

BEINN DEARG SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE



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Site Details

Site name:	Beinn Dearg
Map:	https://sitelink.nature.scot/site/8198
Location:	Highlands and Islands
Site code:	UK0012897
Area (ha):	13,853.92
Date designated:	17 March 2005

Qualifying features

Qualifying feature	Assessed condition	SCM visit date	UK overall Conservation Status
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable Maintained	18 July 2010	Unfavourable-Bad
Wet heathland with cross-leaved heath	Unfavourable No change	11 August 2009	Unfavourable-Bad
Dry heaths	Unfavourable Declining	15 August 2009	Unfavourable-Bad
Alpine and subalpine heaths	Unfavourable No change	13 August 2009	Unfavourable-Bad
Mountain willow scrub	Unfavourable No change	13 August 2009	Unfavourable-Bad
Montane acid grasslands	Unfavourable No change	11 August 2009	Unfavourable - Bad
Alpine and subalpine calcareous grasslands	Favourable Recovered	13 August 2009	Unfavourable - Bad
Species-rich grassland with mat-grass in upland areas*	Unfavourable No change	15 August 2013	Unfavourable - Bad
Tall herb communities	Favourable Maintained	15 August 2013	Unfavourable - Bad
Blanket bog*	Unfavourable No change	11 August 2009	Unfavourable - Bad
High-altitude plant communities associated with areas of water seepage*	Unfavourable No change	13 August 2009	Unfavourable - Bad
Acidic scree	Favourable Maintained	15 August 2013	Unfavourable - Inadequate

Plants in crevices on acid rocks	Favourable Maintained	13 August 2009	Unfavourable - Inadequate
Plants in crevices on base-rich rocks	Favourable Maintained	15 August 2013	Unfavourable - Bad
Caledonian forest*	Favourable Recovered	10 September 2015	Unfavourable - Bad

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.

*Habitats Directive priority habitat

Overlapping Protected Areas:

[Beinn Dearg SSSI](#) and [Beinn Dearg SPA](#)

Key factors affecting the qualifying features

Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

This habitat type comprises both oligotrophic (nutrient-poor) and mesotrophic (moderate nutrient levels) waters, and more rarely may include intergrading types. The dominant substrates of both oligotrophic and mesotrophic waters are silt, sand, gravel, stones and boulders. The clear soft water, which characterises this habitat type, contains low to moderate levels of plant nutrients and supports characteristic assemblages of plant species. The vegetation community is characterised by amphibious short perennial vegetation the marginal components of which can be exposed on the lake shores during summer.

Key management issues include changes to hydrology, invasive non-native species, surface water pollution and air pollution.

Wet heathland with cross-leaved heath

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. Wet heaths occur in several types of ecological gradient. In the drier areas of the south and east, wet heaths are local and often restricted to the transition zone between European dry heaths and constantly wet valley mires. In the uplands they occur most frequently in gradients between dry heath or other dry, acid habitats and blanket bogs.

At high altitude in the Scottish Highlands wet heaths occur in mosaics with Alpine and Boreal heaths; in these situations lichens and northern or montane species may be well-represented. Flushed wet heaths are especially frequent in areas of high rainfall, and occur as topogenous fens, usually in channels within heath or grassland vegetation.

At Beinn Dearg SAC this feature is found at low to moderate altitudes across the whole site. The majority of the habitat is found in the area extending north from the

west end of Loch Glascarnoch extending up the glen of Allt a'Gharbhrain or towards Coire Ghranda.

This habitat is in unfavourable condition because of the nature and extent of deer pressure, grazing above the appropriate low to low-moderate levels as well as burning.

European dry heaths

European dry heaths are widely distributed in Scotland although most extensively in the central and north western Highlands. With such a broad geographic range they can dominate the landscape but exhibit a considerable variation in their structure and form. They typically occur on freely-draining, acidic to almost neutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation but all heaths vary in their flora and fauna according to climate, altitude, aspect, soil conditions (especially base-status and drainage), maritime influence, and grazing and burning intensity.

At Beinn Dearg SAC this feature is found at low to moderate altitudes across the whole site.

Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most dry heaths are managed as extensive grazing for livestock (sheep, cattle and deer).

This habitat is in unfavourable condition because of overgrazing (levels above low to low-moderate), associated trampling by red deer and to a lesser degree incursion of trees from neighbouring wooded habitats.

Alpine and Boreal heaths

Alpine and Boreal heaths occur on acid rocks on mountains, 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.

At Beinn Dearg SAC this feature is found on well-drained slopes with either shallow soils or rocky substrates at higher, often relatively exposed, altitudes that are spread across much of the site.

This habitat is in unfavourable condition because of over grazing (anything above low or low-moderate levels) by red deer impacting the species composition and trampling/disturbing the ground leaving it bare. This habitat would also be at risk of damage from any muirburn activity.

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.

Stands of *Salix* scrub survive on ungrazed ledges and, more rarely, on lightly grazed, steep rocky slopes or boulder fields, occurring only as small, discrete stands or more scattered bushes. At this site all locations of this habitat are on the very steep north face of Beinn Enaiglair, which abounds in small broken crags. The largest continuous stand of this habitat type is about 0.5ha in extent and most stands are much smaller. The presence of *Salix myrsinites* at this site is of note.

This habitat is in unfavourable condition because of grazing pressure, from feral goats as well as red deer; this is believed to have reduced and restricted its occurrence. Muirburn also has the ability to have serious negative impacts on this habitat. At many locations, both within Beinn Dearg SAC and at other 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.

Montane acid grasslands

Montane acid grassland are the most extensive type of vegetation in the high mountain zone, i.e. above an altitude of about 750 m. It characteristically forms large continuous tracts, covering summit plateau 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 majority of this habitat is found either in the Beinn Dearg-Eididh nan Clach Geala-Ceann Garbh-Cona' Mheall or Am Faochagach areas.

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, skiing and use of all-terrain vehicles. The most important of which, causing the feature to be assessed as unfavourable, are over grazing by red deer at this site – altering the species composition and leaving bare or disturbed ground.

Alpine and subalpine calcareous grasslands

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 low altitude, colonisation of the grasslands by trees and shrubs is prevented by a combination of exposure and grazing. At high altitude the grasslands are maintained by the harsh climate, though grazing may also alter species composition.

On Beinn Dearg SAC the two largest areas of this habitat are on the north and south faces of Beinn Dearg with a third a small group south from the top of Am Faochagach.

This habitat is in unfavourable condition due to over grazing of this habitat, primarily by red deer, that requires light to light-moderate grazing only. This over grazing is

both altering the vegetation structure and causing there to be too much disturbance and uprooted plants.

Species-rich grasslands with mat-grass in upland areas

Species-rich grassland with mat-grass in upland areas tend to develop where there is flushing through base-rich strata on siliceous bedrock. These may include moderately base-rich metamorphic and igneous rocks. The soils have an acidic pH (<7.0 and mainly <6.0) and are derived from bedrocks with at least some silica.

The altitudinal range varies from near sea level to an upper limit of between 800 and 900m.

This habitat is particularly susceptible to changed nutrient status eg agricultural improvement, burning over and under-grazing, forestry, air pollution and damage from recreational pressure. Despite this habitat requiring moderate levels of grazing, key management issues causing the feature to be assessed as unfavourable at this site are over-grazing –primarily by red deer – negatively impacting on vegetation structure and trampling leading to bare ground.

Tall herb communities

Tall herb communities habitat is typically 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. At Beinn Dearg SAC this habitat is mainly found on the north and north-east cliffs of Beinn Dearg or in the northern corries of Seana Bhragh.

Key management issues include ensuring only low/no grazing from domestic stock, deer or feral goats and preventing invasion by other species.

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.

At this site blanket bog is often dominant in the bottoms of the glens, the floors of corries and on the gentler, broad slopes of the summit plateaux – especially north of Gleann Beag, north of Cnap Coire Loch Tuath and at the eastern end of the Strathvaich part of the site.

This habitat is in unfavourable condition due to over-grazing (above low levels) by red deer that is resulting in unfavourable vegetation structure and unacceptably high levels of ground disturbance.

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.

