoss *Huperzia selago* and viviparous sheep's-fescue *Festuca vivipara*, enriching the flora of the heaths.

Alpine and boreal heath can host the important montane hepatic mat habitat of leafy liverworts, and lichens such as the Nationally Scarce *Stereocaulon saxatile*.

At altitude with increasing snow-lie blaeberry abundance increases with the rare blue heath *Phyllodoce caerulea* occurring very locally in some snow-bed heaths at Ben Alder and Aonach Beag. Blue heath is very susceptible to damage by burning, and may be negatively affected by climate change.

The indicator plant species for Alpine and Boreal heaths include:

Heather *Calluna vulgaris*

Cladonia spp.

Crowberry *Empetrum nigrum* ssp. *Hermaphroditum*

Bell heather *Erica cinerea*

Woolly fringe-moss *Racomitrium lanuginosum*

Blaeberry *Vaccinium myrtillus*

Cowberry *Vaccinium vitis-idaea*

Typical associated vertebrates of these high habitats are the mammals red deer (*Cervus elaphus*) and mountain hares (*Lepus timidus*) and the birds ptarmigan (*Lagopus muta*), dotterel (*Charadrius morinellus*), golden eagle (*Aquila chrysaetos*) and, on a very localised basis, snow bunting (*Plectrophenax nivalis*).

Conservation Objectives for Sub-Arctic *Salix* spp. Scrub [H4080] (Mountain willow scrub)

2a. Restore the extent and distribution of the Mountain willow scrub within the site

Restore to approximately 1.33ha. This figure is taken from the Standard Data Form. This is a very local habitat type found usually on ungrazed ledges on steep rocky slopes or boulder fields, occurring only as small discrete stands or more scattered bushes (0.5ha or smaller). Therefore current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision.

The objective is to restore this extent as, due to grazing pressure above the low levels this habitat can sustain, some 'stands' of this habitat have very few willow trees (as little as one tree) which is not sustainable in the long term and without management there is a high chance some of these stands could be lost.

On this site, *Salix lanata* and *S. reticulata* occurs in Coire Cheap, *Salix lapponum* and *S. phyllicifolia* occur in Coire na Coichille, *S. lanata* at Geal Charn and *S. myrsinites* and *S. myrsinifolia* at Creag Dhubb.

2b. Restore the structure, function and supporting processes of Mountain willow scrub

The objective is to restore the structure, function and supporting processes of this habitat because it is not reproducing, or seedling trees are not surviving, due to browsing by red deer in some places. To create ecologically functioning populations, the trees must be able to reproduce successfully. As willows have male and female flowers on separate trees, to maintain a viable population it is important that there is a suitably large population size with both male and female plants present. In some locations active conservation measures may be required to restore the viability of this habitat, for example if a lone tree is present, or if all the trees in a group are male or female.

This habitat is the UK's highest-altitude shrubby vegetation, occurring on moist, relatively base-rich soils in rocky situations on mountains. The willow scrub survives on ungrazed ledges and, more rarely, on lightly grazed, steep rocky slopes or boulder fields.

This site has a number of sites with mountain willows of various species. Notably, it has the UK's highest stand of woolly willow *Salix lanata*. This is a large stand with many trees, mostly less than 30cm high. This stand does appear to be reproducing successfully, with viable seed being produced and young trees present.

However, over-grazing/browsing by red deer – above low levels - is believed to have reduced and restricted the occurrence of this habitat. At many sites its continued future is precarious, since it is confined to often unstable rock ledges and reproducing populations are very small, isolated, and of uncertain long-term viability. Excessive trampling can damage the habitat.

Where grazing/browsing occurs it should be at a low level where distinct browse lines or shaping of the canopy (topiary-like effects) does not occur. The most critical single issue is the management of grazing to a level where accessible trees can flower, set seed, and seed can germinate and survive. This is necessary for the population to be ecologically viable in the long term.

This habitat is very sensitive to muirburn and it should be avoided in these areas.

2c. Restore the distribution and viability of typical species of Mountain willow scrub

The distribution of mountain willow scrub is more restricted than it should be to create ecologically viable populations primarily due to grazing by red deer above low levels. This habitat consists of a mixture of willow species which have arctic-alpine and arctic-subarctic distributions in Europe. This site holds some of the highest altitude *Salix* scrub in the UK. The most widespread willows are downy willow *Salix lapponum* and whortle-leaved willow *S. myrsinites*. The high altitude population of woolly willow *Salix lanata* in Coire Cheap is notable, as is the net-leaved willow *S. reticulata* on the edge of the base-rich cliffs around parts of the coire.

The typical species include:

Woolly willow *Salix lanata*

Downy willow *Salix lapponum*

Whortle-leaved willow *S. myrsinites*

Net-leaved willow *Salix reticulata*

Red deer *Cervus elaphus* use this habitat on this site.

Since this habitat is small and fragmented and generally occurs within a wider landscape-

scale, maintenance of the typical species will need to be managed as part of the wider site management.

