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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

BEN NEVIS
SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE

Ben Nevis cliffs from the Allt a'Mhuilinn path © NatureScot

Site Details

Site name:	Ben Nevis
Map:	https://sitelink.nature.scot/site/8204
Location:	Highlands and Islands
Site code:	UK0012956
Area (ha):	9,316.12
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	5 August 2009	Unfavourable - Bad
Wet heathland with cross-leaved heath	Unfavourable No change	19 May 2013	Unfavourable - Bad
Dry heaths	Unfavourable Recovering	8 May 2015	Unfavourable - Bad
Alpine and subalpine heaths	Unfavourable Recovering	11 May 2017	Unfavourable - Bad
Mountain willow scrub	Favourable Recovered	25 July 2017	Unfavourable - Bad
Montane acid grasslands	Unfavourable Recovering	19 May 2013	Unfavourable - Bad
Alpine and subalpine calcareous grasslands	Unfavourable No change	11 July 2009	Unfavourable - Bad
Species-rich grassland with mat-grass in upland areas*	Unfavourable Declining	6 June 2013	Unfavourable - Bad
Tall herb communities	Favourable Maintained	10 July 2014	Unfavourable - Bad
Blanket bog*	Unfavourable No change	19 May 2013	Unfavourable - Bad
High-altitude plant communities associated with areas of water seepage*	Favourable Maintained	13 September 2013	Unfavourable - Bad
Acidic scree	Favourable	11 July 2009	Unfavourable -

	Maintained		Inadequate
Base-rich scree	Favourable Maintained	28 September 2003	Unfavourable - Bad
Plants in crevices on acid rocks	Favourable Maintained	30 September 2003	Unfavourable - Bad
Plants in crevices on base-rich rocks	Favourable Maintained	20 June 2013	Unfavourable - Inadequate
Western acidic oak woodland	Favourable Maintained	13 June 2001	Unfavourable - Bad
Caledonian forest*	Unfavourable Recovering	19 July 2013	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:

Ben Nevis SAC overlaps with most of Ben Nevis Site of Special Scientific Interest (SSSI). A section of Ben Nevis SSSI near the Aonach Mor ski centre is not within Ben Nevis SAC.

Key factors affecting the qualifying features

All habitats
Levels of grazing, browsing and trampling by sheep and red deer are key factors affecting all habitats. Livestock were removed from most of the site in 2003, and there have been improvements in the condition of most habitats since then. Prior to the removal of livestock, all habitats were affected by a long history of relatively high grazing and browsing, and associated trampling, perhaps coupled historically with burning. Red deer are currently the main grazing animal across most the site (though sheep do still affect some areas) and deer management is a key factor affecting most of the features.

The distribution of habitats and species is also affected by altitude. Ben Nevis SAC has a complete altitudinal sequence of vegetation from woodland to scrub and dwarf shrub heaths, then to montane grasslands, and finally to communities dominated by bryophytes or lichens. The altitudinal gradients of climate – and therefore habitat - are very steep. In just over one vertical kilometre from the Water of Nevis to the top of the Ben, the vegetation changes from temperate rain-forest to an arctic environment. Some of the Arctic-alpine species found on the higher parts of this site are at the lowest altitude that they can grow because although these plants can tolerate harsh environmental conditions they would not be able to compete with the faster-growing species that would move into the higher parts of the site if environmental conditions became more benign. These high altitude and snow bed habitats are therefore vulnerable to climate change as there are no higher locations, or ones with more snow, within Ben Nevis SAC.

The distribution of habitats and species on Ben Nevis SAC is also affected by the underlying geology. Most of the site has acid rock types such as granite and quartzite: plants that grow here can tolerate acidic, low-nutrient conditions. In contrast, plants that require more base-rich conditions are confined to areas of base-rich schist on Aonach Beag and Beinn na

Socaich and Dalradian limestone on Meall Cumhann and the eastern slopes of Coire Giubhsachan.

Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
This feature includes Lochan Meall an t-Suidhe as well as other hill lochs that have inflow and/or outflow streams and a stony, rather than a peaty, bottom. The habitat type overall includes both oligotrophic (low nutrient), mesotrophic (moderate nutrient level) waters, and intergrading types. Lochan Meall an t-Suidhe is at the low-nutrient end of this range (Palmer (1992) type 3). The dominant substrates are stones, sand, gravel and boulders. The clear soft water, which characterises this habitat type, contains low 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 shore of the when loch water levels fall in summer.

Key factors that could affect this habitat are changes to hydrology, water pollution, invasive non-native species and nitrate pollution from the air.

Wet heathland with cross-leaved heath
Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats. Wet heaths occur in several types of ecological gradient. At Ben Nevis SAC wet heath is found on large parts of the lower slopes where there are moderate gradients between dry heath or other dry, acid habitats (which are found on steeper ground) and blanket bogs (which are usually found on flatter ground).

This feature was assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to intensive grazing/browsing and trampling by red deer and (historically) by sheep which has changed the species composition to be more grassy and less heathery, led to creation of too much bare, disturbed ground and has removed too much growth from dwarf shrubs such as heather. Most of the sheep have now been removed from the site and improved deer management is now in place that should address these issues. This feature is currently considered to be 'recovering due to management'.

Other key factors currently (or potentially) affecting this habitat include burning, use of vehicles, recreational pressure, forestry, non-native species, nitrate pollution from the air and habitat loss for development.

Dry heaths
Dry heaths occur on freely-draining, acidic to almost neutral soils with generally low nutrient content on this site. Ericaceous dwarf-shrubs dominate the vegetation but all heaths vary in their flora and fauna according to altitude, aspect, soil conditions (especially base-status and drainage), maritime influence, and grazing and burning intensity.

Nearly all dry heath on Ben Nevis SAC is semi-natural, being derived from woodland through a long history of grazing and burning. On this site, dry heaths are managed mainly as extensive grazing for red deer although there are some sheep on parts of the site.

This feature has been assessed through NatureScot's site condition monitoring programme as recovering from unfavourable condition at this SAC following removal of most of the sheep from the site. The most recent survey found that intensive grazing (by red deer as well as some remaining sheep) had still removed too much growth from dwarf shrubs such as heather from parts of the site but the condition of the feature was improving.

Other key factors currently (or potentially) affecting this habitat include trampling by red deer and livestock, burning, use of vehicles, forestry, non-native and invasive species, nitrate pollution from the air and habitat loss for development.

Alpine and subalpine heaths

Alpine and subalpine heaths are widespread on the site, and are generally found on mountain shoulders at a higher altitude than wet and dry heaths but below the alpine summit communities. Exposure or snow-lie, which suppress the growth of dwarf-shrubs, also favours the growth of characteristic lichens and bryophytes. Alpine heaths develop above the natural altitudinal tree-line. On lower slopes, subalpine heaths may grade into floristically similar dry heaths.

Alpine and subalpine heaths are particularly susceptible to disturbance, especially by fire. Rocky ground can be important in protecting heaths from fire.

This feature has been assessed through NatureScot's site condition monitoring programme as recovering from unfavourable condition at this SAC following removal of most of the sheep from the site. The most recent survey found that intensive grazing (by red deer as well as some remaining sheep) had still removed too much growth from dwarf shrubs such as blaeberry from parts of the site, but also found that the condition of the feature had improved since previous surveys.

Other key factors that could potentially affect this habitat include trampling and erosion caused by walkers and runners, trampling by livestock, nitrate pollution from the air and invasive native and non-native species.

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 Ben Nevis where steep slopes make the ground less accessible to herbivores, 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.

The key management issue for this habitat is grazing/browsing pressure. This is believed to have reduced and restricted its occurrence in the past. The reduced grazing levels on Ben Nevis should allow the area of this habitat to be maintained or spread into more accessible areas. Burning also has the ability to have serious negative impacts on this habitat.

Montane acid grasslands

Montane acid grassland is 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 the tops of the higher summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by extremes of exposure and snow-lie.

This feature has been assessed through NatureScot's site condition monitoring programme as recovering from unfavourable condition at this SAC following removal of most of the sheep from the site. Grazing levels were still too high in some parts of the feature during the most recent monitoring, but the condition of the feature had improved since previous surveys.

The habitat is vulnerable to nutrient inputs and physical damage such as occur due to dunging and urination by grazing animals, acid deposition, human and animal trampling and use of all-terrain vehicles.

Other key management issues currently (or potentially) are the nature and extent of grazing/browsing by sheep and red deer, burning, use of vehicles, non-native species, recreation and habitat loss for development. Nitrate pollution from the air can be concentrated in parts of this habitat where there are long-lying snow beds, since the snow captures the nitrogen which is then released into the ground below when the snow melts.

Alpine and subalpine calcareous grasslands

The habitat occurs on base-rich soils and consists of short, often grazed, species-rich mixtures of arctic-alpine cushion herbs, grasses and sedges. It is found in scattered locations, the main areas are on western slopes of Aonach Mor and Aonach Beag and on Beinn na Socaich. This is one of the most important upland habitats in the UK for rare arctic-alpine plants and other rare montane or northern plants.

This feature was assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to much bare, disturbed ground that has been created by intensive grazing/browsing and trampling by red deer and sheep. Most of the sheep have now been removed from the site and improved deer management is now in place that should address these issues. This feature is currently therefore considered to be 'recovering due to management'.

Since the sheep have been removed from the site, undergrazing may become a key management issue for much this feature in future as other habitats such as montane willow scrub and tall herb ledge have the potential to expand at the expense of Alpine and subalpine grasslands when grazing/browsing is reduced.

Species-rich grasslands with mat-grass in upland areas

This Habitats Directive Priority Habitat is widespread within Ben Nevis SAC. It has developed on parts of the site where there is flushing through base-rich strata on siliceous, moderately base-rich metamorphic or igneous bedrock. These grasslands occur in localised areas within the site on base-enriched rocky slopes where calcareous schists outcrop or in spreads of gravel associated with stream beds. Some of the main areas for this habitat are on slopes north of Beinn na Socaich, along most of the west and south facing slopes from lower Glen Nevis to Meall Cumhann, and beneath the steep cliffs south and west of Aonach Beag.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to the legacy of high levels of grazing in the past by sheep (whose numbers have since been decreased) and red deer as well as current under grazing. The high levels of previous grazing have caused grasses to dominate parts of this habitat at the expense of other typical species. Low levels current of grazing have allowed these grasses to grow too tall, shading out smaller plants or preventing them from growing due to a buildup of dead grass on the ground surface.