At Beinn Dearg SAC it is found on base-rich outcrops of schist, generally being closely associated with the calcareous rocky slopes habitat. There are three main concentrations for this feature – in the Luchd Choire, in upper Gleann na Sguaib and between Braemore Wood and Beinn Enaiglair.

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

This habitat is in unfavourable condition due to inappropriate levels of grazing, above low to low/moderate, by red deer and livestock through direct browsing pressure but also ground disturbance and change to drainage.

Acidic scree

Scree habitats 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.

Siliceous rocky slopes with chasmophytic vegetation

Chasmophytic (grows in the crevices of rocks) vegetation consists of plant communities that colonise the cracks and fissures of silica based, acidic rock faces and is widespread in upland areas but is localised and fragmentary in its occurrence. At Beinn Dearg SAC this habitat is almost ubiquitous wherever there is bedrock outcropping away from the more calcareous rock outcrops in Gleann na Sguaib and the Luchd Choire.

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.

The vegetation can be sensitive to overgrazing and trampling although sites at Beinn Dearg SAC are protected by their inaccessibility.

Calcareous rocky slopes with chasmophytic vegetation

Chasmophytic (grows in the crevices of rocks) vegetation consists of plant communities that colonise the cracks and fissures of rock faces and 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.

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.

Key management issues can be sensitivity to overgrazing and trampling although many sites at Beinn Dearg SAC are protected by their inaccessibility. The base-

richness of calcareous rocks may encourage competition from more vigorous native species, or invasive non-native species such as New Zealand willowherb.

Caledonian forest

Caledonian forest comprises relict, indigenous pine forests of Scots pine *Pinus sylvestris* var. *scotica*, and associated birch *Betula* spp. and juniper *Juniperus communis* woodlands of northern character. Self-sown stands naturally regenerated from stock of genuinely native local origin recorded in the Caledonian Pinewood Inventory (Forestry Commission 1998) are included in the Annex I type. It is usually found on strongly-leached, acidic podzols, and these soil conditions are reflected in the ground flora.

A key factor affecting this habitat is inappropriate grazing by herbivores. The habitat requires low, but not zero, levels of grazing to sustain it. High levels of grazing can distort the natural structure and variation within the woodlands, producing a habitat that lacks a natural representation of intermediate life classes; abundance of old trees with very few younger ones. Insufficient grazing impacts can include excessive regrowth leading to changes in microclimates such as light and humidity levels.

Other management issues include impacts from forestry and woodland management, burning and recreational impacts. Further pressures on the habitat are also anticipated, particularly from the effects of climate change (drought, waterlogging, windblow etc.), and of novel pests and pathogens (such as *Dothistroma* needle blight).

Further information about this SAC's protected habitats can be found on the [JNCC website](#).

Conservation Priorities

Blanket bog, high-altitude plant communities associated with areas of water seepage, species-rich grassland with mat-grass in upland areas and Caledonian forest are priority habitats.

Priority should be first given to these habitats, followed by those habitats in unfavourable condition, should any conflict between management of different habitats arise.

In practice there is unlikely to be frequent conflict between management of the different features of Beinn Dearg SAC, because habitat distribution is mainly determined by environmental conditions and grazing levels. Most habitats would benefit from a similar low herbivore population in the wider area, except species-rich grassland which requires a broader range of grazing levels (high to low).

However, as species-rich grassland is very limited in its extent and will attract herbivores due to its higher nutritional value, it is anticipated that a lower herbivore population can meet the conservation objectives for all habitat features. As under-grazed grassland recovers more readily through appropriate management than overgrazed heath or bog, a low herbivore density is desirable for this SAC. Once grazing levels have been reduced to an appropriate level to allow improvement to

over grazed/heavily trampled habitats e.g., blanket bog, then a more dynamic control program can be used to ensure the species rich-grassland receives adequate grazing. Specific grazing using livestock could be used to focus grazing on under grazed grassland in accessible areas if necessary.

Due to Scotland's importance for priority habitat Caledonian forest, hosting all UK sites, management of Beinn Dearg SAC purposefully encourages expansion of this habitat. The expansion aims to take this habitat up to c.76ha with the consequent reduction of two other non-priority habitats (wet heath and European dry heath).

This SAC overlaps with part of Beinn Dearg SPA. Any management of the SAC, or assessment of plans or projects, will also need to take account all of the SPA features.

Conservation Objectives

Overarching Conservation Objectives for all habitat features

1. To ensure that the qualifying features of Beinn Dearg 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 Beinn Dearg SAC is restored by meeting objectives 2a, 2b and 2c for each qualifying feature.
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The aim at this SAC is to restore the habitats to a favourable condition as a contribution to their wider conservation status. Therefore any impacts on the objectives 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 they do not

prevent the ability of a feature to recover and there is certainty that the features will be able to quickly recover.

This objective recognises that the qualifying habitat is 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 the 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 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* [H3130] (Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels)

2a. Maintain the extent and distribution of the habitat within the site

The extent of Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat feature has been estimated at 166.25ha.

The area figure has been taken from the Standard Data Form. Fundamentally there should be no measurable net reduction the extent of the habitat and, most importantly, its distribution throughout the site and the number of sites should be maintained.

This should include the total surface area, depth of water and type and distribution of loch substrate sediments.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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

The structure and function of lochs are strongly influenced by activities within their catchment. Changes in land management or development can affect the integrity of the feature which will manifest itself in changes to the loch.

Physical Attributes

-Surface Area

Changes to surface area can indicate pressures on the structure and function of lochs. The surface area of a loch may fluctuate slightly naturally. However changes to surface area and the associated change to depth can adversely affect the character of the loch, particularly the edge vegetation.

-Hydrological regime

The hydrology of the loch affects both water level fluctuations and annual and within year flushing patterns. Flushing is important as it is strongly related to dilution and removal of nutrients and plankton. Changes to the flushing pattern can be caused by factors similar to those affecting area; abstraction, regulation, construction, excessive sediment deposition and natural succession which may occur in the catchment.

-Loch substrate character

The type and distribution of sediment particles within a loch will affect the biology of the loch and the availability of habitats. Changes to the substrate character may also be indicative of changes to the area and hydrological regime. Reduction in area or flushing

may affect the substrate character as finer sediments become trapped and there is increased input of leaf-litter from scrub encroachment.

-Natural sediment load

Accumulation of nutrient-rich sediment may have a strong effect on the water quality and biology of the loch. Increases in sediment loading may result from both changes in land management practice in the catchment or on the shoreline and short term events such as construction. Evidence is growing that an increase in storm events associated with climate change may increase the amount of sediment deposited in lochs.

-Connectivity between the loch and the surrounding area

While a loch is often perceived as a discrete entity the connections between it and the surrounding area are vital to its functioning as part of a natural system. These natural connections can be reduced or changed by, for example, hard engineering works on the shoreline or loch bed and anything that impedes the exchange of water either on the surface or with the underlying water table.

Water Quality

-Dissolved Oxygen

Oxygen is vital to respiration. An artificially high biomass caused by increased loadings of organic matter or algal blooms can create a heavy demand which causes low levels of dissolved oxygen. Dissolved oxygen is likely to be lowest in July and August. The target is dissolved oxygen >7.0mg/l for lochs classified as at Good Ecological Status (GES) under the Water framework Directive (WFD) or >9.0 Mg/l for lochs classified as High Ecological Status (HES) during July and August.

-pH

This influences many of the chemical processes in lochs such as the binding of phosphorus. Artificial changes through eutrophication or acidification can therefore have a significant effect. Oligotrophic lochs should have pH of 5.5 to 7 and Mesotrophic 6.5 to 8

-Chlorophyll a

Chlorophyll a is a good measure for phytoplankton abundance. Phytoplankton is an important part of the processes of a loch ecosystem affecting light penetration and oxygen demand. A high biomass is usually associated with nutrient enrichment and sedimentation of organic matter. Target Chlorophyll a can be calculated for each loch based on site specific targets related to alkalinity and depth. Where a site is in favourable condition current Chlorophyll a can be used to set a baseline.

-Total Phosphorus

Phosphorus is one of the main nutrients required for plant growth and there is strong correlation between TP concentration and phytoplankton biomass. The target for TP is based on an annual mean; for deeper lochs (mean depth >3m) 15ugP/l maximum annual mean TP, very shallow (Mean depth <3m) 20ugP/l. Site specific targets may also be set where there are good records.