Conservation Objectives for Siliceous alpine and boreal grasslands [H6150] (Montane acid grasslands)

2a. Maintain the extent and distribution of Montane acid grasslands within the site

Maintain to approximately **1457ha**. The area figure has been taken from the Standard Data Form, and is an estimate based on the amount and complex, yet often limited, mosaic of several different high altitude communities. Fundamentally however there should be no measurable net reduction the extent of the habitat and its distribution throughout the site.

The summit of Ben Alder is 1148m and Aonach Beag is 1116m. The montane acid grasslands are amongst the highest altitude habitats on the site. This feature is found on summit plateaux and exposed ridges on all the main hills.

Factors at the global/national level that may affect Montane acid grasslands' extent over the site may be linked to climate change, reduced snow cover and atmospheric acid deposition.

2b. Maintain the structure, function and supporting processes of Montane acid grasslands

Whilst these grasslands are some of the very few predominantly near-natural habitats remaining in the UK, they are very sensitive to changes in current pressures, especially trampling, grazing and nutrient input. Excessive grazing, and the associated manuring, may favour grasses over bryophytes.

Where appropriate low levels of grazing/browsing are in place to allow survival of component species of the habitat the structure, throughout the site, should meet the following conditions:

- Less than 10% of grass and sedge tillers uprooted;
- Less than 10% of live leaves and/or flowers of any of the following showing evidence of grazing *Alchemilla alpina*, *Carex bigelowii*, *Deschampsia flexuosa*, *Festuca ovina*, *Festuca vivipara*, *Juncus trifidus*, *Nardus stricta*, *Sibbaldia procumbens*, *Thymus polytrichus*;
- Less than 50% of live leaves of any of the following showing evidence of grazing *Agrostis capillaris*, *Agrostis vinealis*, *Anthoxanthum odoratum*, *Poa* spp.

Where appropriate levels of disturbance/trampling are in place, that allow for survival of component species of the habitat throughout the site, then the following conditions should be met:

- No signs of burning inside the feature boundaries;
- Less than 10% of the ground cover should be disturbed bare ground
 - a) distinct and clearly defined paths and tracks (exclude constructed tracks) across the feature or,
 - b) diffuse/scattered disturbance of the ground, not on clearly defined paths or tracks.

2c. Maintain the distribution and viability of typical species of Montane acid grasslands

Ben Alder is one of only six sites outside of the Cairngorms and Ben Nevis with extensive

late-lie mossy snow-beds holding *Polytrichum sexangulare* – *Kiaeria starkei* and *Salix herbacea* – *Racomitrium heterostichum* snow-bed communities. Various rare plants occur in the snow-beds, including starwort mouse-ear *Cerastium cerastoides* and the bryophytes *Dicranum glaciale*, *Marsupella condensata* and *Nardia breidleri*. *Carex bigelowii* – *Polytrichum alpinum* sedge-heath attains its largest extent outside of the eastern Highlands.

This feature is restricted to the higher, most exposed ridges and slopes where it is abundant. Communities which occur include *Juncus trifidus* – *Racomitrium lanuginosum* rush-heath, *Carex bigelowii* – *Racomitrium lanuginosum* moss-heath and *Nardus stricta* – *Carex bigelowii* grass-heath, the latter often in areas with more prolonged snow-lie, and in more sheltered hollows within ridges and corries.

The longest lying snow-beds (*Polytrichum* – *Kiaeria* snow-bed, and *Salix* – *Racomitrium* snow-bed) are dominated by mosses and hardy herbs. These communities occur around the edges of high plateaux on steep slopes where a snow cornice develops in high corries or in gullies where deep snow accumulates. They can also occur in snow hollows on the highest summits.

Snowbeds host an important bryophyte community. Species include *Andreaea nivalis*, *Marsupella condensata*, *Nardia breidleri*, *Polytrichastrum sexangulare* and *Pleurocladula albescens*. Snow beds also host hepatic mat communities of liverworts. The snowbeds also support important lichens, including the Nationally Rare *Ameliella andreaeicola*.

In summary the typical species for Montane acid grassland are:

Wavy hair-grass *Deschampsia flexuosa*
Viviparous fescue *Festuca vivipara*
Stiff sedge *Carex bigelowii*
Dwarf cudweed *Gnaphalium supinum*
Starke's fork-moss *Kiaeria starkei*
Woolly hair moss *Racomitrium lanuginosum*
Dwarf willow *Salix herbacea*

In addition, this habitat is important for maintaining populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. High levels of herbivore use can be damaging, but a low level of grazing and browsing is necessary to maintain this habitat.

Conservation Objectives for Alpine and subalpine calcareous grasslands [H6170]

2a. Maintain the extent and distribution of Alpine and subalpine calcareous grasslands within the site

Alpine and subalpine calcareous grasslands occur on lime-rich soils. At Ben Alder and Aonach Beag, it is most abundant in Coire Cheap and upper Coire na Coichille and there are a few small patches in Coire a' Charra Mhoir and on Carr Beag.

The objective is to maintain the extent of the habitat to approximately **19** ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the amount and complex, yet often limited, mosaic of several different high altitude communities.

Fundamentally however there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site. Rock falls and landslips can occur and is recognised as a natural process.