Tall herb communities

Tall herb communities are typically found in restricted parts of the site on ungrazed upland cliff ledges and are restricted to base-rich substrates and somewhat sheltered situations. This habitat provides a refuge for rare, grazing-sensitive, montane plants. Variation within the habitat type is related chiefly to geographical position, altitude, and soil conditions and rock type.

This habitat has the potential to expand onto open ground on Ben Nevis SAC, due to the currently reduced level of grazing.

The key management issue is preventing any increase in grazing/browsing or trampling of this habitat.

Blanket bog

This Habitats Directive Priority Habitat is found in areas of moderate to high rainfall and a low level of evapotranspiration which allow 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. They support a range of specialist plant species adapted to the habitat. Often these species cannot compete with other plants in drier habitats, or those with more nutrient rich conditions.

The site is made up of a complex mosaic of habitats. Blanket bog is found where the terrain is hummocky with bog occupying flatter and gently-sloping ground and hollows, wet heath where slopes increase, and dry heath on steeper and drier areas.

This feature was assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to intensive browsing and trampling by red deer together with associated erosion. Improved deer management is now in place that should address these issues and this feature is currently assessed as 'recovering due to management'.

Other key management issues include burning, changes in the hydrology, recreational pressure, use of vehicles, non-native species, abiotic natural changes (such as sunlight, temperature, moisture, wind, soil and nutrient availability), nitrate pollution from the air, and habitat loss for development

High altitude plant communities associated with water seepage

This Habitats Directive Priority Habitat is a type of flush mire that is associated with areas of water seepage 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 the hydrology as well as harsh climatic and soil conditions. The vegetation consists of mixtures of small sedges, rushes, small herbs and bryophytes, and includes many arctic-alpine species.

Key factors affecting this habitat include levels of grazing and trampling by deer, livestock and people as well as nitrate added by atmospheric pollution.

Acidic scree

Ben Nevis SAC contains extensive acidic screes of quartzite and granite. Scree habitats consist of rock fragments covering the frost-shattered mountain summits and ridges or accumulating on slopes below cliffs. Steeper parts of the scree are intrinsically unstable and rocks frequently move meaning that this habitat is vulnerable to natural disturbance.

The acidic screes found in the site are diverse, with a range of characteristic species. There is an abundance of acid rock-loving species in high-altitude glacial troughs, corries and on summit ridges. These include a number of montane bryophytes, ferns and arctic-alpine flowering plants.

The key issues affecting this habitat are the nature and extent of grazing/browsing by livestock and red deer and trampling by animals and people.

Base-rich scree

Ben Nevis SAC contains patches of base-rich scree that have been derived from bands of Ballachulish limestone or calcareous schist. Scree habitats consist of rock fragments covering frost-shattered mountain summits and ridges or accumulating on slopes below cliffs. Scree is intrinsically unstable and rocks will frequently move meaning that this habitat is vulnerable to natural disturbance.

Although occurrences of this habitat are relatively small in extent there is a good representation of characteristic arctic-alpine flora. Base-rich scree consists of assemblages of calcicole and basiphilous species, and species composition of which is heavily influenced by altitude. The habitat is important for its rich fern flora and acts as a refuge for a number of rare species.

The key issues affecting this habitat are the nature and extent of grazing/browsing by livestock and red deer and trampling by animals and people.

Plants in crevices on acid rocks

Chasmophytic (grows in the crevices of rocks) vegetation that colonises siliceous (silica based, acidic) rock faces is widespread in upland areas on Ben Nevis SAC. 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. Crevice communities occur extensively on acidic crags up to a very high altitude and have a diverse flora, with characteristic examples of the commoner arctic-alpine species. Chasmophytic plant species are adapted to the stresses of drought and low nutrient availability.

Although many sites are protected by their inaccessibility, management issues that can affect this habitat are the nature and extent of grazing/browsing by red deer and sheep and trampling by animals and humans.

Plants in crevices on base-rich rocks

On Ben Nevis SAC, this plant community occurs up to high altitude where there are limestone outcrops and some shelter and moisture, for example Meall Cumhann, Aonach Beag and Beinn na Socaich where notable populations of a number of very rare species are associated with calcareous outcrops of rock faces in high gullies.

This habitat consists largely of ferns and mosses growing out of crevices and cracks in calcareous rocks. Plants tend to be sparse and scattered due to the limited soil development and harsh and sometimes extreme conditions. Chasmophytic plant species such as these (which grow in the crevices of rocks) are adapted to the stresses of drought but can be sensitive to overgrazing and trampling although many sites are protected by inaccessibility. The base-richness of calcareous rocks may encourage competition from more vigorous native species, or non-native invasive species.

The key management issues affecting this habitat are the nature and extent of grazing/browsing by red deer and sheep, trampling by humans and animals and attractiveness of this habitat to of non-native invasive species that have the potential to out-compete the rare native plants found here.

Western acidic oak woodland

This habitat type comprises a range of woodland types dominated by mixtures of oak and birch. It is characteristic of base-poor soils in areas of at least moderately high rainfall. A key feature of importance within this habitat type is the well-developed Atlantic bryophyte communities it can support.

On Ben Nevis SAC Western acidic oak woodland occurs mainly in Glen Nevis, often in mosaic with Caledonian forest. There are also areas of this habitat around the lower reaches of the Allt a Mhuillin and at the northern boundary of the SAC, above Leanachan Forest.

A key factor that can affect this habitat is inappropriate levels of grazing. The habitat requires low but not zero grazing. High levels of grazing can distort the natural structure of the woodlands (by removing the preferentially browsed species such as oak and hazel) leading to woodland dominated by older trees and lacking normal representation of intermediate life classes and saplings as well as other characteristic woodland species. In the future new stresses to the feature, particularly from climate change and novel pests and pathogens, are anticipated.

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 found on strongly-leached, acidic podzols, and these soil conditions are reflected in the ground flora. On Ben Nevis SAC Caledonian forest is predominantly found in Glen Nevis, between Polldubh and Steall. Outwith Glen Nevis there is just one other tiny area of this habitat on the woodland margin in Coire an Eoin.

A key factor affecting this habitat is the level of grazing by red deer and livestock. 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.

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).

This feature has been assessed through NatureScot's site condition monitoring programme as recovering from unfavourable condition at this SAC following reduction in red deer browsing and removal of most of the sheep from the site. However, pine is still not regenerating and observations show that browsing levels are still too high to achieve this. Low levels of browsing need to be maintainedto allow successful Scot pine regeneration. Control of rank ground cover may also be needed to help Scots pine seedlings to establish.

Further information about these habitats can be found on the JNCC website.

Conservation Priorities

Higher priority features

The habitats listed below are the higher priority features, chosen because Ben Nevis is a key site for these habitats. Within this list, for the habitats in italics, Ben Nevis SAC scored A on the site data form for its overall importance to the conservation of these vegetation communities:
Acidic scree
Alpine and subalpine calcareous grasslands
Montane acid grasslands
Plants in crevices on base-rich rocks
Plants in crevices on acid rocks

In addition, the following habitats are EU priority habitats of particular conservation importance across their range and so are included here as higher priority features on this site:
Blanket bog
Caledonian forest
High-altitude plant communities associated with areas of water seepage
Species-rich grassland with mat-grass in upland areas

In general, priority should be given to priority habitats and features that are in unfavourable condition, should any conflict between management of different habitats or species arise.

Site Management

Current management across Ben Nevis SAC is focussed on lowering the levels of grazing and browsing, which were historically high on this site. This effect of this on feature condition is summarised below, with the higher priority features (identified above) in bold.

Feature	**Effect of current herbivore reduction (desirable impact range in brackets)**	**Summary of condition, including herbivore impacts**
Clear-water lochs with aquatic vegetation and poor to moderate nutrient levels (3130)	N/A	Aquatic flora of oligotrophic lochs, not affected by herbivores (though poaching at the water edge or nutrient enrichment caused by high levels of trampling or dung would be detrimental)
Wet heathland with cross-leaved heath (4010)	Positive (L to L/M)	The 2009 SCM reported higher browsing impacts on the east side of Water of Nevis and in the Grey Corries. 2013 SCM found 18 of 28 sample points failing across the site (apart from near the Allt a Mhuilinn and Glen Nevis). However, Mid West deer management plan now addresses this and allows

		Recovering due to management status.
Dry heaths (4030)	Positive (L to L/M)	Herbivore impacts have reduced but pockets of higher browsing still exist, particularly north of Grey Corries from Tom na Sroine to Beinn Bhàn.
Alpine and subalpine heaths (4060)	Positive (L to L/M)	In 2009 high browsing and trampling impacts (sheep and deer), particularly in the Grey Corries, led to unfavourable condition status. Surveys in 2013 and 2017 showed clear improvements in condition and Recovering due to management status was assigned.
Mountain willow scrub (4080)	Positive (L)	Mountain willow scrub is normally found in steep areas less accessible to herbivores. Monitoring in 2017 found low levels of herbivory and suggested if these lower herbivore impacts remain then this habitat may spread into more accessible locations.
Montane acid grassland (6150)	Positive (L to L/M)	There has been an improving trend associated with reduced herbivore pressure on the site and the feature was assessed as recovering in 2013. Further reduction in sheep and deer impacts in the Grey Corries may be desirable.
Alpine and subalpine calcareous grasslands (8170)	Positive (L/M to M/H – there should be a range)	The 2009 SCM indicated browsing impacts are largely compatible with favourable condition. However, reduction in trampling impacts is desirable. Mid West deer management plan now addresses this and allows Recovering due to management status.
Species-rich grassland with mat-grass in upland areas* (6230)	Negative (L/M to M/H – there should be a range)	This feature is in unfavourable declining condition and most of the points failing SCM targets in relation to undergrazing were found around the top of Meall Cumhan above Glen Nevis in the west of the site.
Tall herb communities (6430)	Neutral or Positive (L to L/M)	Typically found on un-grazed ledges. With lower herbivore impacts this habitat may spread into more accessible locations.
Blanket bog* (7130)	Positive (L to L/M)	Although there have been improvements in condition of blanket bog, eg re-vegetation of previously eroded peat in some areas, this habitat has been slower to recover and was still reported as Unfavourable in 2013. However, Mid West deer management plan now addresses this and allows Recovering due to management status.