-Total Nitrogen

Nitrogen is the other main nutrient important in loch ecosystems. It is generally less likely to be limiting than phosphorus because of the ability of some organisms to fix Nitrogen from the atmosphere. The target for all lochs is that Annual Mean Total Nitrogen should not exceed 1.5mg/l. with no deterioration from baseline. For N limited lochs consideration may be given to setting site based targets.

2c. Maintain the distribution and viability of typical species of the habitat

Typical species of the oligo/mesotrophic lochs found on Beinn Dearg SAC include: Water lobelia *Lobelia dortmanna*, broad-leaved pondweed *Potamogeton natans*, shoreweed *Littorella uniflora*, alternate water-milfoil *Myriophyllum alterniflorum*, lake quillwort *Isoetes lacustris*, bulbous rush *Juncus bulbosus*, jointleaf rush *Juncus articulatus*, awlwort *Subularia aquatica*, northern bladderwort *Utricularia stygia*, lesser spearwort *Ranunculus flammula*, water horsetail *Equisetum fluviatile*, beaked sedge *Carex rostrata*, common spike-rush *Eleocharis palustris*, floating bur-reed *Sparganium angustifolium*,

The viability of the characteristic species is determined by water quality and other conditions that support the plant community such as water clarity. Loss or reduction in frequency of species may therefore be an indicator of deteriorating or changing water quality or some other adverse impact.

Alien species can have direct effects upon the natural plant communities through competition. They may also have more subtle effects as the niche they fill is different and this may directly or indirectly affect the rest of the ecosystem. A list of high impact species has been agreed as part of the Water Framework Directive. Other species that may also affect the integrity of the site include *Elodea nutallii*, *E.canadensis* and *Crassula helmsii*.

Filamentous algae are indicative of high nutrient levels. This can create dense blankets reducing light and which can cause problems when they die and decay.

Non-plant typical species of this habitat include bird species such as black-throated divers.

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

2a. Maintain the extent and distribution of the habitat within the site

Maintain to approximately 2046.22ha.

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 (note Conservation Priorities section with regard to planned expansion of Caledonian forest).

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

Northern Atlantic wet heath with *Erica tetralix* is sensitive to moderate or high levels of grazing or burning that may affect the habitat structure and function in two main ways. Overgrazing/burning, can lead to creation of a grass sward. Overgrazing, by livestock, can also result in high levels of nutrient input and trampling. Under grazing/burning can lead to the habitat type being colonised by non-typical species. At Beinn Dearg SAC the moderate to high levels of grazing by red deer, as well as residual impacts from historic burning, are responsible for this feature not being at favourable condition.

The predominant requirement for wet heath is suitably managing active drainage in conjunction with the appropriate, low to low/moderate levels of grazing and an absence of burning.

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

- At least 25% (up to 90%) cover of dwarf-shrub heath species with *Erica tetralix* as the defining dwarf-shrub.
- Less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding *Betula nana* and *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.

Invasive native and non-native species

- Cover by species that are not typical of this habitat should not increase. Examples of inappropriate species are bracken, trees and non-native species. In the long-term there should be no non-native species within the habitat.
- The heath cover should be open with no more than scattered native trees (including seedlings and bushes, excluding *Betula nana* and *Myrica gale*) and scrub present. An exception to this is where juniper or bog myrtle are well established as significant components of the moorland vegetation; these elements should be maintained.

2c. Restore the distribution and viability of typical species of the habitat

Wet heath is an important habitat for a range of vascular plant and bryophyte species. The wet heath seen on Beinn Dearg SAC is of the NVC type M15. The majority belonging to the *Cladonia* subcommunity (M15c) but with subcommunities M15b, M15d and M15a also common across the site.

The below list represents some of the species typical of this site that is dominated by common heather *Calluna vulgaris* with purple moor-grass *Molinia caerulea*, deergrass *Trichophorum germanicum*, and cross-leaved heath *Erica tetralix* all abundant. Other species found include common tormentil *Potentilla erecta*, heath milkwort *Polygala serpyllifolia* and bog asphodel *Narthecium ossifragum*. Sphagnum spp. are only poorly represented. *Cladonia* spp. are abundant, particularly reindeer lichen *Cladonia impexa* and thorn cladonia *C. uncialis*.

Non-plant typical species associated with this habitat include red deer *Cervus elaphus* and birds such as red grouse *Lagopus l. scotica*, golden plover *Pluvialis apricaria*, dunlin *Calidris alpina schinzii*, greenshank *Tringa nebularia* and golden eagle *Aquila chrysaetos*

Current overgrazing by red deer is responsible for this objective not being met with typical plant species absent from a number of sample plots in the last round of site condition monitoring .

Conservation Objectives for European dry heaths [H4030]

2a. Maintain the extent and distribution of the habitat within the site

Maintain to approximately 1363.23ha

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/low-moderate level of grazing.
- avoidance of any loss of habitat through increased extent of successional or adjacent natural habitats (note Conservation Priorities section with regard to planned expansion of Caledonian forest), afforestation or invasion by alien species.
- avoidance of negative effects of access and recreation (not identified as a pressure at this site)

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

European dry heaths are closely associated with scrub and woodland habitats, which would form the climax habitat without heathland management. Therefore maintaining dry heath is a fine balance between degrading to grasslands as a result of intensive management, and succession to scrub or woodland from too low a level of browsing, grazing or burning.

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. Appropriate burning or cutting can contribute to the variation in age phase, but it is important that this does not result in a monoculture of large areas of same age heather.

At this site grazing at too high a level, above low to low-moderate, and increasing bracken cover are responsible for failures in the structure of the habitat.

Note that interaction of burning and grazing is an important cause of loss of dwarf shrub cover.

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 (ie 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

- Cover by species that are not typical of this habitat should not increase. Examples of inappropriate species are bracken, trees and non-native species. In the long-term there should be no non-native species within the habitat.

- The heath cover should be open with no more than scattered native trees (including seedlings and bushes, excluding *Betula nana* and *Myrica gale*) and scrub present. An exception to this is where juniper or bog myrtle are well established as significant components of the moorland vegetation; these elements should be maintained.

2c. Maintain the distribution and viability of typical species of the habitat

Typical species vary depending upon location. In the uplands the sub-montane heaths are dominated by heather *Calluna vulgaris*, blaeberry *Vaccinium myrtillus* and crowberry (*Empetrum nigrum*).

Other typical species include dwarf birch *Betula nana*, bog-myrtle *Myrica gale*, creeping willow *Salix repens*, downy willow *Salix lapponum*, western gorse *Ulex gallii*, mossy cyphel *Minuarita sedoides*, wooly fringe-moss *Racomitrium lanuginosum* and *Erica* spp.

Typical non-plant species of this habitat 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 harrier (*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 the habitat within the site

Maintain to approximately 484.89ha.

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 generally found on on acid rocks on mountains, both on exposed lower summits and ridges and on sheltered slopes 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,
- the effects of access and recreation

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

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.

As with many other Scottish upland habitats, maintaining Alpine and Boreal heaths is a fine balance between degrading to grasslands with intensive management and succession to scrub/ woodland with too low a level of browsing, grazing or burning. This is especially the case with the Boreal (sub-alpine) heaths where there may be only subtle differences between them and some adjacent habitats.

Current grazing levels are too high and impacting on the structure of the habitat, with plants showing too high a level of browsing and disturbed/bare ground present at too high a frequency.

Low to low/moderate levels of grazing are required to allow the structure to be maintained in a favourable condition.

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 *Carex bigelowii*, *Deschampsia flexuosa*, *Festuca ovina*, *Festuca vivipara*, *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 the habitat

This habitat comprises a wide range of heath types, with variation related to climate, local exposure and snow-lie. At Beinn Dearg SAC the Alpine heath is primarily found on exposed slopes at high altitude with thin, stony soils or else around screes.

Alpine and Boreal heaths at Beinn Dearg SAC are represented by a wide range of heath types including the oceanic north-western and northern, *Calluna vulgaris-Racomitrium lanuginosum* heath (H14) and *Calluna vulgaris-Arctostaphylos alpinus* heath (H17). Other types represented include *Calluna vulgaris-Cladonia arbuscula* heath (H13), *Vaccinium myrtillus-Racomitrium lanuginosum* heath (H20) and *Vaccinium myrtillus-Rubus chamaemorus* heath (H22).