2b. Restore the structure, function and supporting processes of Alpine and subalpine calcareous grasslands

Whilst these grasslands, especially the *Dryas octopetala* – *Silene acaulis* ledge community, are amongst the most near-natural habitats remaining in the UK, they are very sensitive to certain pressures. The main elements that affect the habitat are under-grazing, over-grazing, trampling damage and naturally unstable soils.

A distinctive characteristic of this habitat is the high proportion of dwarf forbs to grasses accompanied by a relatively high proportion of mosses in the sward. Where appropriate levels of grazing occur habitat structure should meet the below criteria:

- At least 50% of live leaves and/or flowering shoots of vascular plants should be more than 20 cm above the ground in high summer – the height would be lower at other times of year. The leaf length can also be shorter where the habitat is at a high altitude or very exposed, as is the case at this site.
- Less than 10% of vegetation cover should be made up of bracken and/or scattered native trees and scrub.
- Less than 10% of ground cover should be disturbed bare ground.

This is a habitat where the ideal grazing level is higher than that required for the surrounding habitats. For this reason, the surrounding habitats have been prioritised. Although this may mean that the grazing level is lower than might be ideal, the habitat is preferentially chosen by herbivores due to its palatability, and the actual grazing level is likely to be higher than might be suspected from the number of animals. Red deer are the main grazing animal at this site.

2c. Maintain the distribution and viability of typical species of Alpine and subalpine calcareous grasslands

Both *Festuca ovina* – *Alchemilla alpina* – *Silene acaulis* dwarf-herb and *Dryas octopetala* – *Silene acaulis* ledge communities are well-represented, especially the latter. The widespread arctic-alpines purple saxifrage *Saxifraga oppositifolia* and yellow saxifrage *S. aizoides* are frequent, while rarer species that are widespread on the site include cyphel *Minuartia sedoides*, alpine meadow-grass *Poa alpina*, hair sedge *Carex capillaris*, black alpine-sedge *C. atrata* and alpine speedwell *Veronica alpina*.

Unusually, grazing levels appear to be low enough to allow the development of mountain avens heath on slopes open to grazing animals. The low grazing levels also allow the exceptional development of moderately large populations of montane willows, including woolly willow *Salix lanata*. The transition between these two habitat types is unusual.

On this site alpine and subalpine calcareous grassland is present in a small part of Coire Cheap and there are also small areas in Coire na Coichille and Chàrra Mhòir. The *Festuca ovina* – *Alchemilla alpina* – *Silene acaulis* dwarf-herb community is patchily distributed within Coire Cheap. There is also a band of *Dryas octopetala* – *Silene acaulis* ledge community, which is approximately 20m wide below a series of base-rich rock outcrops in the northern part of Coire Cheap.

There is a notable bryophyte flora associated with the grasslands, including *Blepharostoma trichophyllum* subsp. *Brevirete*, which is common in Scandinavia but not recorded elsewhere in Britain.

This habitat also supports a notable lichen flora, including the Red Data Book Nationally Rare montane calcicoles including the Tundra Sulphur Lichen *Fulgensia bracteata* and

several rare Wart Lichens including *Pertusaria glomerata*. Coire Cheap supports 5 lichen taxa known from nowhere else in Britain: the 4 lichen species *Fulgensia bracteata*, *Involucropyrenium waltheri*, *Pertusaria bryontha*, *Placidiopsis pseudocinerea* and the lichenicolous fungus *Cercidospora stereocaulorum* (growing on the lichen *Stereocaulon dactylophyllum*).

Moss campion *Silene acaulis*
Cyphel *Minuartia sedoides*
Thrift *Armeria maritima*
Mountain avens *Dryas octopetala*
Sheep's fescue *Festuca ovina*
Alpine lady's mantle *Alchemilla alpina*

Variation within the habitat type is due to differences in altitude, climate and the intensity of grazing. The level of grazing for this habitat needs to be set by the level required by the surrounding habitats. These are given higher priority in this document.

Non plant typical species of this habitat include red deer *Cervus elaphus*. This habitat also has the rare cross whorl snail *Vertigo modesta*. It is the highest altitude site for *V. modesta* and is also the largest known UK colony.

Conservation Objectives for Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [H6430] (Tall herb communities)

2a. Maintain the extent and distribution of Tall herb communities within the site

Maintain the current extent – note that no figure is given in the Site Data Form because this habitat is mainly present on steep ground and cliffs.

The habitat is often within a complex, yet often limited, mosaic of several different high altitude communities. Fundamentally however there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site. Where possible opportunity should be taken to restore and/or extend this habitat.

This feature occurs in Coire Cheap where it is locally abundant on cliff ledges and more locally among boulders. There are also scattered stands on the cliffs above Loch an Sgoir, in Coire na h Iolaire and on the north-facing cliffs of Ben Alder.

2b. Maintain the structure, function and supporting processes of Tall herb communities

The extreme sensitivity of this habitat to grazing pressure is responsible for its scarcity. On this site the grazing is by red deer. Whilst this habitat would have once been more abundant it is now largely confined to areas inaccessible to grazers. Introduction of additional grazing pressure, especially from highly agile species such as goats, would cause major losses. Direct reduction of grazing pressure has the ability to restore or extend this scarce habitat.