High-altitude plant communities associated with areas of water seepage* (7240)	Positive (L to M: <25% M)	Not monitored since 2003. Habitat generally sensitive to trampling.
Acidic scree (8110)	Neutral or Positive (L)	In favourable condition. Scree generally loose so herbivores deterred.
Base-rich scree (8120)	Neutral or Positive (L)	This habitat has not been monitored since 2003. At that time the target for disturbance due to human trampling was not met, though only one area was sampled so the assessment was tentative only.
Plants in crevices on acid rocks (8220)	Neutral or positive (L)	Mainly in locations that relatively inaccessible to herbivores.
Plants in crevices on base-rich rocks (8210)	Neutral or positive (L)	Mainly in locations that relatively inaccessible to herbivores.
Caledonian forest* (91C0)	Positive (L)	Assured management in the form of active deer management and planned exclosures led to change to recovering status in 2013. However, the 2016 survey showed no establishment or recruitment of Scots pine by natural regeneration beyond field layer height due to deer browsing. A reduction in browsing is needed in the woodland regeneration zones to enable successful Scots pine regeneration.
Western acidic oak woodland (91A0)	Positive (L)	Oak woodland has not been monitored since 2001, when it was found to be in favourable condition, but recent site visits show there this woodland is overgrazed in the northeast of the site and has very little woodland regeneration. Herbivore impact reduction is required in Coire an Eoin and Coire Chomhlidh. Some of the oak woodland at the upper margin on Leanachan is to be fenced by FLS.

The table above shows that the majority habitats are benefiting from the reduction in herbivore pressure on Ben Nevis SAC, except Species-rich grassland with mat grass in upland areas. For this habitat, a range of impacts from low to high is appropriate and moderate grazing impacts are likely to give rise to the highest diversity of characteristic flora and invertebrates and are likely to maintain habitat condition.

In order to improve the condition of the woodland features in Glen Nevis, herbivore pressure will need to be lowered further (large scale fencing is not appropriate in this location). As this is a large SAC, this reduction in herbivore pressure would be unlikely to affect the whole site, but there will be local effect on other habitats in the vicinity.

The current tree line in Glen Nevis is around 350m. If herbivore pressure is lowered enough to enable tree regeneration it is predicted that habitats under 450m between Lower Glen Nevis and Steall meadows may be directly affected. Within this area, the following habitats are present:

Habitat	**Area of habitat in Glen Nevis <450m (ha)**	**Percentage of habitat within SAC (%)**
Wet heathland with cross-leaved heath (4010)	205.9	8.1
Dry heaths (4030)	23.2	4.3
Species-rich grassland with mat-grass in upland areas (6230)	13.8	12.6
Tall herb communities (6430)	0.1	1.0
Blanket bog (7130)	3.2	0.6
Acidic scree (8110)	2.7	0.4
Plants in crevices on acid rocks (8220)	51.9	6.5
Caledonian forest (91C0)	8.5	99.9
Western acidic oak woodland (91A0)	160	75

As seen in the table above a very high proportion of the Caledonian forest and Western acidic oak woodland features is found within Glen Nevis. Very low herbivore impact is required to enable regeneration which is currently lacking in these woodland habitats and will have a positive effect on feature condition. This is particularly important for Caledonian forest, a priority habitat within Ben Nevis SAC that is found almost wholly within Glen Nevis. On the other hand, some other habitats may suffer negative consequences as a result of very low herbivore impact.

Wet heathland with cross-leaved heath and Dry heaths are benefitting from the current reductions in herbivore pressure, however with very low herbivore impact trees and scrub may start to colonise these habitats. The Site Condition Monitoring guidelines allow for up to 20% of the dry and wet heath habitats to contain scattered trees or woodland and small proportions of these habitats are found within Glen Nevis. These habitats are therefore likely to move into favourable condition and remain there even with localised very low herbivore impacts.

Tall herb communities and Plants in crevices on acid rocks are already found in locations out of the reach of most herbivores and so very low herbivore impacts would have no effect on their condition, or perhaps a positive effect if they are able to expand from their current locations on inaccessible crags. Acidic scree habitat is found amongst loose rock less favoured by herbivores and there is unlikely to be any effect on condition of this habitat.

Blanket bog is a priority habitat and therefore needs careful consideration. Blanket bog is benefitting from the current reductions in herbivore pressure, however there is a risk that with very low herbivore impact trees and scrub may start to colonise, though this is less likely than for wet and dry heaths given the waterlogged conditions. In Glen Nevis blanket bog is found in mosaic with other habitats, particularly in wetter pockets in areas of Wet heathland with cross- leaved heath. It tends to be found as a very low proportion of these habitat mosaics, for example for the two larger polygons with Blanket bog in Glen Nevis, this habitat is found as 1% of the habitat mosaic above the pinewood at Càthar na Seilge, and 2-5% on low ground on the east bank of the River Nevis opposite the youth hostel. There is one more

significant area of Blanket bog in Glen Nevis at Blàr Bàn, where it makes up 33% of habitat mosaic. This is a distinct area along the path on the south side of the River Nevis where Peatland Restoration is being considered, and could be kept clear of scrub/trees if these were found to be encroaching. Given the very small proportion of Blanket bog that is within Glen Nevis (0.6%), this habitat is therefore likely to move into favourable condition with the current reductions in herbivore pressure and remain there even with localised very low herbivore impacts.

Species-rich grassland with mat-grass in upland areas is also a priority habitat that needs careful consideration, and approximately 13% of this habitat on Ben Nevis SAC is found within Glen Nevis, according to HabMos. The area figure on the Standard Data Form is only 19ha, but habitat mapping has found a much larger area of this habitat on the site: an estimate of 110ha. When herbivore pressure is very low, these grasslands would not be destroyed – the management just would not be ideal for them. They are likely to change due to the low level of grazing compared to the ideal. The likely changes would vary according to the vegetation present, soils, steepness and wetness of the ground.

- Where heather and other heath species are present, they are likely to grow higher with a lower level of grazing. The heath species are present in the grassland under high levels of grazing, but are not very apparent due to being continually cropped. To the casual observer a grassland changes to a grass-heath.
- It is also likely that grasses will dominate over forbs and over time, the cover of non-grasses such as thyme etc. will decrease. In most locations the flowers will still be present, but less obvious.
- On steeper and more broken ground, tall herb species would be able to colonise the grasses below, potentially resulting in an expansion of this SAC habitat.
- In some locations where a suitable seed source exists within approximately 100m, trees may colonise the grasslands. In Glen Nevis this could result in an expansion of the Caledonian forest and the Western acidic oak woodland habitats.

Where the grassland and forest habitats are close together in Glen Nevis, the management should favour the forest, and natural processes should be allowed to take place, recognising that this is likely to change the characteristics of these habitats. The reason is that Species grasslands can be managed in other ways and will continue in other parts of the site, and grazing levels need to be kept low to allow tree regeneration which is essential to the continuity of the woodland habitats in the long term.

Outwith Glen Nevis, efforts to reduce browsing impact in the Western acidic oak woodlands above Leanachan have so far focussed on fencing rather than reducing herbivore impacts at a landscape scale. Each proposal should be assessed in a Habitats Regulations Appraisal.

Conservation Objectives

Overarching Conservation Objectives for all features of Ben Nevis SAC

1. To ensure that the qualifying features of Ben Nevis SAC are in favourable condition and make an appropriate contribution to achieving favourable conservation status
Favourable Conservation Status (FCS) is considered at a European biogeographic level. When determining whether management measures may be required to ensure that the conservation objectives for this site are achieved, the focus should be on maintaining or restoring the contribution that this site makes to FCS.

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

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

2. To ensure that the integrity of Ben Nevis SAC is restored by meeting objectives 2a, 2b and 2c for all qualifying features

The aim at this SAC is to maintain, or where appropriate restore, the protected habitats in 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 habitats are exposed to a wide range of drivers of change. Some of these are natural and are not a direct result of human influences. Such changes in the habitats' 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 exception to this is when the favourable condition of a habitat is dependent on halting or managing natural succession. 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 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels' within the site

This feature includes Lochan Meall an t-Suidhe as well as other hill lochs that have inflow and/or outflow streams and a stony, rather than a peaty, bottom.

The extent of clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat feature has been estimated at approximately 18 ha, approximately 10.7 ha of which consists Lochan Meall an t-Suidhe. The area figure has been taken from the Standard Data Form. There should be no measurable net reduction in the extent of the habitat and, 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 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'

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 lochs on this site fluctuates slightly naturally with variation in rainfall. Any longer lasting changes to surface area and the associated change to depth should be avoided as these could adversely affect the character of the loch, particularly the edge vegetation.

Changes to the surface area may also indicate a number of pressures such as abstraction, regulation, construction, excessive sediment deposition and natural succession which may occur in the catchment.

Hydrological regime

The hydrology of the loch affects water level fluctuations and 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.

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 in the catchment or on the shoreline, such as changes in run-off into Lochan Meall an t-Suidhe from the main path up Ben Nevis. 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

Dissolved oxygen in loch water is vital for respiration of all aquatic plants and animals. 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 such as Lochan Meall an t-Suidhe, should have pH of 5.5 to 7.

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. 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.

Nutrients
There should be no unnatural nutrient inputs to lochs, for example from sources such as litter or human waste. Excessive dunging by animals should be prevented by avoiding management that encourages them from congregating near lochs.

Phosphorus is one of the main nutrients required for plant growth. There is strong correlation between Total Phosphorus (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, and for shallow lochs (mean depth <3m) 20ugP/l.

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 1.5 mg/l with no increase from the baseline level where that is known.

2c. Maintain the distribution and viability of typical species of the 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'

Typical species should include:

Litorella uniflora	shoreweed
Juncus bulbosus	bulbous rush
Lobelia dortmanna	water lobelia
Subularia aquatica	awlwort
Nitella species	stoneworts
Isoetes lacustris	lake quillwort
Potamogeton polygonifolius	bog pondweed

The viability of the typical 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.

Non-native 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.

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 wet heathland with cross-leaved heath within the site

Maintain the extent of this habitat to approximately 1164 ha. The area figure has been taken from the Standard Data Form, and is an estimate.

Wet heath is present across all of the lower slopes on this site, forming mosaics with blanket bog and (in dryer areas) dry heaths and grassland. Baseline surveys will include smaller areas of other habitats. Dwarf shrub cover and structure is variable, ranging from being similar to dry heath in drier areas, and to blanket bog in wetter places. Wet heath should be restored where it has been invaded by bracken.

There should be no measurable net reduction in the extent of the habitat and its distribution throughout the site unless due to restoration to active blanket bog in areas where wet heath has formed on degraded areas of blanket bog.

2b. Restore the structure, function and supporting processes of the wet heathland with cross-leaved heath

Wet heath is sensitive to inappropriate trampling, grazing or burning that may affect the habitat structure and function in two main ways. A combination of overgrazing and burning over many years has led to creation of a grassier sward in parts of the wet heath that should be dominated by dwarf shrubs. High stocking levels (by red deer and/or livestock) should be avoided as these can also result in locally high levels of nutrient input and trampling.