The dominant plants in UK examples of Alpine and Boreal heaths are usually dwarf-shrubs of heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus* or juniper *Juniperus communis*, which are low-growing or prostrate owing to exposure to high winds or prolonged snow cover at moderately high altitudes. Other dwarf-shrubs at this site include

including *Arctostaphylos alpina*, *Loiseleuria procumbens* and *Empetrum nigrum* ssp. *hermaphroditum*.

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* (NVC communities *Calluna – Erica*; *Calluna – Vaccinium*; *Calluna vulgaris – Arctostaphylos uva-ursi*; *Calluna – Vaccinium – Sphagnum*, and *Vaccinium – Rubus* heaths). 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 (NVC communities *Calluna – Cladonia* and *Calluna – Racomitrium* heaths). Heather may also be combined with dwarf juniper *Juniperus communis* ssp. *nana* (NVC community *Calluna – Juniperus* heath) or with *Arctostaphylos alpinus* and *Loiseleuria procumbens* (NVC community *Calluna – Arctostaphylos alpinus* heath). At higher altitudes, where conditions are too extreme for heather, short or prostrate *Vaccinium* spp. and *E. nigrum* ssp. *hermaphroditum* dominate (NVC communities *Vaccinium – Cladonia* and *Vaccinium – Racomitrium* heaths). On sheltered slopes where snow lingers, the dominant shrub is *V. myrtillus*, which is either the sole dominant (NVC community *Vaccinium – Deschampsia* heath) or grows with *E. nigrum* ssp. *hermaphroditum*, dwarf cornel *Cornus suecica* and cloudberry *Rubus chamaemorus* (NVC community *Vaccinium – Rubus* heath).

In addition to this altitudinal zonation, there are other lines of floristic variation within the habitat type. In the more oceanic climate of the north-west and north, woolly fringe-moss *Racomitrium lanuginosum*, bell heather *Erica cinerea* and Atlantic liverworts and mosses (especially the species of the northern Atlantic hepatic mat) may be abundant in *Calluna – Racomitrium*, *Calluna – Juniperus*, *Calluna – Arctostaphylos alpinus* and *Vaccinium – Racomitrium* heaths. In the northern Scottish Highlands and Northern Isles, favoured by a cooler climate, mountain bearberry *Arctostaphylos alpinus* and trailing azalea *Loiseleuria procumbens* are abundant (characteristically in *Calluna – Arctostaphylos alpinus* heath, but also in *Calluna – Racomitrium* and *Calluna – Juniperus* heath). Different structural forms of heath also occur, owing to differences in exposure, giving rise to closed or open heaths with crescentic waves (wave-form).

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*, sea plantain *Plantago maritima*, fir clubmoss *Huperzia selago* and viviparous sheep's-fescue *Festuca vivipara*, enriching the flora of the heaths.

Non-plant typical species of this habitat include 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. Maintain the extent and distribution of the habitat within the site

Maintain the extent of mountain willow scrub. There is not an area figure for this habitat on the Standard Data Form, however between surveys, previously known, accessible areas

have been noted as depleting. At the same time previously unrecorded areas have been identified.

The objective is to maintain the extent as there does not appear to be an overall loss between surveys due to previously unrecorded stands being found. The habitat's extent is however under pressure and this should be taken into account when deciding management.

Mountain willow scrub 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).

Grazing pressure above the low levels this habitat can sustain mean some 'stands' of this habitat have very few willow trees which is not sustainable in the long term and without management there is a high chance some of these stands could be lost.

Inappropriate levels of grazing, those above low to low/moderate, will result in reduction of this habitat and so management that maintains a low level of grazing will allow the extent and distribution to be maintained (or locally restored).

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

This habitat should continue to be restored by maintaining low levels of browsing by red deer and/or goats and livestock, to allow the willow scrub to recover from previously high levels of browsing.

Browsing levels should be low enough that the willow scrub can successfully grow, flower and set seed. There should be no shaping of the willow in topiary-like effects as this would indicate that browsing levels were too high.

Since this habitat is small and fragmented, the red deer/feral goat population where this habitat is found should be managed as part of the wider site.

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

2c. Restore the distribution and viability of typical species of the habitat

This habitat at Beinn Dearg SAC corresponds with NVC type W20 *Salix lapponum* – *Luzula sylvatica* scrub. Downy willow *Salix lapponum* is the dominant willow species present.

Willows are dioecious (i.e., male and female flowers are found on different plants) so a suitably large population size is needed to maintain a viable population, with both male and female plants flowering close enough together to allow successful pollination to occur.

Red deer *Cervus elaphus* and feral goats use this habitat on this site. Grazing above low levels can damage mountain willow scrub, whilst a low level of browsing may be necessary to maintain this habitat. This feature failed due to high grazing pressure, much of which is attributed to goats.

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

2a. Maintain the extent and distribution of the habitat within the site

Maintain to approximately 3463.48ha.

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.

A key factor in maintaining this habitat in favourable condition on this site is maintaining the correct, low level, of grazing. If grazing levels are too high or low, the habitat can become degraded or, rank and overgrown, both leading to a decline in the extent and diversity of typical species, particularly the smaller flowering herbs. Keeping grazing, primarily by red deer, under constant review is necessary to maintain this balance. Frequent monitoring of the habitat will help to inform discussions with land managers over grazing management.

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.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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

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 grazing and nutrient input as is the case at this site. Excessive grazing, and the associated manuring, may favour grasses over bryophytes.

Appropriate levels of grazing/browsing will be considered to be in place to allow survival of component species and structure of the habitat, throughout the site, when the following conditions are met:

- 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 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. Restore the distribution and viability of typical species of the habitat

The number of sub-types in the habitat results in a spectrum of specialised plants, the actual species in any one dependent upon the specific topography where the community occurs. As a result there are multiple NVC communities that can form Montane acid grassland habitat. These vary geographically with the relevant types for this site given below:

U10 *Carex bigelowii* – *Racomitrium lanuginosum* moss-heath. The characteristic north-western form with an abundance of the cushion herbs *Minuartia sedoides*, *Armeria maritima* and *Silene acaulis* is extensive, which is also well-represented on Fannich Hills and Ben More Assynt. The species-rich *Silene acaulis* sub-community (U10c) also occurs, a type restricted to richer rocks

A rich variety of small montane forbs including *Persicaria vivipara*, *Thalictrum alpinum*, *Sibbaldia procumbens* and *Alchemilla alpina* and rare montane mosses are represented. Some of the species-rich *Carex-Racomitrium* community occurs on open deflation terraces with *Juncus trifidus*, *Festuca vivipara*, *Luzula spicata*, *Alchemilla alpina*, *Sibbaldia procumbens*, *Gnaphalium supinum*, *Salix herbacea*, *Antennaria dioica* and *Silene acaulis*.

Beinn Dearg is the best site in the northern Highlands for late-lie snow-bed communities for range, extent and presence of rare plants. The snow-beds of latest-lie, *Polytrichum sexangulare-Kiaeria starkei* snow bed (U11) and *Salix herbacea-Racomitrium heterostichum* snow-bed (U12), occur on the highest slopes

Alchemilla alpina-Sibbaldia procumbens dwarf-herb community (U14) is represented by some small, but good stands that are probably the best developed in the northern Highlands. The western and northern *Deschampsia cespitosa-Galium saxatile* grassland, *Rhytidiadelphus loreus* sub-community (U13b) occurs in high corries associated with late snow-lie but is not extensive.

Unusually, a species-rich form of this grassland with *Alchemilla alpina*, *Gnaphalium supinum*, *Sibbaldia procumbens* and *Thymus polytrichus* occurs associated with base-rich rock. This is only known also from Ben More Assynt and Beinn Eighe. Beinn Dearg has the second largest extent after the Cairngorms of montane *Nardus stricta* grasslands associated with differing degrees of snow-lie and consisting of *Nardus stricta-Carex bigelowii* grass-heath (U7) and *Nardus stricta-Galium saxatile* grassland, *Racomitrium lanuginosum* sub-community (U5e).