Where appropriate low levels of grazing/browsing are in place to allow survival of component species of the habitat the structure, throughout the site, should meet the following conditions:

- At least 50% of tall herb stems should be more than 20 cm tall, or there should be few observable signs of grazing on tall herbs or ferns, and most tall herb species should be flowering or showing signs of being able to flower, (qualifier: include flowering stems, other than those of *Luzula sylvatica* which can be hard to see clearly from a distance and do not tend to form a distinct stratum) assessed against

- visual estimate at individual stand scale.
- Less than 50% of live flowering shoots of indicator tall herbs (see list in 2c) should show evidence of grazing.

The structure of this habitat can also be impacted by succession from tall-herb communities to woodland although on this site only montane willows could spread into this habitat. This is another Natura habitat which is very rare nationally, so if natural processes result in the spread of willows onto this habitat, it would be allowed to occur.

Where appropriate levels of disturbance are in place, that allow for survival of component species of the habitat, throughout the site, then the following conditions should be met:

- Less than 25% of the ground cover, of each patch or stand, should be disturbed bare ground*.
- Over the whole feature scanned from sample locations, less than 10% of the ground cover should be disturbed bare ground*. Assessed against the aggregate of visual estimates for as much of the feature as is visible while standing at all sample locations.

* The emphasis is on 'disturbed' rather than 'bare'. Exclude distinct and clearly defined paths or tracks.

This site is not burnt in these areas. Wildfire would negatively impacts upon this habitat type.

2c. Maintain the distribution and viability of typical species of Tall herb communities

Tall herb is a species-rich habitat and on this site is the *Luzula sylvatica* – *Geum rivale* tall-herb community.

It is characterised by the abundance of a species-rich mix of tall, broad-leaved herbs, most of which are otherwise rare in the uplands owing to their sensitivity to grazing.

These are species rich communities with many rare and scarce species, so the list below is not exhaustive. Typical species for the Tall-herb community on this site includes:

Lady's-mantles *Alchemilla* spp.
 Wild angelica *Angelica sylvestris*
 Water avens *Geum rivale*
 Great wood-rush *Luzula sylvatica*
 Alpine meadow-grass *Poa alpina*
 Wood cranesbill *Geranium sylvaticum*
 Roseroot *Sedum rosea*
 Ferns (excluding bracken)

Conservation Objectives for Blanket bog [7130]

2a. Maintain the extent and distribution of Blanket bog within the site

Blanket bog typically covers very large areas, forming complex mosaics with other wetland habitats as well as heath and grass habitats in drier areas. On this site blanket bog is widespread, covering gentler slopes at altitudes up to 900 metres.

There should be no measurable net reduction in the extent of the habitat on the site such that the area of blanket bog is maintained (or restored where necessary) to approximately **1250ha**. This figure is taken from the Site Data Form.

2b. Restore the structure, function and supporting processes of Blanket bog

Much of the blanket bog on this site is in good condition but in some locations it is not, for example at Caol Reidh there are deeply hagged bare peat gullies. The blanket bog needs to be restored in those areas where it is eroding and not re-vegetating, and in other areas, it has fewer indicator species than it should and there is a lack of diversity in sphagnum species, probably due to past burning or grazing above low levels. It should be noted that restoring this kind of habitat takes a long time after appropriate management is put in place due to the harsh conditions.

The predominant requirement for blanket bog is to be actively forming peat, a process that relies on peat-forming species having suitable conditions to maintain growth. Blanket bog that is degraded through damage or drying is likely to resume active peat-forming function following suitable restoration. A covering of 'active' peat-forming vegetation will protect the peat surface and will be more resilient to climate change.

Maintaining appropriate hydrology for blanket bog is critical. This will depend on management to prevent or reduce detrimental effects of drainage, including in the wider surrounding area and potentially at a distance from the habitat. There are no known man-made ditches on this site, apart from those associated with hill tracks and paths, but there are peat hags and gullies.

In addition, reducing negative impacts caused by past burning, inappropriate grazing (above low levels), trampling and nitrogen deposition is important; these are often combined and can make the habitat more vulnerable to more frequent and intense weather events. Wind and heavy rainfall can have dramatic impacts resulting in erosion or even landslips.

Although not currently an issue at this site, in drier areas invasion of scrub and non-native species can further reduce the water table, and so coverage of trees and non-peat forming grasses, bracken and other plants should be minimised. Any non-native species should be removed.

Ben Alder is a popular hill walking area. Good quality footpaths across blanket bog and the other habitats means that trampling damage from people is largely avoided.

The main targets for habitat structure for the SAC are:

- Restore all areas of currently eroding peat, re-establishing peat-forming vegetation so that the extent of eroding peat is less than the extent of stable re-deposited peat and new growth of bog vegetation.
- Manage grazing to maintain a natural, diverse and open sward of typical plant species by avoiding overgrazing that affects habitat condition.
- Reduce active drainage of gullies through targeted peat re-profiling.
- .
- Appropriate management of the effects of access and recreation.