Complete lack of grazing can lead to wet heath being colonised by species that are not typical of this habitat (such as dense areas of trees) if this management is continued over many years. Scattered native trees are compatible with wet heath habitat. A low level of grazing is therefore needed to maintain this habitat. Most of the grazing/browsing at this SAC is currently by red deer although parts of the site are used for grazing sheep.

Wet heath on this SAC should be restored from the long term effects of past grazing, trampling, burning and invasion by bracken. The restoration objectives of the current management are to:

- reduce levels of grazing/browsing by red deer and sheep so that the dwarf shrub cover can recover.
- restore the height structure of the vegetation by reducing grazing/browsing by red deer and sheep so that less than 1/3rd of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*) show signs of browsing.
- restore the ground cover structure of the heath by reducing trampling by red deer and sheep so that less than 10% of ground cover is disturbed bare ground (with an emphasis on 'disturbed' rather than 'bare') and less than 10% of the *Sphagnum* moss is crushed or pulled up.
- Less than 10% of this habitat should be covered by species that are not typical of wet heath, such as bracken.

Additional objectives for the structure of the habitat are:

- Minimise active drainage. No new drains should be dug and existing ones should be blocked.
- The area of bare ground should not be increased. Activities that might cause this to increase include excessive use of vehicles, introduction of heavier livestock such as cattle or increasing use of the habitat by red deer and sheep.

The goal should be no bare peat, active drains, bracken cover or non-native species. Where these are present, management should focus on reducing their extent and impact.

2c. Restore the distribution and viability of typical species of the wet heathland with cross-leaved heath

The distribution of typical plant species should be restored throughout the habitat by appropriate management of red deer and sheep, and avoiding burning (see Objective 2b).

Wet heath is an important habitat for a range of vascular plant and bryophyte species. Generally the vegetation is dominated by mixtures of cross-leaved heath, heather, grasses, sedges and *Sphagnum* bog-mosses. NVC type M15 should be widespread and extensive throughout this site.

At Ben Nevis the typical species should include:

Arctostaphylos spp	bearberry/Arctic bearberry
Calluna vulgaris	common heather
Erica cinerea	bell heather
Erica tetralix	cross leaved heath
Eriophorum angustifolium	common cottongrass
Cladonia spp	lichens
Racomitrium lanuginosum	woolly fringe-moss
Sphagnum spp	bog mosses
Trichophorum cespitosum	deer grass
Vaccinium species	several species of heath plants
Myrica gale	sweet gale

Wet heath is currently used by red deer on this site. High levels of herbivore use have damaged this habitat in the past and led to a reduction in the distribution of typical species. A low level of grazing and browsing is necessary to allow this habitat to recover and be maintained in future.

In addition, some uncommon species such as the bog-moss *Sphagnum strictum* are found in this habitat and as well as birds such as red grouse (*Lagopus l. scotica)*, golden plover (*Pluvialis apricaria*), and golden eagle (*Aquilla chrysaetos*).

Conservation Objectives for European dry heaths [H4030] (Dry heaths)

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

Maintain extent of habitat to approximately 969 ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that dry heaths can form complex mosaics with habitats such as grasslands, wet heaths and bogs. 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, mainly on steeper south-facing slopes at low to moderate altitude. This can determine the extent and distribution of

the habitat throughout the SAC, although since it is found below the tree line it is also dependant on management to maintain its extent including:

- maintaining a low level of grazing and muirburn.

- avoidance of any loss of habitat through increased extent of successional or adjacent natural habitats, afforestation or invasion by alien species.

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

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. Red deer and sheep are the main herbivores on Ben Nevis SAC, and appropriate management of their numbers and distribution across the site is important to maintain dry heath habitat whilst preventing habitat degradation from under/overgrazing or trampling. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on the dry heath habitat.

The objective for restoring dry heath on this site is to:

- restore the height structure of the vegetation in the area north of the Grey Corries from Tom na Sroine to Beinn Bhan by reducing grazing/browsing by red deer and sheep so that less than1/3 of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*) show signs of browsing.

Additional objectives for the structure of the habitat are:

- maintain reduced herbivore impacts over the rest of the feature
- 25-90% of vegetation should be dwarf shrub heath species. Heather *Calluna vulgaris* should remain the dominant species and 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.
- Current levels of disturbed bare ground should not be increased and less than 10% of the habitat should be bare, disturbed ground. Activities that might cause an increase include excessive use of vehicles, introducing heavier livestock such as cattle or increasing use of the habitat by red deer and sheep.
- Cover by species that are not typical of this habitat should not increase. Examples of inappropriate species are bracken, trees and non-native species.

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

The dry heath at Ben Nevis SAC includes NVC types H10, H12, H18 and H21 which are dominated by heather *Calluna vulgaris*, blaeberry *Vaccinium myrtillus,* crowberry *Empetrum nigrum* with some bearberry *Arctostaphylos uva-ursi*.

On the north-facing slopes of Glen Nevis, on the crags around Steall falls, there are patches of liverwort-rich *Calluna-Vaccinium-Sphagnum* heath H21b with a flora including the uncommon oceanic liverworts *Herbertus aduncus, Pleurozia purpurea, Bazzania pearsonii, Lepidozia pearsonii, Mastigophora woodsii, Plagiochila carringtonii* and *Scapania ornithopodioides*. The uncommon sub-oceanic moss *Dicranodontium uncinatum* also grows here.

This habitat is used by populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. High levels of herbivore use can damage dry heath, but a low level of grazing and browsing is necessary to maintain this habitat.

In addition, typical associated birds of upland heaths are red grouse *Lagopus l. scotica*,

golden plover *Pluvialis apricaria*, and golden eagle *Aquila chrysaetos*.

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

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

Maintain extent of the habitat to approximately 326 ha. The area figure for this SAC has been taken from the Standard Data Form, and is an estimate based on the fact that both Alpine and subalpine heaths can grade into other heath types, especially the latter into floristically-similar dry heaths. 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 mountain shoulders on the middle and upper slopes, above the tree line but below but below the alpine summit communities. 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 Alpine heath throughout the SAC. The distribution of subalpine heath is also influenced by continuation of the historic browsing/grazing that converted woodlands into subalpine heath in the past.

The habitats' long-term existence also has the potential to be affected by the effects of access and recreation on this site.

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

Alpine heath is climax vegetation in exposed and extreme conditions which result in slow growth. It is therefore very sensitive to disturbance and is slow to recover.

As with many other Scottish upland habitats, maintaining subalpine 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.

The objective for restoring Alpine and subalpine heath on this site is to:

- restore the height structure of the vegetation by reducing grazing/browsing by red deer and sheep so that less than 1/3 of the last complete growing season's shoots of dwarf-shrub species (collectively but excluding dwarf birch *Betula nana* and bog myrtle *Myrica gale*) show signs of browsing.

Additional objectives for the structure of the habitat are to maintain:

- a low level of grazing by sheep and red deer that allows typical plants (listed in 2c) to grow and set seed
- no signs of burning inside the feature boundaries
- less than 10% of the ground cover should be disturbed bare ground (the emphasis is on 'disturbed' rather than 'bare'.)
- bracken *Pteridium aquilinum* should be kept to less than 10% of the ground cover.

Alpine and subalpine heath 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 Alpine and subalpine heaths

This habitat comprises a wide range of heath types, with variation related to climate, local exposure and snow-lie. The dominant plants are dwarf-shrubs of heather *Calluna vulgaris*,

blaeberry *Vaccinium myrtillus* and crowberry *Empetrum nigrum*, which are low-growing or prostrate owing to exposure to high winds or prolonged snow cover.

On less-exposed, more sheltered ground at the lower altitudinal range of the habitat, *Calluna* generally dominates. *Calluna* is usually accompanied by other dwarf-shrubs, such as *V. myrtillus*, bell heather *Erica cinerea*, bearberry *Arctostaphylos uva-ursi* and crowberry *E. nigrum* ssp. *nigrum*. On more exposed and windswept ground, a range of dwarf-shrubs may dominate, forming an altitudinal progression. The first in the progression, and often the most extensive, are heaths dominated by *Calluna* growing in a prostrate form. At higher altitudes, where conditions are too extreme for heather, short or prostrate *Vaccinium* spp. and *E. nigrum* ssp dominate. On sheltered slopes where snow lingers, the dominant shrub is *V. myrtillus*, which is either the sole dominant or grows with *E. nigrum*, dwarf cornel *Cornus suecica* and cloudberry *Rubus chamaemorus*.

Woolly fringe-moss *Racomitrium lanuginosum*, bell heather *Erica cinerea* and Atlantic liverworts and mosses may be abundant as well as mountain bearberry *Arctostaphylos alpinus* and trailing azalea *Loiseleuria procumbens* Different structural forms of heath can 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 subalpine heaths the action of solifluction creates unstable soils, which provide more plant nutrients and maintain open conditions. These conditions favours the growth of plants such as 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.

Uncommon species such as bog whortleberry *Vaccinium uliginosum* and juniper *Juniperus communis* ssp. *nana* can be found in some parts of this habitat.

This habitat is used by populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. High levels of herbivore use can damage heaths, but a low level of grazing and browsing is necessary to maintain this habitat.

Ptarmigan *Lagopus muta*, dotterel *Charadrius morinellus*, golden eagle *Aquila chrysaetos* and snow bunting *Plectrophenax nivalis* also use this habitat.

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

2a. Maintain the extent and distribution of mountain willow scrub within the site

Maintain the extent of existing mountain willow scrub at approximately 1 ha. The area figure has been taken from the Standard Data Form, and is an estimate.

This habitat is found on the limestone and calcareous schist of Meall Cumhann, Coire Giubhsachan, Sgurr a' Bhuic, Aonach Beag and in the Grey Corries. Most of this habitat occurs as small discrete stands in steep areas that are less accessible to herbivores. Baseline estimates of habitat area may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision. The currently reduced level of grazing does, however, give this habitat the opportunity to expand.

2b. Maintain the structure, function and supporting processes of mountain willow scrub

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

Over-grazing/browsing is believed to have reduced and restricted the occurrence of this habitat on Ben Nevis in the past, although it appears to have benefited from recently reduced grazing levels and may have the potential to spread. Low levels of grazing/browsing should be maintained and agile herbivores, such as goats, should not be introduced. Excessive trampling should be avoided as this can also damage the habitat.

This habitat is very sensitive to burning, which should be avoided where mountain willow scrub is found.