In summary indicator species for Montane acid grassland are:

<i>Alchemilla alpina</i>	alpine lady's mantle
<i>Carex bigelowii</i>	stiff sedge
<i>Cetraria islandica</i>	Iceland moss (lichen)
<i>Cladonia arbuscula</i>	(lichen)
<i>Cladonia uncialis</i>	thorn lichen
<i>Dicranum fuscescens</i>	dusky fork-moss
<i>Empetrum nigrum</i> ssp. <i>hermaphroditum</i>	crowberry
<i>Gnaphalium supinum</i>	dwarf cudweed
<i>Juncus trifidus</i>	three-leaved rush
<i>Kiaeria starkei</i>	Starke's fork-moss
<i>Nardus stricta</i>	mat-grass
<i>Polytrichum alpinum</i>	alpine haircap
<i>Ptilidium ciliare</i>	ciliated fringewort
<i>Racomitrium lanuginosum</i>	wooly hair moss

<i>Rhytidiadelphus loreus</i>	little shaggy-moss
<i>Salix herbacea</i>	dwarf willow

Currently the composition of plant species found in this habitat are distorted towards non-indicator species as a result of grazing above low levels, primarily by red deer, and this is causing the habitat to be assessed as unfavourable. Recent management has led to the habitat now being considered as recovering.

Conservation Objectives for Alpine and subalpine calcareous grasslands [H6170]

2a. Maintain the extent and distribution of the habitat within the site

Alpine and subalpine calcareous grasslands occur on lime-rich, damp soils at high altitude and on base-rich ledges.

On Beinn Dearg, this habitat is mostly the dwarf-herb community (*Festuca ovina-Alchemilla alpina-Silene acaulis* - CG12) which is often abundant on flatter, slightly less exposed areas of the summit ridges where base-rich schist is present. It is also often associated with the richly flushed grasslands below some of the best outcrops for Salix scrub and calcareous rocky slopes. The exception being a small stand of the ledge community (*Dryas octopetala-Silene acaulis* - CG14) from the Luchd Choire.

The objective is to maintain the extent of the habitat to approximately 1.39 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.

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

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 encroachment of trees and scrub. Inappropriate grazing may facilitate creation of a grass sward.

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.
- 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

2c. Maintain the distribution and viability of typical species of the habitat

On Beinn Dearg the Alpine and subalpine calcareous grasslands comprises the NVC types as given below:

- Festuca ovina – Alchemilla alpina – Silene acaulis* dwarf-herb community (CG12)
- Dryas octopetala – Silene acaulis* ledge community (CG14)

At high altitudes the habitat type occurs in two forms with a much larger assemblage of arctic-alpine species. Dominance of mountain avens is maintained on steep rocky ground, on rock ledges, and among boulders out of reach of grazing animals, forming *Dryas* – *Silene* ledge community. Within this sub-type, mountain avens occurs mixed with a wide range of arctic-alpine species. On open slopes, montane cushion herbs, especially moss campion *Silene acaulis*, and other small herbs replace mountain avens to form *Festuca* – *Alchemilla* – *Silene* dwarf-herb community. Arctic-alpines also dominate here, usually moss campion and alpine lady's-mantle, sometimes with cyphel.

On most upland sites, Alpine and subalpine calcareous grasslands form intimate mosaics with other upland Annex I habitats, and there are complex transitions to a range of montane communities. They are often associated with Sub-Arctic *Salix* spp. scrub and Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels on inaccessible rocky ground. On more siliceous soils, they give way to Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas in continental Europe) or more species-poor forms of *Nardus* grassland. Where snow lies late they give way to late snow-bed communities, and on the more windswept and leached summits they are replaced by moss-heaths, both habitats belonging to Siliceous alpine and boreal grasslands. Where there is strong base-rich flushing they grade into Alpine pioneer formations of the *Caricion bicoloris-atrofuscae* and on rocky ground to Calcareous rocky slopes with chasmophytic vegetation or Siliceous rocky slopes with chasmophytic vegetation.

In summary indicator species for Alpine and subalpine calcareous grasslands can include:

<i>Alchemilla alpina</i>	alpine lady's mantle
<i>Carex capillaris</i>	hair sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex pulicaris</i>	flea sedge
<i>Dryas octopetala</i>	mountain avens
<i>Linum catharticum</i>	fairy/purging flax
<i>Lotus corniculatus</i>	common bird's-foot-trefoil
<i>Luzula spicata</i>	spiked wood-rush
<i>Plantago maritima</i>	sea plantain
<i>Persicaria vivipara</i>	alpine bistort
<i>Salix reticulata</i>	net-leaved willow
<i>Saxifraga aizoides</i>	yellow mountain saxifrage
<i>Saxifraga oppositifolia</i>	purple saxifrage
<i>Selaginella selaginoides</i>	lesser clubmoss
<i>Sibbaldia procumbens</i>	least cinquefoil
<i>Silene acaulis</i>	moss campion
<i>Thalictrum alpinum</i>	alpine meadow-rue
<i>Thymus polytrichus</i>	wild thyme

Conservation Objectives for Species-rich *Nardus* grassland, on siliceous substrates in mountain areas [H6230] (Species-rich grasslands with mat-grass in upland areas)

2a. Maintain the extent and distribution of the habitat within the site

Maintain to approximately 6.93ha.

The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that Species-rich *Nardus* grasslands can grade into Alpine and subalpine calcareous grasslands or, next to limestone areas, form transitions to Semi-natural dry grasslands and scrubland on calcareous substrates. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

2b. Restore the structure, function and supporting processes of the habitat(s)

As with many upland habitats maintaining Species-rich grasslands with mat-grass in upland areas is mainly reliant on appropriate levels of grazing; moderate to moderate/high.

Reduction in grazing may cause a change towards tall herb communities or, at higher altitudes, towards *Dryas octopetala* vegetation as has occurred in some areas of Beinn Dearg SAC. Overgrazing, also evident in other areas of this habitat, or burning/muirburn may cause increase in unpalatable species i.e. *Prunella vulgaris*, *Cirsium* spp and mosses and local trampling to communities with *Lolium*, *Plantago* and *Poa*.

The key factors affecting the habitat type and measures to assess whether or not they are causing damage are given below;

- For overgrazing/browsing
 - At least 25% of the tips of live leaves and/or flowering shoots of vascular plants should be more than 5 cm above the ground surface.
 - at least 25% of the tips of live leaves and/or flowering shoots of vascular plants should be less than 5 cm above the ground surface.
- For colonisation by other species
 - Less than 10% of vegetation cover should be made up of bracken and/or scattered native trees and scrub.
- For trampling
 - Less than 10% of ground cover should be disturbed bare ground (emphasis on disturbed)

2c. Restore the distribution and viability of typical species of the habitat

Species present in the grassland tend to be mesophilic. Swards are closely grazed and consist of a complex mosaic of grasses, small herbs and bryophytes.

The species composition of this habitat type will be affected by factors such as altitude and soil moisture levels.

At high altitude there is a greater representation of arctic-alpine plants, and the habitat can be transitional floristically to and grade into Alpine and subalpine calcareous grasslands. Floristically richer areas develop where there is a concentration of base-rich or calcareous strata, giving suitable conditions for the rarer base- or calcium-loving species. In such situations, especially where outcrops of limestone occur, transitions to Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) may develop

At this site the habitat is represented by stands of *Festuca ovina*-*Agrostis capillaris*-*Thymus praecox* grassland (NVC type CG10)

Whilst grazing is a necessary for this habitat the historic levels have been too high (above moderate to moderate/high) and as a result indicator species are not found across all areas of this habitat.

Indicator species for species-rich grassland with mat grass in upland areas can include:

<i>Alchemilla alpina</i>	alpine lady's mantle
<i>Alchemilla glabra</i>	smooth lady's mantle
<i>Angelica sylvestris</i>	wild angelica
<i>Briza media</i>	quaking grass
<i>Campanula rotundifolia</i>	harebell
<i>Carex caryophylllea</i>	spring sedge
<i>Carex panicea</i>	carnation sedge
<i>Cerastium fontanum</i>	common mouse-ear
<i>Danthonia decumbens</i>	heath-grass
<i>Filipendula ulmaria</i>	meadowsweet
<i>Galium verum</i>	lady's bedstraw
<i>Geum rivale</i>	water avens
<i>Lathyrus linifolius</i>	bitter-vetch
<i>Lotus corniculatus</i>	common bird's-foot-trefoil
<i>Pinguicula vulgaris</i>	common butterwort
<i>Persicaria vivipara</i>	alpine bistort
<i>Stachys officinalis</i> (<i>S. betonica</i>)	common hedgenettle
<i>Succisa pratensis</i>	devil's bit scabious
<i>Thymus polytrichus</i>	wild thyme
<i>Veronica officinalis</i>	heath speedwell

Typical non-plant species include herbivores such as red deer *Cervus elaphus*.