Blanket bog should not be burnt as fire damages the structure, function and supporting processes of this habitat and is contrary to the Muirburn Code.

2c. Restore the distribution and viability of typical species of Blanket bog

The main Blanket bog vegetation community on this site is *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire with all three sub-communities found. Montane blanket bog of the *Vaccinium vitis-idaea* – *Hylocomium splendens* sub-community is abundant above 700 metres. *Trichophorum cespitosum* – *Eriophorum vaginatum* blanket mire is found more locally on flatter, wetter ground.

Typical species include the important peat-forming species, such as bog-mosses *Sphagnum* species and cotton grasses *Eriophorum* spp, together with heather *Calluna vulgaris* and other ericaceous species and forbs such as bog asphodel *Narthecium ossifragum* and the carnivorous sundews *Drosera* spp.

The typical species of these communities include:

Sphagna species *Sphagnum*
Hare's-tail cottongrass *Eriophorum vaginatum*
Heather *Calluna vulgaris*
Common cotton-grass *Eriophorum angustifolium*
Deergrass *Trichophorum cespitosum*
Dwarf birch *Betula nana*
Dwarf cornel *Cornus suecica*
Heaths *Erica* spp.
Heaths *Vaccinium* spp

Non-plant typical species that use this habitat include bird species such as red grouse (*Lagopus l. scotica*), golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina schinzii*) and greenshank (*Tringa nebularia*) golden eagle (*Aquila chrysaetos*), merlin (*Falco columbarius*) and hen harrier (*Circus cyaneus*).

Conservation measures should aim to maintain or restore conditions suitable for these species. The most important factor is grazing and trampling by red deer. All characteristic bog species rely on a high water table, and are likely to benefit from measures to maintain and improve the bog's hydrological integrity. The distribution and viability of typical species of blanket bog needs to be restored to increase the diversity of both typical species and sphagna.

Conservation Objectives for Alpine pioneer formations of the *Caricion bicoloris-atrofuscae* [H7240] (High altitude plant communities associated with water seepage)

2a. Maintain the extent and distribution of High altitude plant communities associated with water seepage within the site

Maintain the extent of existing High-altitude plant communities associated with areas of water seepage at 19 ha. This figure is taken from the Site Data Form. However, baseline estimates may not be very precise and any changes in extent as a result of new survey may not represent real change but greater precision. The reason is that this habitat usually forms mosaics and shows complex transitions to other upland habitat types, and it is small and fragmentary.

On Ben Alder – Aonach Beag this habitat occurs in flushes and is quite widespread but local within this site. These flushes were found mostly in north and east-facing corries, such as Coire Cheap, Coire An Sgoir, Coire na Coichille and the north facing corries and cliffs of Ben Alder.

2b. Restore the structure, function and supporting processes of High altitude plant communities associated with water seepage

This habitat usually forms mosaics and shows complex transitions to other upland Annex I habitat types and is maintained by harsh climatic and soil conditions. There is variation in this habitat because of differences in altitude, geographic location, length of snow-lie, nature of the substrate, and the amount of water flushing the communities.

Over-grazing, above low levels, and excessive poaching/trampling can be detrimental to this habitat which can result in disturbed bare ground. This is where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks. The emphasis is on 'disturbed' rather than 'bare'. At this site the excessive trampling in places, due primarily to red deer is causing this habitat to be at unfavourable status.

The exact grazing level which is appropriate will vary between and within sites, and should be considered at an individual site level to ensure the maintenance of the high-altitude plant communities associated with areas of water seepage within the wider habitat structure and function across the whole of the site. Regular monitoring will ensure inappropriate grazing will be noted and management can be directed accordingly.

Atmospheric pollution can add nitrogen which results in vigorous growth of grasses, sedges and rushes at the expense of the rarer species.

This habitat is very sensitive to muirburn and this should not be carried out in areas where it is found.

2c. Maintain the distribution and viability of typical species of High altitude plant communities associated with water seepage

This site has a variety of plant communities which fall under this category. They include *Carex dioica* – *Pinguicula vulgaris mire*, *Carex demissa* – *Saxifraga aizoides mire*, and *Carex saxatilis mire*.

This habitat is characterised by a number of common species. These include yellow sedge *Carex viridula*, carnation grass *C. panicea*, flea sedge *C. pulicaris*, russet sedge *C. saxatilis*, jointed rush *Juncus articulatus*, common butterwort *Pinguicula vulgaris*, yellow saxifrage *Saxifraga aizoides*, alpine bistort *Persicaria vivipara*, alpine meadow-rue *Thalictrum alpinum* and the moss *Blindia acuta*.

At Ben Alder and Aonach Beag there are also a number of rare species, including scorched alpine-sedge *Carex atrofusca*, bristle sedge *C. microglochis*, alpine rush *Juncus alpinoarticulatus*, chestnut rush *J. castaneus*, two-flowered rush *J. biglumis*, three-flowered rush *J. triglumis*, and false sedge *Kobresia simpliciuscula*. Other uncommon species may occur, such as hair sedge *Carex capillaris*, sheathed sedge *C. vaginata*, alpine cat's-tail *Phleum alpinum* and variegated horsetail *Equisetum variegatum*. There is a range of calcicolous mosses, some of which are rare.