2c. Maintain the distribution and viability of typical species of mountain willow scrub

This habitat consists of stands of downy *Salix lapponum* (NVC type W20). It comes in two forms: one acid with *Vaccinium* species and abundant *Racomitrium lanuginosum*, and one basic, with a rich array of tall herbs and grasses. Although most patches are individually small, W20 is the predominant type of vegetation on one large cliff on the eastern side of Aonach Beag. The distribution and viability of downy willow should be maintained.

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.

The willows grow among a rich mixture of dwarf shrubs, grasses, rushes and broad-leaved herbs, such as:

blaeberry	*Vaccinium myrtillus*
tufted hair-grass	*Deschampsia cespitosa*
great wood-rush	*Luzula sylvatica*
Alpine lady's-mantle	*Alchemilla alpina*,
holly fern	*Polystichum lonchitis*,
Arctic mouse-ear	*Cerastium arcticum*
Alpine mouse-ear	*C. alpinum*
Alpine speedwell	*Veronica alpina*
three-flowered rush	*Juncus triglumis*
russet sedge	*Carex saxatilis*

Since this habitat is small and fragmented, maintenance of the typical species needs to be managed as part of the wider site management.

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

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

This is a widespread, high altitude habitat found on the high exposed terrain of Aonach Mor, Aonach Beag and the ridges of the Grey Corries. It is associated with summit plateaux, ridges, corries and late-lie snow beds.

The area of montane acid grassland should be maintained to approximately 1286 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.

There should be no measurable net reduction the extent of the habitat and its distribution throughout the site.

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 montane acid grasslands

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

Montane acid grassland at Ben Nevis should continue to be restored to favourable condition by maintaining reduced grazing levels across most of the site (following removal of most of the sheep) and further reducing grazing by sheep and red deer in the Grey Corries area.

Grazing levels by sheep and red deer should be low enough throughout the habitat that typical plants (listed in 2c) are able to grow and set seed. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on montane acid grasslands.

Less than 10% of the ground cover should be disturbed bare ground (the emphasis is on 'disturbed' rather than 'bare'.)

Montane acid grasslands 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 montane acid grasslands

This feature includes extensive *Carex bigelowii – Racomitrium lanuginosum* moss-heath (NVC type U10) on the summit plateau of Aonach Mór. This grades into *Juncus – Racomitrium* rush-heath (NVC type U9) dominated by three-leaved rush *Juncus trifidus* where exposure is more severe or the substrate unstable. These communities are also found around the edges of high plateaux on steep slopes where a snow cornice develops in high corries or in gullies where deep snow accumulates. The normal dominant *Racomitrium lanuginosum* is in part replaced on Aonach Mór by *R. canescens*. The *R. canescens* is associated with open, wind-blown sandy areas where there is active erosion and deposition of sand caused by the exceptionally high altitude and exposure. Other wind-eroded areas among *Carex – Racomitrium* moss-heath may be colonised by three-leaved rush *Juncus trifidus*, and the national rarity curved wood-rush *Luzula arcuata*. Other arctic-alpine plants frequently found in the *Carex – Racomitrium* moss-heath include least willow *Salix herbacea*, spiked wood-rush *Luzula spicata,* moss campion *Silene acaulis* and the lichens *Solorina crocea* and *Thamnolia vermicularis*

This feature also includes several other habitats such as extensive *Nardus stricta – Carex bigelowii* grass-heath (NVC type U7) which is found mostly in corries and in hollows on ridges where snow lies late. *Carex bigelowii – Polytrichum alpinum* (NVC type U8) sedge-heath occurs on high plateaux and summits where snow lies late in hollows. These communities are associated with extensive moss-dominated late-lie snow beds (NVC type U11 *Polytrichum sexangulare – Kiaeria starkei* and NVC type U12 *Salix herbacea –*

Racomitrium heterostichum snow-beds). The longest lying snow-beds (*Polytrichum – Kiaeria* snow-bed, *Salix – Racomitrium* snow-bed and *Alchemilla – Sibbaldia* dwarf-herb community) are dominated by mosses and hardy herbs and they contain several uncommon species such as *Juncus trifidus*, *Luzula spicata*, *L. arcuata*, *Sibbaldia procumbens*, *Gnaphalium supinum*, *Cerastium cerastioides*, *C. arcticum*, *Veronica alpina*, *Saxifraga cernua*, *Poa alpina*, *P. glauca*, *Kiaeria* spp., *Oedipodium griffithianum*, *Conostomum tetragonum*, *Marsupella* spp. and *Pleurocladula albescens*. There are also patches of *Alchemilla alpina-Sibbaldia procumbens* snow-bed vegetation (NVC type U14) which should contain uncommon species such as *Sibbaldia procumbens.*

Montane acid grassland also include six other scarce montane vegetation types that are not described in the NVC: *Racomitrium ericoides* moss heath (scarce on Aonach Mór, Aonach Beag and the Carn Dearg ridge), *R. heterostichum* snow-bed (scattered on high north-facing to east-facing slopes), *Pohlia ludwigii* snow-bed (scattered on high north-facing to east-facing slopes), UX mixed snow-bed (a particularly species-rich habitat found on high north-facing to east-facing slopes on Aonach Mór and the Carn Dearg ridge), *Luzula spicata* swards (rare on Aonach Mór) and lichen heath (rare on Ben Nevis). Various uncommon species such as three-leaved rush *Juncus trifidus*, spikes woodrush *Luzula spicata*, sibaldia *Sibbaldia procumbens*, creeping cudweed *Gnaphalium supinum*, lesser bulbous saxifrage *Saxifraga cernua*, Alpine speedwell *Veronica alpina*, the mosses *Polytrichum sexangulare*, *Conostomum tetragonum* and the liverwort *Marsupella brevissima*.

Typical species found in montane acid grassland should include:

Alchemilla alpina	alpine lady's mantle
Carex bigelowii	stiff sedge
Cetraria islandica	Iceland moss lichen
Cladonia species	lichens
Dicranum fuscescens	dusky fork-moss
Empetrum nigrum ssp. hermaphroditum	crowberry
Gnaphalium supinum	dwarf cudweed
Juncus trifidus	three-leaved rush
Kiaeria starkei	Starke's fork-moss
Nardus stricta	mat-grass
Polytrichum alpinum	alpine haircap
Ptilidium ciliare	ciliated fringewort
Racomitrium lanuginosum	wooly fringe-moss
Rhytidiadelphus loreus	little shaggy-moss
Salix herbacea	dwarf willow

Red deer and mountain hare use this habitat for grazing and birds such as ptarmigan, dotterel and snow bunting can be found here.

Conservation Objectives for Alpine and subalpine calcareous grasslands [H6170]

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

Alpine and subalpine calcareous grasslands occur on base-rich soils within Ben Nevis SAC on Meall Cumhann, on the eastern side of Coire Giubhsachan, on the Agaidh Garbh, in Coire a' Mhadaidh and on Beinn na Socaich.

The objective is to maintain the extent of the habitat to approximately 9 ha. The area figure

has been taken from the Standard Data Form, and is an estimate based on the amount and complex mosaic of several different high altitude communities. 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 montane willow scrub and tall herb communities. They can also give way to species-rich grasslands with mat-grass on more siliceous substrates. 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. Where there is strong base-rich flushing they grade into high-altitude plant communities associated with areas of water seepage and on rocky ground to plants in crevices on base-rich rocks or plants in crevices on acid rocks.

There should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

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

Whilst these grasslands, especially the *Dryas octopetala – Silene acaulis* ledge community, are amongst the most near-natural habitats remaining in the UK, they are very sensitive to certain pressures. The main elements that affect the habitat are under-grazing, over–grazing and damage from trampling. Levels of grazing that are too high may also facilitate creation of a grass sward at the expense of some of the other plants listed in section 2c.

Alpine and subalpine calcareous grassland on this SAC should continue to be restored from the long term effects of high levels of grazing and trampling in the past. The restoration objective of the current management is to have stocking levels that are low enough to reduce the amount of disturbed bare ground to less than 10% of the ground cover.

A distinctive characteristic of this habitat should be the high proportion of dwarf forbs to grasses accompanied by a relatively high proportion of mosses in the sward. Appropriate (low) levels of grazing should allow the typical plants listed in section 2c to grow, flower and set seed.

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

The site contains moderately extensive areas of both *Festuca ovina – Alchemilla alpina – Silene acaulis* dwarf-herb community (NVC type CG12) and *Dryas octopetala – Silene acaulis* ledge community (NVC type CG14). There is also some borderline CG11-12 habitat (CG11 is *Festuca ovina - Agrostis capillaris - Alchemilla alpina grass-heath*). These habitats should have a moderately rich arctic-alpine flora including alpine mouse-ear *Cerastium alpinum*, arctic mouse-ear *Cerastium arcticum*, rock sedge *Carex rupestris*, hair sedge *C. capillaris*, mossy saxifrage *Saxifraga hypnoides* and alpine meadow-rue *Thalictrum alpinum*. Where there are relatively low grazing levels on the northern slopes of Ben Nevis, the high-altitude *Dryas* heath community can be found on the open hillside, rather than being restricted to inaccessible ledges.

On open slopes, montane cushion herbs, especially moss campion *Silene acaulis*, and other small herbs form *Festuca – Alchemilla – Silene* dwarf-herb community. Arctic-alpines dominate here, usually moss campion *Silene acaulis* and alpine lady's-mantle *Alchemilla alpine* as well as sheep's fescue *Festuca ovina* being abundant. Mountain avens *Dryas octopetela* is found here mixed with a wide range of arctic-alpine species.

Other typical species for Alpine and subalpine calcareous grasslands should also include:

Carex flacca	glaucous sedge
Carex pulicaris	flea sedge

Linum catharticum	fairy/purging flax
Lotus corniculatus	common bird's-foot-trefoil
Luzula spicata	spiked wood-rush
Plantago maritima	sea plantain
Persicaria vivipara	alpine bistort
Salix reticulata	net-leaved willow
Saxifraga aizoides	yellow mountain saxifrage
Saxifraga oppositifolia	purple saxifrage
Selaginella selaginoides	lesser clubmoss
Sibbaldia procumbens	least cinquefoil
Thymus polytrichus	wild thyme
Veronica alpina	Alpine speedwell

Uncommon species such as Scottish aspodel *Tofieldia pusilla*, spiked woodrush *Luzula spicata* and downy willow *Salix lapponum* can also be found here as well as red deer, mountain hare and birds such as ptarmigan, dotterel and snow bunting.