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 the habitat within the site

Maintain to approximately 27.71ha

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.

On Beinn Dearg SAC this habitat is widespread and is particularly associated with the biotite-rich outcrops in Gleann na Sguaib and the Luchd Choire, but also with examples on Beinn Enaiglair and Èididh nan Clach Geala.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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

The extreme sensitivity of this habitat to grazing pressure is responsible for its scarcity. 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, has the ability to cause major losses. Direct management of grazing pressure has the ability to restore or extend this scarce habitat.

Where appropriate 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.
- Less than 50% of live flowering shoots of indicator tall herbs should show evidence of grazing.

The structure of this habitat can also be impacted by succession from tall-herb communities to woodland.

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.

Tall herb communities should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.

2c. Maintain the distribution and viability of typical species of the habitat

The Tall herb communities' habitat is a species-rich habitat corresponding to NVC type U17 *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.

In summary indicator species for Tall-herb communities can include:

<i>Alchemilla</i> spp.	lady's-mantles
<i>Angelica sylvestris</i>	wild angelica
<i>Cirsium heterophyllum</i>	melancholy thistle
<i>Crepis paludosa</i>	marsh hawk's-beard
<i>Filipendula ulmaria</i>	meadowsweet
<i>Galium boreale</i>	northern bedstraw

<i>Geranium sylvaticum</i>	wood crane's-bill
<i>Geum rivale</i>	water avens
<i>Heracleum sphondylium</i>	hogweed
<i>Hieracium</i> spp.	hawkweeds
<i>Hypericum</i> spp.	St. John's-worts
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Luzula sylvatica</i>	great wood-rush
<i>Meconopsis cambrica</i>	welsh poppy
<i>Mercurialis perennis</i>	dog's mercury
<i>Oxyria digyna</i>	mountain sorrel
<i>Pimpinella saxifraga</i>	burnet-saxifrage
<i>Potentilla crantzii</i>	alpine cinquefoil
<i>Primula vulgaris</i>	primrose
<i>Ranunculus acris</i>	meadow buttercup
<i>Rubus saxatilis</i>	stone bramble
<i>Rumex acetosa</i>	common sorrel
<i>Saussurea alpina</i>	alpine saw-wort
<i>Sedum rosea</i>	roseroot
<i>Silene dioica</i>	red campion
<i>Solidago virgaurea</i>	goldenrod
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Trollius europaeus</i>	globe-flower
<i>Valeriana officinalis</i>	common valerian
<i>Calluna vulgaris</i>	common heather
<i>Empetrum nigrum</i>	crowberry
<i>Erica</i> spp.	heaths
Ferns (excluding bracken)	
<i>Vaccinium</i> spp.	

Conservation Objectives for Blanket bog [7130]

2a. Restore 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. Extents, distributions and patterns of mosaics therefore need to be assessed in relation to the expectation for the site.

Whilst the extent of the habitat at this site has not reduced, there are areas within this that are no longer 'active' raised bog and so the objective is set to restore.

There should be no measurable net reduction in the extent of the habitat on the site such that the area of blanket bog is restored to approximately 3991.31ha.

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

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.

In addition, reducing negative impacts caused by 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. The current reason for this feature being assessed as unfavourable are over grazing and trampling, primarily by red deer.

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.

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 at low levels to maintain a natural, diverse and open sward of typical plant species by avoiding overgrazing that affects habitat condition.
- Reduce active drainage through targeted ditch damming and peat reprofiling as appropriate
- 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 the habitat

Typical species include the important peat-forming species, such as bog-mosses Sphagnum species and cotton grasses *Eriophorum spp.*, or purple moor-grass *Molinia caerulea* in certain circumstances, together with heather *Calluna vulgaris* and other ericaceous species and forbs such as bog asphodel *Narthecium ossifragu* and the carnivorous sundews *Drosera spp.* This site is notable primarily for the montane dwarf-shrub rich blanket bog with *Betula nana* and *Arctostaphylos alpina*.

Other indicator species can include:

<i>Arctostaphylos spp</i>	
<i>Betula nana</i>	dwarf birch
<i>Carex bigelowii</i>	stiff sedge
<i>Cornus suecica</i>	dwarf cornel
<i>Erica spp.</i>	heaths
<i>Empetrum nigrum</i>	crowberry
<i>Menyanthes trifoliata</i>	bogbean
<i>Myrica gale</i>	sweet gale
Non-crustose lichens	(lichens)
Pleurocarpous mosses	(mosses)
<i>Racomitrium lanuginosum</i>	wooly hair moss
<i>Rubus chamaemorus</i>	cloudberry

<i>Rhynchospora alba</i>	white beak-sedge
<i>Trichophorum cespitosum</i>	deer grass
<i>Vaccinium spp</i>	

Conservation measures should aim to maintain or restore conditions suitable for these species. Currently overgrazing/trampling is causing there to be a loss of indicator species across areas of this habitat. All characteristic bog species rely on a high water table, and are likely to benefit from measures to improve the bog's hydrological integrity, principally by damming of artificial drainage. Healthy bog vegetation relies on light grazing by livestock and/or wild herbivores, sufficient to maintain a diverse open structure but without causing surface damage/erosion or loss of more grazing-sensitive species.

This habitat supports populations of red deer *Cervus elaphus* on this site. In addition, typically associated birds include red grouse (*Lagopus l. scotica*), golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina schinzii*), greenshank (*Tringa nebularia*) and golden eagle (*Aquila chrysaetos*).

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

2a. Restore the extent and distribution of the habitat within the site

There is not an area figure for this habitat on the Standard Data Form.

This habitat is associated with the most base-rich outcrops of schist, generally being closely associated with the calcareous rocky slopes habitat. At Beinn Dearg SAC this habitat is mainly found in three areas; in the Luchd Choire, in upper Gleann na Sguaib and between Braemore Wood and Beinn Enaiglair

Inappropriate herbivore pressure/levels of grazing, those above low to low/moderate, will result in reduction of this habitat and so management that maintains a low level of grazing will allow the extent and distribution to be restored.

However, since this habitat usually forms mosaics and shows complex transitions to other upland habitat types, and due to the small and fragmentary extent of the 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.

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

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 and excessive poaching/trampling should be avoided as it 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 Beinn Dearg SAC this habitat is in unfavourable condition due to the high level of disturbed ground and grazing of plants as a result of over-grazing by red deer and sheep.

Appropriate grazing levels will vary between and within sites, and should be considered at an individual site level to ensure the restoration 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.

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

2c. Restore the distribution and viability of typical species of the habitat

At this site the habitat is mainly formed of NVC habitat types *Carex demissa*-*Saxifraga aizoides* mire (M11) and *Carex saxatilis* mire (M12).

Rare arctic-alpine species include Scottish asphodel *Tofieldia pusilla*, two-flowered rush *Juncus biglumis*, three-flowered rush *J. triglumis* and chestnut rush *J. castaneus*.

A number of commoner species are also characteristic of the habitat. 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*.

Excessive grazing/browsing/trampling by deer and/or livestock – above the low levels this habitat and site can sustain - are contributing to a deterioration in the habitat structure at this site, leading to a reduction or loss in the typical/indicator species for this habitat.

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

2a. Maintain the extent and distribution of the habitat within the site

The extent of the acidic scree feature has been estimated at 362.97ha. 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 Beinn Dearg SAC this habitat is found in the Luchd Choire/ Seana Bhraigh (Binneag) area or the Cona' Mheall-Meall nan Ceapraichean area or north of Beinn Enaiglair and 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 the habitat

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 have the potential to harm this feature through over-grazing and trampling damage.