A *Sphagnum denticulatum* - *Anthelia julacea* flush on the Geal-charn plateau has *Sphagnum lindbergii*.

Excessive grazing/browsing/trampling by deer and/or livestock can contribute to a deterioration in the habitat structure, leading to a reduction or loss in the typical/indicator species for this habitat and should be only be allowed in a controlled, appropriate manner that helps maintain the habitat within the wider site management.

Conservation Objectives for Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladanii*) [H8110] Acidic scree

2a. Maintain the extent and distribution of Acidic scree within the site

The extent of the acidic scree feature has been estimated at 432ha, based on the information available in the Site Data Form. This should be maintained.

However, due to the localised and fragmentary nature of this habitat current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision.

On Ben Alder and Aonach Beag this habitat is found at Carn Dearg, Sgor lutharn, Coire na Lethois and around Ben Alder, Sron Coire na h-Iolaire and below Beinn Bheoil. It is also closely associated with plants in crevices on acidic rock where the same rock type is also found forming the scree.

2b. Maintain the structure, function and supporting processes of Acidic scree

Scree is intrinsically unstable and rocks will frequently move so this habitat is vulnerable to disturbance naturally.

Additional disturbance may be seen through herbivore grazing, trampling and recreation activities. There is also the possibility of colonisation, particularly of more stable scree, by other species, including trees and scrub where there are seed sources.

Inappropriate grazing regimes, above low levels, have the potential to harm this feature through over-grazing and trampling damage, although grazing animals tend not to access scree where it is steep and unstable.

2c. Maintain the distribution and viability of typical species of Acidic scree

This site is one of the best sites for siliceous scree in the central Highlands, with extensive base-poor schistose screes developed at moderate to high altitude. Where snow lies late there is an extensive development of *Cryptogramma crispa* – *Athyrium distentifolium* snow-bed community. Within these snow-beds the endemic Newman's lady fern *Athyrium flexile* occurs.

Key mosses and liverworts on screes at Ben Alder includes *Mnium spinosum*, *Sciuro-hypnum glaciale*, and *Sciuro-hypnum reflexum*, Scree on Ben Alder also supports the important North Atlantic mixed hepatic mat habitat. This is a vegetation dominated by leafy liverworts and it depends on high rainfall and humidity, and is therefore likely to be sensitive to climate change, especially warmer and dryer summers. It often occurs on very steep, loose ground and can be easily eroded. It is also extremely vulnerable to trampling and grazing. Key species of hepatic mats at Ben Alder include *Anastrophyllum joergensenii*, *Scapania ornithopodioides*, and *S. nimbosa*. Hepatic mats also occur on alpine or boreal heath, snowbeds and on cliff ledges.

Siliceous rocks have very healthy populations of several Nationally Scarce and Nationally Rare upland lichen species including a small population of the RDB, Nationally Rare, Schedule 8 lichen Goblin Lights *Catolechia wahlenbergii*.

Excessive grazing /trampling by deer and/or livestock - above low levels - can contribute to a deterioration in the habitat structure, having harmful effects on the typical species. This

habitat would also be very sensitive to muirburn or wildfire.

Colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion can reduce or eliminate cover of indicator species, including bryophytes.

Conservation Objectives for Siliceous rocky slopes with chasmophytic vegetation [H8220] (Plants in crevices on acid rocks)

2a. Maintain the extent and distribution of plants in crevices on acid rocks within the site

The extent of the plants in crevices on acid rocks feature has been estimated at 119ha. This should be maintained.

However, due to the localised and fragmentary nature of this habitat current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision. On Ben Alder and Aonach Beag this habitat is widespread on large cliff faces on the northern and eastern sides of all the main hills. It is also closely associated with acidic scree where the same rock type is also found forming the scree.

Montane willow scrub can be allowed to expand into this habitat, as there is much more plants in crevices on acid rocks than montane scrub.

2b. Maintain the structure, function and supporting processes of plants in crevices on acid rocks

This habitat is found in harsh and sometimes extreme conditions with limited soil development, but where there is some shelter and moisture, and so plants are sparse and scattered. Chasmophytic plant species are adapted to the stresses of drought.

Colonisation or shading of this habitat by vigorous native species, such as bracken, tree growth or invasive non-native species can reduce or eliminate cover of typical species including bryophytes.

Inappropriate grazing regimes, above low levels, have the potential to harm this feature through over-grazing and trampling damage. However, most examples of this habitat are protected from herbivores by inaccessibility.

Loss from rock falls or avalanches are a natural feature of this habitat type and it is anticipated that normally the vegetation recolonises the new rock surface over time.

2c. Maintain the distribution and viability of typical species of plants in crevices on acid rocks

This habitat typically comprises mixtures of a limited number of species, most of which may also occur in other adjacent habitats, with mosses and ferns often prominent. The habitat is mostly dry heath or alpine heath types, and at Ben Alder the main communities are *Nardus stricta* – *Carex bigelowii* grass-heath, *Vaccinium myrtillus* – *Racomitrium lanuginosum* heath and *Deschampsia cespitosa* – *Galium saxatile* grassland.