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 species-rich grasslands with mat-grass in upland areas within the site

The area of this habitat should be maintained at at least 19 ha. The area figure has been taken from the Standard Data Form, and is an estimate because species-rich *Nardus* grasslands can grade into Alpine and subalpine calcareous grasslands or tall herb ledge communities. Habitat mapping in fact shows a far greater extent of species-rich *Nardus* grasslands than is on the dataform: an estimate of 110 ha based on HabMos. There should be no measurable net reduction in the extent of the habitat and its distribution throughout the site. These grasslands occur in localised areas within the site on base-enriched rocky slopes where calcareous schists outcrop or in spreads of gravel associated with stream beds. They are found on the steep, south-facing slopes of Ben Nevis, on the west side of Carn Dearg and Meall an t-Suidhe, on Meall Cumhann, on the east side of Coire Giubhsachan, and on the slopes of Beinn na Socaich and Stob Coire Gaibhre. They are also found the west side of Ben Nevis, onSgurr a' Bhuic and Sgurr Chòinnich Beag, and on Beinn na Sochaich

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 species-rich grasslands with mat-grass in upland areas

As with many upland habitats maintaining Species-rich grasslands with mat-grass in upland areas is mainly reliant on appropriate levels of grazing. Overgrazing should be avoided as this can lead to local trampling and an increase in the proportion of grasses at the expense of forbs other than unpalatable species such as selfheal *Prunella vulgaris*.

In contrast to most other habitats on Ben Nevis SAC, species-rich grassland with mat-grass should be restored by increasing the level of grazing. The current low level of grazing favours succession to a tall herb plant community.

The height structure of the habitat should be restored by increasing grazing levels so

- 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

- Less than 10% of the ground cover should be a thatch of dead plant litter

The structure of the habitat should be also maintained such that

- 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.
- Less than 10% of ground cover should be disturbed bare ground.

Trampling from walkers and hill runners can contribute to deterioration in the habitat structure. This has been a particular issue on the 'grassy bank' where hill runners and walkers take short cuts off the main summit path around the Allt na h-Urchaire or Red Burn. Work should continue to ensure organised races avoid this area and walkers are encouraged to use the constructed paths.

2c. Restore the distribution and viability of typical species of the species-rich grasslands with mat-grass in upland areas

The species composition and distribution should be restored on this site by allowing the habitat to recover from the long term effects of over-grazing, which has caused the sward to lose diversity and become overly dominated by grasses. Swards should have a complex mosaic of grasses, small herbs and bryophytes.

The species-rich grassland with mat-grass on this site should be a mixture of *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland (NVC type CG10) and *Festuca ovina-Agrostis capillaris-Alchemilla alpina* grassland (NVC type CG11) with occasional stands of a herb-rich variant of *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland (NVC type U4) and the flushed variant of *Nardus stricta* grassland (U5c).

Typical species found in species-rich grassland with mat grass in upland areas should include:

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

Uncommon species found here should include Alpine meadow rue *Thalictrum alpinum*, moss

campion *Silene acaulis*, Scottish asphodel *Tofieldia pusilla*, hair sedge *Carex capillaris* and mountain avens *Dryas octopetala*.

This is an important habitat for lepidoptera, including the Small mountain ringlet butterfly *Eribia epiphron scotica,* a feature of Ben Nevis Site of Special Scientific Interest.

This habitat is used by as red deer, mountain hare and birds such as ptarmigan, dotterel and snow bunting.

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 tall herb communities within the site

The area of this habitat should be maintained at approximately 1 ha (the extent at classification stated on the Standard Data Form).

Small patches of tall herb communities should be widespread on steep, rocky slopes within Ben Nevis SAC. However, the current reduced levels of grazing across much of the site may provide an opportunity for this habitat to spread.

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 tall herb communities

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. The reduced grazing levels on Ban Nevis SAC provide an opportunity for this scarce habitat to expand. Introduction of additional grazing pressure, especially from highly agile species such as goats, should be avoided as this would cause major losses.

The following conditions should be met when grazing/browsing is low enough to allow survival of component species of the habitat and to maintain the habitat's structure:

- 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 (in summer) or showing signs of being able to flower.
- Less than 50% of live flowering shoots of indicator tall herbs (see below in section 2c for list) should show evidence of grazing.

The structure of this habitat can also be impacted by succession from tall-herb communities to woodland. This is not happening at Ben Nevis at present, but if it were to happen in future it could be controlled by additional grazing.

The following conditions should be met when appropriate levels of disturbance are in place, to allow for survival of component species of the habitat throughout the site:

- 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 tall herb communities

This vegetation is represented by the *Luzula sylvatica-Geum rivale* tall herb ledge (NVC type U17) within which there is usually some roseroot *Sedum rosea,* wild angelica *Angelica sylvestris* and lady's-mantle *Alchemilla* species*.*

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. Agile herbivores, such as goats, should not be introduced to this site as they would be likely to damage this habitat.

Other species typically found in tall-herb communities at Ben Nevis SAC should include:

Filipendula ulmaria	meadowsweet
Galium boreale	northern bedstraw
Geranium sylvaticum	wood crane's-bill
Geum rivale	water avens
Hieracium spp*.*	hawkweeds
Luzula sylvatica	great wood-rush
Oxyria digyna	mountain sorrel
Persicaria vivipara	Alpine bistort
Saussurea alpina	alpine saw-wort
Solidago virgaurea	goldenrod
Succisa pratensis	devil's-bit scabious
Trollius europaeus	globe-flower
Valeriana officinalis	common valerian
Calluna vulgaris	common heather
Empetrum nigrum	crowberry
Vaccinium spp.	

Uncommon plants found here include downy willow *Salix lapponum*, lesser bulbous saxifrage *Saxifraga cernua*, Alpine saxifrage *S. nivalis*, Alpine meadow-rue *Thalictrum alpinum*, Alpine scury grass *Cochlearia pyrenaica* ssp. *alpina*, moss campion *Silene acaulis*, Alpine meadow grass *Poa alpina*, glaucous meadow grass *P. glauca*, sibbaldia *Sibbaldia procumbens*, the mouse-ears *Cerastium cerastioides*, *C. alpinum*, *C. arcticum* and Alpine speedwell *Veronica alpina* as well as the bryophytes *Moerckia blyttii*, *Scapania uliginosa*, *Marsupella alpina*, *M. adusta*, *M. brevissima*, *Anthelia juratzkana, Pleurocladula albescens, Diplophyllum taxifolium, Philonotis seriata, Oedopodium griffithianum, Polytrichum sexangulare*, *Pohlia wahlenbergii* ssp. *glacialis*, *P. ludwigii*, *Kiaeria glaciale, Orthothecium rufescens* and *Conostomum tetragonum*.

Conservation Objectives for Blanket bog [7130]

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

Maintain the total extent of blanket bog at approximately 587 ha. The area of blanket bog is an estimate taken from the Standard Data Form.

Blanket bog should remain widespread and extensive on this site, covering very large areas, forming complex mosaics with other wetland habitats as well as heath and grass habitats in drier areas. On Ben Nevis SAC the blanket bog feature is scattered across the site, where broader areas of flat to gently sloping ground are present, e.g. to the north-west of Ben Nevis around the Allt a Mhuillin catchment, on the valley basin around the headwaters of the Water of Nevis and on gentle slopes throughout the Grey Corries.

There should be:-

- No measurable net reduction in the extent of the habitat on the site
- Maintenance of the appropriate level of grazing.
- Avoidance of the effects that could lead to a permanent reduction in the extent or distribution of the habitat, or that prevent its recovery through burning, overgrazing, agricultural improvement e.g. liming and fertilising, or other forms of degradation.
- Avoidance of any loss of habitat through increased extent of adjacent natural habitats, afforestation or invasion by alien species.
- Appropriate management of the effects of access and recreation
- Extents, distributions and patterns of mosaics therefore need to be assessed in relation to the expectation for each site. Where recovery is the issue these should not differ significantly from those expected under the particular physical and climatic conditions anticipated for the geographical location of the site.

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

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, 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 landslips.

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 to maintain a natural, diverse and open sward of typical plant species by avoiding overgrazing that affects habitat condition, or undergrazing.

- Reduce active drainage through targeted ditch damming and peat reprofiling as appropriate

- Burning should be avoided, but where it is considered necessary e.g. for wild fire control, agreed good practice should be adhered to, as set out in the Muirburn Code

Herbivore impacts have been greatly reduced with the removal of a large proportion of livestock in 2003. Additionally, alterations to the Mid West Deer Management Plan should also make a marked difference to the condition of the notified features including blanket bog.

Areas that would benefit from peatland restoration have been identified; applications have been submitted to Peatland Action but unfortunately, due to the inaccessible locations and associated high costs, funds have not yet been approved.

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

On the lower slopes of Ben Nevis, the blanket bog is mostly represented by the *Trichophorum cespitosum-Eriophorum vaginatum* community (NVC type M17); *Molinia caerulea* was abundant in the sward giving a grassy appearance although *Calluna vulgaris* and other dwarf shrubs were frequent (although suppressed) and *Myrica gale* was quite frequent. The *Calluna vulgaris-Eriophorum vaginatum* community (NVC type M19) is found higher in the range. There are occasional hags and pools.

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 ossifragum* and the carnivorous sundews *Drosera* species.

Other typical species should include:
Arctostaphylos spp
Betula nana
Carex bigelowii
Cornus suecica
Erica spp.
Empetrum nigrum
Menyanthes trifoliate
Myrica gale
Non-crustose lichens
Pleurocarpous mosses
Racomitrium lanuginosum
Rubus chamaemorus
Rhynchospora alba
Trichophorum cespitosum
Vaccinium spp

Conservation measures should aim to restore conditions suitable for these species. 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 to moderate grazing by livestock and/or wild herbivores, sufficient to maintain a diverse open structure but without causing surface damage/erosion, loss of more grazing-sensitive species or preventing plants from growing and setting seed.

This habitat is used by red deer, water voles and birds such as golden eagle, red grouse and

golden plover.

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

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

These mires should remain widespread and common on the middle and upper slopes in the study area. The extent of high-altitude plant communities associated with areas of water seepage should be maintained at approximately 1 ha (the area stated on the Standard Data Form).

On Ben Nevis SAC this habitat is found where there are outcrops of calcareous rock, for example on the slopes of Aonach Beag and the Grey Corries. This habitat forms mosaics and shows complex transitions to other upland habitat types, so 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. Maintain the structure, function and supporting processes of the 'high altitude plant communities associated with water seepage' habitat

This habitat forms mosaics and shows complex transitions to other upland habitats types and is maintained by the hydrology and well as 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.

Soft, wet ground such as high altitude plant communities associated with water seepage tends to be more sensitive to damage from trampling than the surrounding, drier, habitats. Levels of poaching/trampling by red deer, livestock and people should low enough to keep areas of disturbed bare ground to less than 10% of each flush. (Note: the emphasis is on avoiding 'disturbed' ground rather than all 'bare' ground as at high altitude, levels of vegetation cover may be naturally low).