2c. Maintain the distribution and viability of typical species of the habitat

At Beinn Dearg SAC this habitat is most closely represented by NVC type U18 *Cryptogramma crisper-Athyrium distentifolium*.

Notable is the presence of the rare Northern Atlantic Hepatic Mat which is represented in scree at 660-800m with the Atlantic liverworts *Anastrophyllum donianum*, *A. joergensenii*, *Mastigophora woodsii*, *Plagiochila carringtonii*, *Scapania nimbosa* and *S. ornithopodioides*.

This habitat may be colonised by a range of pioneer species. It also provides shelter for many species sensitive to frost such as parsley fern *Cryptogramma crisper*, species requiring a humid microclimate such as Wilson's filmy-fern *Hymenophyllum wilsonii*, and species sensitive to grazing such as stone bramble *Rubus saxatilis*. It is important for its rich fern flora and act as refugia for a number of rare species.

Excessive grazing/browsing/trampling by deer and/or livestock can contribute to a deterioration in the habitat structure, having harmful effects on the typical species. This habitat is also very sensitive to muirburn.

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

Trampling from walkers can contribute to a deterioration in the habitat structure, having harmful effects on the typical species.

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

2a. Maintain the extent and distribution of the habitat within the site

The extent of the plants in crevices on acid rocks feature has been estimated at 362.97ha, 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 Beinn Dearg SAC this habitat is found in the Luchd Choire/Seana Bhraigh (Binneag) area and the Cona' Mheall-Meall nan Ceapraichean area or north of Beinn Enaiglair and is also closely associated with acidic scree where the same rock type is also found forming the scree, and/or plants in crevices on base-rich rocks where calcareous bands of rock are found within siliceous rock.

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

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, some examples of this habitat are protected from herbivores by inaccessibility.

2c. Maintain the distribution and viability of typical species of the habitat

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. There are no indicator species for this habitat.

Excessive grazing/browsing/trampling by deer and/or livestock 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.

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

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

Trampling from walkers can contribute to a deterioration in the habitat structure, having harmful effects on the typical species.

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

2a. Maintain the extent and distribution of the habitat within the site

The extent of the plants in crevices on base-rich rocks feature has been estimated at 49.87ha. 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 Beinn Dearg SAC this habitat is found in Luchd Choire, Gleann a' Chadha Dheirg, Gleann na Sguaib and near Beinn Enaiglair, and south of Éididh nan Clach Geala and is also closely associated with base-rich scree where the same rock type is also found forming the scree, and/or plants in crevices on acid rocks where calcareous bands of rock are found within siliceous rock.

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

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 have the potential to harm this feature through over-grazing and trampling damage. However, some examples of this habitat are protected from herbivores by inaccessibility.

2c. Maintain the distribution and viability of typical species of the habitat

Plants in crevices on base-rich rocks is characterised by the presence of bryophytes such as *Tortella tortuosa*, *Anoetangium aestivum* and *Ctenidium molluscum*. Associated vascular plants include brittle bladder-fern *Cystopteris fragilis*, green spleenwort *Asplenium viride* and glaucous meadow-grass *Poa glauca*. However, floristic variation within the habitat type is influenced by geographical location, altitude and rock type.

The examples of this habitat found on this site tended to feature species such as *Thalictrum alpinum*, *Saxifraga aizoides*, *Polystichum lonchitis*, *Thymus polytrichus*, *Saxifraga oppositifolia*, *Alchemilla alpina* and *Calcicolous asplenium* spp. such as *A. viride* and *A. trichomanes*.

Excessive grazing/browsing/trampling by deer and/or livestock 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.

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

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

Trampling from walkers can contribute to a deterioration in the habitat structure, having harmful effects on the typical species.

Conservation Objectives for Caledonian forests [91C0]

2a. Maintain, or expand, the extent and distribution of the habitat within the site

Maintain to approximately 12.47ha (with planned expansion to 76ha).

The area figure of the extent of the Caledonian forest feature has been taken from the Standard Data Form. This should be maintained or allowed to increase through natural regeneration. Fundamentally however there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

This will include the avoidance of effects that could lead to a permanent reduction in the extent or distribution of the habitat such as medium or high levels of grazing or, minimising the risk of fire.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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

Caledonian pinewoods are found on soils dominated by low nutrient status, strongly-leached acidic podzols, ranging from well drained to very wet and boggy often over short distances. The habitat is characterised by vegetation that

- has a diverse structure including young, mature, dying and dead trees in dense thickets and open glades with a range of shade cast on the woodland floor
- is mostly evergreen and coniferous, long lived (to >250 years) and grows to large dimensions with a variety of niches including furrowed bark, rot-holes, large slow-decaying snags and deadwood
- has small proportions of diverse broadleaved trees and shrubs (and juniper), especially on pockets of richer soils

- has ground flora dominated by dwarf ericaceous shrubs, grasses, bryophytes and in places rare pinewood specialist species

This can be achieved through the presence of key tree species at all ages up to senescence and death, particularly Scots pine, juniper, birch spp, and aspen providing continuous cover of young, mature and old trees, dead and dying trees throughout the site; absence of invasive species which compromise the critical characteristics; and grazing levels that allow trees, shrubs and ground flora to develop naturally.

2c. Maintain the distribution and viability of typical species of the habitat

Caledonian forest comprises relict, indigenous pine forests of Scots pine *Pinus sylvestris* var. *scotica*, and associated birch *Betula* spp. and juniper *Juniperus communis* woodlands of northern character. It is usually found on strongly-leached, acidic podzols, and these soil conditions are reflected in the ground flora, which typically includes the dwarf shrubs heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus* and cowberry *V. vitis-idaea*, wavy hair-grass *Deschampsia flexuosa*, and the bryophytes *Dicranum scoparium*, *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*. Some stands support populations of notable bird species such as Scottish crossbill *Loxia scotica*. Of the higher animals, red squirrel, pine marten, and wildcat are amongst the most distinctive.

The relict Caledonian Forest sites have Scots pine populations with a local genetic distinctiveness, especially in the Wester Ross sites. We value this distinctiveness in its own right, as well as in terms of adaptation to current local conditions, and current practice protects it. We do not know how the anticipated long term changes and potential threats will interact with this genetic distinctiveness and the variation within it. Further work should help us better understand these interactions, but for now we recommend that any planting or replanting of Scots pine should originate from the appropriate region.

Conservation Measures

Beinn Dearg 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).

Conservation Measures for Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

Issue	Measure	Responsible party
Water quality	Implement and maintain monitoring of key water quality parameters.	NatureScot/SEPA
	Any development proposals in the catchment should include appropriate measures to minimise sediment run-off and prevent pollutants from entering the lochs e.g. track creation	Land Manager The Highland Council NatureScot
	Ensure no adverse impacts from diffuse or point sources. Any significant artificial inputs of nitrogen and phosphorus are likely to lead to undesirable nutrient enrichment.	Land Manager SEPA NatureScot The Highland Council
Sediment	Activities such as ATV use should be carried out with care so that they do not lead to	Land Manager Planning Authority

	creation of bare peat that can be washed into lochs or dubh lochans. Any track maintenance, creation or other development proposals should avoid sediment from disturbed ground being washed into lochs.	NatureScot SEPA
Grazing/Trampling	Ensure livestock levels are sufficiently low to avoid poaching of edges and peat erosion. Avoid activities related to stock management such as supplementary feeding and fencing close to lochs. Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature.	Land Manager NatureScot SGRPID
Invasive species	Avoid deliberate introduction of invasive species. Maintain surveillance for invasive species and agree action with regulator. All anglers and other water users (such as wild swimmers or researchers) should follow the Check, Clean, Dry biosecurity procedures to help prevent the spread of invasive species.	SEPA NatureScot Land managers Members of the public North and West District Salmon Fisheries Board West Sutherland Fisheries Trust

Current and recommended management for Wet heathland with cross-leaved heath, European dry heaths, Alpine and Boreal heaths and Blanket bog