Excessive grazing browsing/trampling by deer and/or livestock – above low levels - can contribute to a deterioration in the habitat structure, having harmful effects on the typical species, and grazing should be only be done in a controlled, appropriate manner that helps maintain the habitat.

Colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion can reduce or eliminate cover of indicator species, including bryophytes. Montane willow scrub can be allowed to naturally spread into this habitat because the plants in crevices should still be present and the montane willow habitat is much rarer than the plants in crevices on acid rocks habitat.

Conservation Objectives for Calcareous rocky slopes with chasmophytic vegetation [H8210] (Plants in crevices on base-rich rocks)

2a. Maintain the extent and distribution of plants in crevices on base-rich rocks within the site

There is no estimate of the extent of the plants in crevices on base-rich rocks feature in the Site Data Form, but we know that this habitat is small scale, fragmented and on cliffs or very steep ground.

On Ben Alder and Aonach Beag this habitat is found predominantly in Coire Cheap and on Aonach Beag, including Corrie na Coichille, Coire a'Charra Mhoir and Coire a Charra Bhig. Much of it consists of angled limestone slabs, though steeper cliffs are present in upper Coire Cheap.

The habitat can be vulnerable to natural rock fall or landslide but otherwise the extent and distribution of this habitat is unlikely to change.

2b. Maintain the structure, function and supporting processes of plants in crevices on base-rich rocks

This habitat is found in harsh and sometimes extreme conditions with limited soil development, but where there is some shelter and moisture, and so plants are sparse and scattered. Chasmophytic plant species are adapted to the stresses of drought.

However, the base-richness of calcareous rocks may encourage competition from more vigorous native species, such as bracken and/or scattered native trees or scrub; or non-native invasives such as New Zealand willowherb. Colonisation or shading of this habitat by vigorous native species, tree growth or invasive non-native species can reduce or eliminate cover of indicator species.

Inappropriate grazing regimes, above low levels, have the potential to harm this feature through over-grazing and trampling damage. However, most examples of this habitat are protected from herbivores by inaccessibility.

2c. Maintain the distribution and viability of typical species of plants in crevices on base-rich rocks

Ben Alder and Aonach Beag has an outstanding flora of rare arctic-alpine calcicoles mostly associated with a high-altitude band of limestone at 900-1000 m. The flora includes tufted saxifrage *Saxifraga cespitosa*, alpine saxifrage *S. nivalis*, hoary whitlowgrass *Draba norvegica*, mountain avens *Dryas octopetala*, black alpine-sedge *Carex atrata* and alpine meadow-grass *Poa alpina*. Various rare montane calcicolous mosses and lichens also occur on the rock faces, such as *Blindia caespiticia*, *Campylophyllum halleri*, *Hypnum bambergeri*, *Ptychodium plicatum*, *Timmia norvegica* and *Hylocomiastrum pyrenaicum*.

The indicator species for this habitat on this site, of which at least four should be present are: Alpine lady's mantle *Alchemilla alpina*; hair sedge *Carex capillaris*; flea sedge *Carex pulicaris*; brittle bladder-fern *Cystopteris fragilis*; mountain avens *Dryas octopetala*; hawkweed spp *Hieracium spp.*; alpine bistort *Persicaria vivipara*; yellow saxifrage *Saxifraga*

aizoides; purple saxifrage *Saxifraga oppositifolia*; lesser clubmoss *Selaginella selaginoide*; moss campion *Silene acaulis*; alpine meadow-rue *Thalictrum alpinum*; wild thyme *Thymus polytrichus*.

Excessive grazing/browsing/trampling by deer and/or livestock, above low levels, can contribute to a deterioration in the habitat structure, having harmful effects on the typical species, and should be only be done in a controlled, appropriate manner that helps maintain the habitat. However, most examples of this habitat are protected from herbivores by inaccessibility.

Cliffs can host the montane hepatic mat habitat, which is dominated by bryophytes.

Colonisation or shading of this habitat by tree growth and/or woodland expansion can reduce or eliminate cover of indicator species, including bryophytes.

Tufted saxifrage *Saxifraga cespitosa* is a rare and declining species across Scotland. It occurs on this site and is an important feature in those locations where it occurs. It is found in wet and base-rich conditions.

Conservation Measures

Ben Alder and Aonach Beag SAC is notified as a Site of Special Scientific Interest and management changes described on the list of Operations Requiring Consent must have prior consent from SNH (NatureScot).