There should be some grazing to maintain an open habitat structure but levels of grazing should be low enough to avoid associated damage from trampling and low enough to allow typical plants listed in 2c to grow, flower and set seed.

This habitat is sensitive to muirburn, which should be avoided in these areas.

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

This habitat consists of Carex demissa – Saxifraga aizoides mires (NVC type M11), Carex saxatilis mires (NVC type M12) and those Carex dioica – Pinguicula vulgaris mires (NVC type M10) with arctic-alpine species. It is characterised by the presence of Scottish asphodel *Tofieldia pusilla*.

Other typical species should include brown mosses*;* carnation sedge *Carex panicea;* three-flowered rush *Juncus triglumis;* bog asphodel *Narthecium ossifragum,* common butterwort *Pinguicula vulgaris;* purple mountain saxifrage Saxifraga oppositifolia and alpine meadow-rue

Excessive grazing/browsing/trampling by deer and/or livestock and trampling by people should be avoided as this could contribute to a deterioration in the habitat structure, leading to a reduction or loss in the typical species.

A variety of the birds living at high altitude on Ben Nevis SAC such as dotterel, ptarmigan, ring ouzel and snow bunting are likely to feed, drink and bathe here.

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

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

The extent of the acidic scree feature has been estimated at approximately 1118 ha (the area stated on the Standard Data Form). This should be maintained.

This site contains extensive screes of quartizite and granite on frost-shattered ridges and the high, steep slopes. Due to its sometimes fragmentary nature, and transitions to other surrounding habitats, and because it is found on steep ground, baseline area 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. This habitat is formed from scree that has weathered from outcrops where the 'plants in crevices on acidic rock' habitat is found.

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

Scree is intrinsically unstable and rocks move frequently on the steeper parts of the feature, so this habitat is naturally adapted to a certain level of disturbance due to rock movement. Acidic scree is also vulnerable to excessive disturbance. Inappropriate grazing regimes have the potential to harm this feature through over-grazing and trampling damage. Red deer (and to a lesser extent) sheep are the main herbivores on Ben Nevis SAC. Inaccessibility means that they have limited effects on larger, steeper areas of acidic scree habitat, particularly where there are larger boulders. However deer and sheep can reach acidic scree habitat on frost-shattered ridges and where it occurs in a mosaic with grassland or heath. Mountain hares also use this habitat, but due to their relatively small size and population, they currently have little effect on this habitat. Agile herbivores, such as goats, should not be introduced to this site as they would be likely to damage parts of this habitat that are currently inaccessible to grazing animals.

Colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion should be avoided as this can reduce or eliminate cover of indicator species, including bryophytes. Fire is unlikely to spread easily in this habitat due to the sparse vegetation and rocky ground, however acidic scree should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.

Trampling from walkers and hill runners can contribute to deterioration in the habitat structure by moving stones more frequently than plants are able to recolonise the disturbed ground, this is exacerbated if walkers and hill runners deliberately slide down scree slopes. On Ben Nevis SAC, most hillwalkers typically stick to a small number of routes, so only a small proportion of the habitat is affected.

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

Acidic scree should include an abundance of acid rock-loving species in high-altitude glacial troughs, corries and on summit ridges. This habitat includes NVC types U18 and U21 and should be colonised by a range of pioneer snow-bed scree species such as parsley fern *Cryptogramma crispa* and alpine lady-fern *Athyrium distentifolium*. There should also be a number of arctic-alpine vascular plants such as heath bedstraw *Galium saxatile* curved wood-rush *Luzula arcuata*, wavy meadow-grass *Poa flexuosa*, hare's-foot sedge *Carex lachenalii*, alpine tufted hair-grass *Deschampsia alpina*, starwort mouse-ear *Cerastium cerastoides*, alpine speedwell *Veronica alpina* and Highland saxifrage *Saxifraga rivularis*. Acidic scree should contain other scarce species including oceanic and snow-bed

bryophytes such as *Anastrophyllum donnianum, Bazzania pearsonii, Scapania ornithopodioides, S. nimbosa* and *Plagiochila carringtonii*.

Excessive grazing/browsing/trampling by deer and/or livestock and trampling by people should be avoided as this could contribute to a deterioration in the habitat structure, leading to a reduction or loss in the typical species.

This habitat is used by mountain hare, ring ouzel, ptarmigan, dotterel and snow bunting.

Conservation Objectives for Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) [H8120] (Base-rich scree)

2a. Maintain the extent and distribution of base-rich scree within the site

The extent of the base-rich scree feature has been estimated at approximately 93 ha (the area stated on the Standard Data Form). This should be maintained.

Patches of this habitat occur scattered from low to high altitudes on this site where there are exposures of Ballachulish limestone or calcareous schist, mainly on the western and north-eastern slopes Aonach Beag but also near the Ben Nevis path and in Coire Giubhsachan.

Due to its sometimes fragmentary nature, and transitions to other surrounding habitats, and because it is often found on steep ground, baseline area 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. This habitat is formed from scree that has weathered from outcrops where the 'plants in crevices on base-rich rocks' habitat is found.

2b. Maintain the structure, function and supporting processes of base-rich scree

The structure, function and supporting processes of this habitat should be maintained in the same way as described in Objective 2b for acidic scree.

2c. Maintain the distribution and viability of typical species of base-rich scree

This habitat consists of assemblages of calcicole and basiphilous species, the composition of which is heavily influenced by altitude. The main arctic-alpine species found in this habitat on Ben Nevis SAC should include Alpine Lady's mantle *Alchemilla alpina,* wood-sorrel *Oxalis acetosella,* holly fern *Polystichum lonchites*, purple saxifrage *Saxifraga oppositifolia*, yellow mountain saxifrage *Saxifraga aizoides*, glaucous meadow-grass *Poa glauca*, mountain sorrel *Oxyria digyna* and Highland saxifrage *Saxifraga rivularis*.

This habitat is used by mountain hare, ptarmigan, ring ouzel, dotterel and snow bunting.

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

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

The extent of the plants in crevices on acid rocks feature should be maintained at approximately 745 ha (as stated on the Standard Data Form).

Due to the widespread but sometimes fragmentary nature of this habitat, and the steep ground where it is often found, current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision.

On Ben Nevis SAC this habitat is closely associated with acidic scree.

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

This habitat is found in harsh and sometimes extreme conditions with limited soil development. Plants are sparse and scattered and often limited to where there is some shelter and moisture. Some of the plant species that grow mainly in crevices in rocks 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 should be avoided as this could reduce or eliminate cover of typical species including bryophytes.

This habitat is not particularly attractive to grazing/browsing animals such as red deer or sheep as the vegetation is sparse and inaccessible due to the rocky ground. However, it is sensitive to over-grazing and trampling damage. Introduction of agile herbivores (such as goats) should not be introduced to the site as they would have potential to damage this habitat.

Trampling by climbers can contribute to deterioration in the habitat structure, having harmful effects on the typical species. On Ben Nevis SAC, hillwalkers and climbers typically stick to a small number of routes, so only a small proportion of the habitat is affected.

Fire is unlikely to spread easily in this habitat due to the sparse vegetation and rocky ground, however it should not be burnt to avoid damage to the structure, function and supporting processes of plants in crevice on acid rocks.

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

This habitat should typically have a limited number of species, most of which may also occur in other adjacent habitats, with mosses and ferns often prominent. Alpine speedwell *Veronica alpine,* spiked wood-rush *Luzula spicata* and hares-foot sedge *Carex lachenalii* should be amongst the plants found here.

Excessive grazing, browsing and trampling by deer and/or livestock can contribute to deterioration in the habitat structure, having harmful effects on the typical species. Herbivore numbers should be controlled to an appropriate (low) level that helps to maintain the habitat by preventing colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion. Equally, grazing levels should be low enough that typical plants can grow, flower and set seed. Shading should be avoided as this reduce or eliminate cover of indicator species, including bryophytes.

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

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

The extent of the plants in crevices on base-rich rocks feature has been estimated at approximately 75 ha (as stated on the Standard Data Form). This should be maintained.

Due to the fragmentary nature of this habitat, and the very steep ground on which is it typically found, current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater

precision. On Ben Nevis SAC this habitat is found on mountain slopes and ridges where there are bands of calcareous rock such as where there are base-rich outcrops on Meall Cumhann, Aonach Beag and Beinn na Socaich.

This habitat is found in a mosaic with tall herb communities and mountain willow scrub as well as being associated with base-rich scree.

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

The structure, function and supporting processes of this habitat should be maintained in the same way as described in Objective 2b for 'plants in crevices on acid rocks'.

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

A number of rare species are found in this habitat on Ben Nevis SAC. The distribution and viability of these notable populations should be maintained. Species that should be found in this habitat should include tufted saxifrage *Saxifraga cespitosa*, drooping saxifrage *S. cernua* and Highland saxifrage *S. rivularis,* glaucous meadow-grass *Poa glauca*, alpine meadow-grass *Poa alpina*, arctic mouse-ear *Cerastium arcticum* and alpine saxifrage *Saxifraga nivalis* rose-root *Sedum rosea*, alpine scurvygrass *Cochlearia pyrenaica* ssp. *alpina*, mountain sorrel *Oxyria digyna*, holly fern *Polystichum lonchitis*, mossy saxifrage *Saxifraga hypnoides* Alpine saxifrage *S. nivalis*, Alpine rivulet saxifrage *S. rivularis* and purple saxifrage *S. oppositifolia*.

Typical species for this habitat on this site should include brittle bladder-fern *Cystopteris fragilis;* holly fern *Polystichum lonchitis;* wild thyme *Thymus polytrichus*, roseroot *Roseroot Sedum rosea* and alpine speedwell *Veronica alpina*.

Conservation Objectives for Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] (Western acidic oak woodland)

2a. Maintain the extent and distribution of western acidic oak woodland within the site

The area of western acidic oak woodland should be maintained where it is found within Ben Nevis SAC on the well-drained lower slopes in the north of the site and in Glen Nevis. NVC type W11 woodland is found at several locations within the SAC in a mosaic with other woodland types. NVC type W17 woodland occurs along the Allt a' Mhuilinn and on the southern slopes above the Water of Nevis. It is also a major component of the Polldubh woods.