Issue	Measure	Responsible party
Grazing & grazing levels	Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature. Currently no stock on site. Feral goats are present but numbers are unknown	Land manager
Muirburn	Muirburn has happened in the past but very little evidence that it is a widespread practice currently. Muirburn should be carried out according the Muirburn code and should avoid very steep ground. Most wet heath on Beinn Dearg SAC occurs as a mosaic with blanket bog and dry heath on the lower ground and therefore burning on wet heath risks spreading to more sensitive habitats and should be avoided.	Land manager
Drainage	This habitat should not be actively drained and natural hydrology should be restored by blocking existing drains where feasible.	Land manager Funding authority
Afforestation	Any expansion of native woodland onto these open habitats would need to ensure the	“

	conservation objectives for the site are met. Furthermore, any expansion should only be carried out where it will be of benefit to the woodland feature of the SAC. Natural regeneration is likely to be restricted by grazing/browsing levels.	
Invasive species	Adjacent to the SAC on the south side is Inverlael Forest managed by Forest and Land Scotland where <i>Rhododendron ponticum</i> is present and has been managed previously. There should be no spread outwith the plantation. Alien and invasive species should not be introduced to the site	Land manager SISI (NatureScot)
Vehicle and access tracks	Existing tracks should be maintained within their existing footprint and without having significant effects on the surrounding hydrology. Use of drainage ditches should be minimised in flatter areas. Culverts should be used to allow streams to pass underneath existing tracks or paths. In steeper areas, water should be diverted from existing paths and tracks at regular intervals. This will prevent substantial amounts of water collecting on paths/tracks that can lead to deep erosion gullies.	Land Manager
Erosion	Activities that might cause erosion (such as vehicle use or deer management that encourages animals to concentrate in small areas) should be avoided. Areas of current erosion should be left undisturbed until the vegetation has recovered.	Land manager
Recreation	Discussions on options available – what, when where , how much (if controllable) and how to manage effectively	Land manager, Local authority, NatureScot

Current and recommended management for Mountain willow scrub

Issue	Measure	Responsible party
Herbivore impacts (grazing and/or trampling)	Ensure that herbivore impacts by deer and feral goats on the feature are 'low' based on the FLS/NatureScot Herbivore Impact Assessment Process to prevent browsing and/or loss of typical species. Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature.	Land managers, Deer Management Groups, NatureScot
Habitat Management	Red deer are currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery of the upland features.	Landowners, Land Managers, NatureScot
Research and monitoring	To identify emerging impacts on the habitat and their causes, in order to understand the	NatureScot

	long term issues, and to inform future management of the habitat across Scotland.	
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Current and recommended management for Montane acid grasslands

Issue	Measure	Responsible party
Grazing and trampling	Red deer are currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery of this feature	Land manager
Vehicle use, particularly ATVs	Avoid vehicle use that damage habitats. Any vehicles used on these habitats should be low ground pressure ATVs and should avoid areas recovering from past damage	Land manager
Access tracks, used by both people and stock	No new access tracks should be created. Existing tracks should be maintained within their existing footprint and without having significant effects on the surrounding hydrology.	Land manager, Local authority, NatureScot
Recreation	The mountains within the site attract hillwalkers especially on access paths. Hillwalkers cause some trampling and erosion, through scuffing of the grassland. Further restoration and information for walkers is required. Dogs that are not under close control also have the potential to impact protected breeding birds. .	Land manager, Developer, Local authority, NatureScot

Current and recommended management for Alpine and subalpine calcareous grasslands

Issue	Measure	Responsible party
Grazing and trampling and levels by herbivores	The high altitude and generally inaccessible nature of these calcareous grasslands means that this habitat is less at risk from grazing and trampling by deer. The current Section 7 agreement aims to maintain sustainable levels of deer across the site and this should help continue the low herbivore impacts. Feral goats are known to be present and targeted culling near sensitive habitats may be beneficial.	Land manager

Current and recommended management for Species-rich grasslands with mat-grass in upland areas

Issue	Measure	Responsible party
Grazing and browsing levels, stock type and seasonality of grazing and trampling	Deer (and locally sheep and goat) grazing and trampling continue to be the most significant management issues. However some areas are also being under grazed leading to areas of rank grasses and high litter cover. A range of grazing pressure is required to create the variety of texture in the sward height, with both	Land manager

	<p>shorter swards and longer tufts of grasses. Grazing impacts should fall mostly in the range of 'low/medium' up to 'medium/high' in Habitat Impact Assessments.</p> <p>Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature.</p>	
Vehicle tracks	Avoid vehicle use that damage habitats. Any vehicles used on these habitats should be low ground pressure ATVs and should avoid areas recovering from past damage.	Land Manager
Recreation	Monitor level of pressure. Discussions on options available – what, when where , how much (if controllable) and how to manage effectively if/when issues are established.	Land manager, Local authority, NatureScot
Access tracks	Only existing permitted tracks should be maintained – this must be within their existing footprint.	Land manager

Current and recommended management for Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Issue	Measure	Responsible party
Grazing and trampling	The extreme sensitivity of this habitat to grazing pressure means this habitat requires very low grazing and trampling impacts. Grazing will be from red deer (although limited through inaccessibility at most locations) and feral goats. Deer are managed on the SAC as part of a Section 7 agreement to maintain sustainable levels for all upland habitats. Targeted culls near to sensitive habitats, especially for feral goats, could be beneficial.	Land manager

Current and recommended management for High-altitude plant communities associated with areas of water seepage

Issue	Measure	Responsible party
Herbivore impacts (grazing and trampling)	<p>This habitat 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 ground where this community occurs. Ensure that deer impacts on the feature are 'low' based on the Herbivore Impact Assessment Process to prevent poaching and/or loss of typical species.</p> <p>Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature.</p>	Land managers, Deer Management Groups, NatureScot

Heavy trampling and/or tracking	Trampling and/or tracking by deer / livestock / ATVs to be minimal to be prevent disturbed ground within this habitat.	Land managers, Deer Management Groups, NatureScot
Habitat Management	Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery of this feature.	Landowners, Land Managers, NatureScot
Research and monitoring	To identify emerging impacts on the habitat and their causes, in order to understand the long term issues, and to inform future management of the habitat across Scotland.	NatureScot

Current and recommended management for habitat types: Acidic scree, Siliceous rocky slopes with chasmophytic vegetation and Calcareous rocky slopes with chasmophytic vegetation

Issue	Measure	Responsible party
Herbivore impacts (grazing and/or trampling)	Red deer and unknown numbers of feral goats are present in the higher parts of the site. Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery of this feature. These habitats all benefit from low levels of grazing and trampling. Further work to establish the numbers of goats may be needed.	Land managers, Deer Management Groups, NatureScot
Non-native and invasive native species	Currently there are no significant issues with non-native species or invasive native species (such as bracken or scrub) impacting on these features. This should be monitored by regular site survey through SCM assessments or similar surveys and action taken when necessary to reduce the extent of or eradicate problematic species.	Land Managers, NatureScot
Habitat Management	Identify any current management plans that support/include this feature e.g. NNR plan; deer management plan, AECS.	Landowners, Land Manager, NatureScot.
Recreation activity	Ensure trampling by walkers is minimal to maintain cover of typical species.	Land owners, land managers, NatureScot.
Research and monitoring	To identify emerging impacts on the habitat and their causes, in order to understand the long term issues, and to inform future management of the habitat across Scotland.	NatureScot

Current and recommended management for Caledonian forest

Issue	Measure	Responsible party
Herbivore impacts	Ensure that herbivore impacts on the feature are 'low' across the majority of the woodland based on the FCS/SNH Herbivore Impact Assessment Process.	Land managers, Deer Management Groups, NatureScot

	Grazing by deer is currently managed through a Section 7 agreement to maintain a density that is compatible with the recovery and maintenance of this feature.	
Muirburn	Ensure muirburn follows best practice and the Muirburn Code and does not occur in the woodland	Land managers
Invasion by non-native species.	Ensure that invasive non-natives (including non-native conifers and rhododendron) do not encroach and/or spread across the site.	Land manager
Future threats	A coordinated resilience planning process should be developed to respond to anticipated future threats to the habitat. Management actions arising from the resilience planning process, and site-level plans, should be implemented to anticipate future threats to the habitat on the site. This resilience work may also include further research to understand the vulnerabilities of the habitat.	NatureScot Land managers
Research and monitoring	To identify emerging impacts on the habitat and their causes, in order to understand the long term issues, identify refugia, and review site-level resilience plans in the light of updated future threat projections.	NatureScot, Land Managers, Universities

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