Current and recommended management for:

Wet heathland with cross-leaved heath

Blanket bog

European dry heaths

Alpine and Boreal heaths

Montane acid grasslands

Blanket bog

High-altitude plant communities associated with areas of water seepage

Issue	Measure	Responsible party
Grazing and trampling by deer	<p>The main grazing animal is currently red deer although roe deer are present. Management of deer should be at a level where the habitats do not erode faster than vegetation can recolonise, and the vegetation can flower, set seed, and the seedlings survive, and so that heather and other heath species are not suppressed. This is measured by Site Condition Monitoring, and informed by Herbivore Impact Assessments. The Deer Management Group should set cull targets for the wider area, based on the information provided by HIA and SCM, since deer are a wide ranging species and management needs to be at a population level.</p> <p>The High altitude plant community associated with water seepage (flush) is especially vulnerable to trampling by deer because it has a high cover of fragile mosses, and can be used as one indicator of deer numbers, especially on higher</p>	Land owner

	ground where this community occurs. Deer numbers should be at a level where the mosses are not trampled faster than they can recover.	
Grazing and trampling by domestic stock	This site currently has very little grazing pressure from domestic stock. Should stock numbers increase in future, the aim is to manage them to achieve favourable condition for each feature in Site Condition Monitoring. Aim to ensure that herbivore impacts on the feature are 'low' based on the NatureScot Herbivore Impact Assessment Process. The overall aim is the same as with deer impacts above.	Land owner
Muirburn	At present this site is not burnt, and this is benefiting the features. Should muirburn be carried out in future, it should be in accordance with the Muirburn Code. Wet heath and blanket bog, and all alpine habitats (wind clipped) should not be burnt. This site has Blue heath, a very rare species which is vulnerable to burning and areas with this species should not be burnt.	Land owner
Drainage, afforestation, and other developments	The site has no drainage or afforestation. No new drainage or afforestation should be carried out as these are not compatible with the features on this site. The existing exclosures for natural regeneration are appropriate in location and scale.	Land owner
Vehicle tracks, footpaths and ATV use	Ponies are used for deer extraction, which benefits the habitats. Vehicle tracks should only be constructed only if they have a positive assessment in a Habitat Regulations Appraisal. ATVs should be used in accordance with best practice to minimise tracking or erosion. Good quality footpaths helps to minimise trampling and path braiding by people.	Land owner
Peat restoration	Aim to actively restore eroding peat on blanket bog.	Land owner
Non-native invasive species	The introduction of non-native species should be avoided in all habitats. If invasive species become established, they should be controlled as early as possible after introduction.	Land owner
Climate change	Climate change is likely to impact on these habitats, especially the alpine ones. Blue heath is a snowbed species and climate change may result in a decrease in the population. Monitor any changes to inform the wider debate. Monitor snow beds and their vegetation for change over time.	NatureScot, Research community
Available nutrient levels	Monitor to gather information on nutrient levels in rain and snow, and snow melt, and the effect on the upland habitats.	NatureScot, Research community
Research and monitoring	To identify emerging impacts on the habitats and their causes, in order to understand the long term issues, and to inform future management of the habitats.	NatureScot, Research community

Current and recommended management for:
Mountain willow scrub
Alpine and subalpine calcareous grasslands
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
Calcareous rocky slopes with chasmophytic vegetation

Siliceous rocky slopes with chasmophytic vegetation
Acidic scree

Issue	Measure	Responsible party
Grazing and trampling by domestic stock	Domestic stock are not likely to access these habitats. Should stock numbers increase in future, the aim is to manage them to achieve favourable condition for each feature in Site Condition Monitoring. Aim to ensure that herbivore impacts on the feature are 'low' based on the NatureScot Herbivore Impact Assessment Process.	Land owner
Grazing and trampling by deer	<p>The main grazing animal is currently red deer although roe deer are present. Most of these habitats are not accessible to red deer but if deer numbers were to be reduced, the habitats would have an opportunity to expand off the cliffs and screes. Deer culls should be set so that the majority of habitats benefit and it is recognised that this may mean that the calcareous grassland is grazed less than might be ideal. However, this community is palatable and is likely to be grazed more than might be suggested by the numbers of animals present.</p> <p>Management of deer should be at a level where the vegetation can flower, set seed, and the seedlings survive, and so that heather and other heath species are not suppressed. In particular, montane willows are susceptible to deer grazing pressure and deer numbers should allow them to increase their populations so that they become sustainable in the long term.</p> <p>This is measured by Site Condition Monitoring, and informed by Herbivore Impact Assessments. The Deer Management Group should set cull targets for the wider area, based on the information provided by HIA and SCM, since deer are a wide ranging species and management needs to be at a population level.</p>	Land owner
Spread of montane willows	If willows spread across tall herb or chasmophytic communities, this would be allowed since the willow populations are the more restricted and vulnerable in the long term, and the plants in the other communities would still be present amongst the willows.	Land owner
Muirburn	These habitats are high altitude and steep, and should not be burnt.	Land owner
Climate change	Climate change is likely to impact on these habitats, especially the alpine ones and some of the flowering plants such as tufted saxifrage. Monitor any changes to inform the wider debate.	NatureScot, Research community
Available nutrient levels	Monitor to gather information on nutrient levels in rain and snow, and snow melt, and the effect on the upland habitats and/or species.	NatureScot, Research community
Research and monitoring	To identify emerging impacts on the habitats and their causes, in order to understand the long term issues, and to inform future management of the habitats.	NatureScot, Research community

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