The extent of the western acidic oak woodland feature, taken from the Standard Data Form, has been estimated at approximately 345 ha. This should be maintained or allowed to increase through natural regeneration; 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 levels of grazing that are too high to allow seedlings to develop into mature trees and 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. Restore the structure, function and supporting processes of western acidic oak woodland

This habitat should comprise a range of woodland types with mixtures of trees including oak. The tree cover should:

- have a structure including young, mature, dying and dead trees in dense thickets and open glades with a range of shade cast on the woodland floor.
- be dominated by variable proportions of tree species with the characteristics (shade, leaf decay, structure, bark pH and obligate/associated dependent species) of oak and birch, with holly and in some places hazel as a lower shrub. There should be long lived trees growing to large dimensions with a variety of niches including furrowed bark, rot-holes, large slow-decaying snags and deadwood.

The field layer should be characterised by ericoid shrubs and grasses together with a diversity of ferns, lichens and bryophytes.

These characteristics can be achieved by ensuring an abundance of key tree and shrub species, and absence of invasive species such as rhododendron, and grazing levels that allow trees, shrubs and ground flora to grow, flower and fruit naturally.

Woodlands are extremely complex ecosystems, and in order to restore the structure, function and processes supporting the habitat the key elements that should be in place include:

- Canopy cover should be around 50% overall in the woodland, although some variation in density with open glades as well as denser areas of trees is desirable.

- The understory should be maintained with species such as new shoots from hazel trees, honeysuckle scrambling along the ground, holly and bramble.

- There should be low levels of herbivore impacts throughout the site to facilitate regeneration and growth of trees, shrubs, herbs, bryophytes and lichens, maintain low levels of ground disturbance and assist with structural woodland variation. Recent surveys suggest that herbivore impacts need to be reduced in Glen Nevis, Coire an Eoin and Coire Chomhlidh where grazing is limiting tree regeneration.

- Invasive non-native species such as Rhododendron should not be introduced to the site.

- Invasive native species such as bracken should be controlled if their spread starts to restrict growth of the woodland species listed in 2c.

2c. Maintain the distribution and viability of typical species of western acidic oak woodland

This habitat includes the NVC types:

- W11 Quercus petraea – Betula pubescens – Oxalis acetosella woodland
- W17 Quercus petraea – Betula pubescens – Dicranum majus woodland

The canopy should be birch *Betula pubescens*, with smaller amounts of oak *Quercus petraea*, rowan *Sorbus aucuparia*, holly *Ilex aquifolium*, hazel *Corylus avellana* as well as some alder *Alnus glutinosa* and ash *Fraxinus excelsior*.

The field layer under canopy should be dominated by woodland herbs, ferns and grasses.

Constant species should include:-

Vaccinium myrtillus	blaeberry
Oxalis acetosella	wood-sorrel
Potentilla erecta	common tormentil
Viola riviniana	dog-violet
Holcus mollis	creeping soft-grass
Agrostis capillaris	common bent
Anthoxanthum odoratum	sweet vernal grass
Deschampsia flexuosa	wavy hair-grass
Hylocomium splendens	glittering wood-moss
Rhytidiadelphus squarrosus	springy turf-moss
Thuidium tamariscinum	comon tamarisk-moss
Polytrichum formosum	bank haircap

Western acidic oak woodland should continue to support an important component of Britain's oceanic bryophyte flora and lichen mycota which should, in some parts of the woodland, cover every surface. Species found here should continue to include common bryophytes such as *Isothecium myosuroides, Hypnum jutlandicum, Racomitrium lanuginosum, Rhytidiadelphus loreus, Hylocomium splendens, Sphagnum quinquefarium* and the liverworts *Diplophyllum albicans* and *Frullania tamarisci* as well as filmy fern *Hymenophyllum wilsonii and* the uncommon oceanic liverworts *Scapania ornithopodioides, Plagiochila carringtonii, P. atlantica, Bazzania pearsonii* and *Mastigophora woodsii*. The distribution and viability of these assemblages should be maintained with particular focus on nationally rare, scarce and/or threatened species and on assemblages that indicate a long period of ecological continuity.

Red deer use this habitat for shelter and foraging, particularly in winter. Low levels of use by red deer helps to maintain the diversity of plant species, including allowing tree regeneration. Other mammals that are found here include pine marten and wildcat and a variety of small birds such as redstart, tree pipit, willow warbler, wood warbler, coal tit, great tit, robin and wren.

Conservation Objectives for Caledonian forest [91C0]

2a. Maintain the extent and distribution of Caledonian forest within the site

Caledonian Forest is found scattered in patches among the more extensive birch-dominated woods of Glen Nevis. The area of the forest should be maintained at approximately 28 ha (the extent stated on the Standard Data Form) or allowed to increase through natural regeneration. 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 for example having a low level of grazing by red deer and minimising the risk of fire.

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

The age structure of the Caledonian forest should be restored by allowing natural regeneration of Scots pine so the woodland has a diverse structure including seedlings, saplings, young, mature, dying and dead trees in dense thickets and open glades with a range of shade cast on the woodland floor. There are currently very few young or intermediate-aged Scots pine within the Caledonian forest due to high levels of long term,

historical browsing by red deer, which are particularly likely to use the forest in winter. Recovery of the age structure should be achieved by maintaining low browsing pressure from red deer. Control of rank ground cover may also need to be considered, as tall vegetation may be hindering germination of Scots pine seedlings.

The habitat should be characterised by vegetation that

- 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 management that leads to the presence of key tree species at all ages up to senescence and death, particularly Scots pine, juniper, birch species, and aspen providing continuous cover of young, mature and old trees, dead and dying trees throughout the site.

There should be no invasive species such as Rhododendron on this site.

2c. Maintain the distribution and viability of typical species of Caledonian forest

Caledonian forest comprises relict, indigenous pine forests of Scots pine *Pinus sylvestris* var. *scotica*, and associated birch *Betula pubescens*. and rowan *Sorbus aucuparia* woodlands of NVC type W18.

The ground flora is currently dominated by grasses such as purple moor-grass *Molinia caerulea* and wavy hair grass *Deschampsia flexuosa* but some examples of W18e on steeper banks contain good bryophyte assemblages including the liverwort juniper prongwort *Herbertus aduncus*. Other typical ground flora should include bilberry *Vaccinium myrtillus* and the mosses *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*.

Red deer use this habitat for shelter and foraging, particularly in winter. Low levels of use by red deer helps to maintain the diversity of plant species. Other mammals that are found here include pine marten and wildcat and a variety of small birds such as redstart, tree pipit, willow warbler, wood warbler, coal tit, great tit, robin and wren.

Relict Caledonian Forest sites such as found within Ben Nevis SAC have Scots pine populations with a local genetic distinctiveness. 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

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

Current and recommended management for

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

Issue	Measure	Responsible party
Abstraction	Ensure timing and volume of abstraction from any of the lochs or dubh lochans does not alter water levels or the hydrological flushing regime to a damaging extent through discussions with regulator. Ensure that drought plans adequately address the interests of the site.	SEPA Scottish Water NatureScot North and West District Salmon Fisheries Board West Sutherland Fisheries Trust
Afforestation	Ensure that any forestry is not beyond the carrying capacity of the catchment and that design and management strictly follow the guidelines.	Land Manager Scottish Forestry NatureScot
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 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.	Land Manager Planning Authority NatureScot SEPA
Grazing/Trampling	Ensure stocking levels by both deer and livestock 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.	Land Manager NatureScot SGRPID
Development	Ensure any development proposals do not adversely affect lochs and dubh lochans.	Land Manager Planning Authority NatureScot
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 heathery/grassy habitats:

- **Wet heathland with cross-leaved heath**
- **Dry heaths**
- **Alpine and subalpine heaths**
- **Montane acid grasslands**
- **Alpine and subalpine calcareous grasslands**
- **Species-rich grasslands with mat-grass in upland areas**
- **Blanket bog**

Issue	Measure	Responsible party
Herbivore impacts (grazing and trampling)	Manage a low level of grazing and trampling by deer and livestock within these habitats. Grazing/browsing should be at a level that prevents succession to woodland in drier areas, and avoids domination of habitats by more vigorous species, but avoids damage to habitats by preventing growth or seeding or more palatable plants. Concentrations of animals should be avoided in soft wet habitats such as blanket bog or wet heath where plants such as *Sphagnum* moss are particularly susceptible to damage from trampling and use by large numbers of animals is likely to create bare ground. As a guide to achieving the correct balance the herbivore impact on the features should be 'low' based on the NatureScot Herbivore Impact Assessment Process. Where species-rich grassland and forest habitats are close together in Glen Nevis, the management should favour the forest, and natural processes should be allowed to take place, recognising that this is likely to change the characteristics of these habitats. In other parts of the site, species-rich grassland will require to be monitored to ensure it does not become unfavourable as a result of low grazing. Away from particularly sensitive habitats higher grazing levels may be permitted to allow a range of impacts from low to high.	Land managers, NatureScot, Deer Management Groups
Supplementary feeding of deer	Sustainable deer populations should be in balance with their environment so that natural foraging is sufficient to sustain healthy animals and supplementary feeding is not necessary. If any supplementary feeding is proposed within or close to the site, NatureScot advice should be sought on how to avoid localised damage to habitats that could be caused by concentrated trampling or dunging.	Land managers, NatureScot, Deer Management Groups
Nutrient input (dunging)	Livestock and deer management should avoid encouraging large numbers of animals to concentrate in small areas as the dung can cause	Land managers, NatureScot, Deer Management

	significant nutrient enrichment and consequent habitat change.	Groups
Recreation, especially organised hill running, walking, mountain biking and camping.	Work to manage visitor impacts should continue in partnership with Land Managers and the Nevis Landscape Partnership, including dealing with camping issues and erosion caused by walkers and hill runners. Organised recreational events should continue to be carefully managed and consented through the SSSI consenting process to ensure no negative effects on SAC habitats. Although few people take mountain bikes onto the site at present, active management to promote responsible access may be needed in future.	Land managers, Nevis Landscape Partnership, Developer, Local authority, NatureScot
Hydrology	No new drains should be dug and natural hydrology should be restored by blocking existing drains. Re-profiling of hags and gullies in peatland would be beneficial where they are not re-vegetating naturally.	Land managers, Local authority, NatureScot, SEPA
Alien and invasive species	Alien and invasive species should not be introduced to the site	Land manager, Scottish Invasive Species Initiative (SISI), NatureScot
Habitat damage from vehicle use	Avoid using ATVs or other vehicles in a way that damages habitats and leads to an increase in exposed bare peat. Vehicle use should be entirely avoided in areas where the vegetation is still recovering from past vehicle damage. Any vehicles driven on these habitats should have low ground pressure tyres and avoid breaking through the vegetation by avoiding soft wet ground or sharp turns.	Land manager, NatureScot
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, Deer Management Groups, NatureScot
Access tracks and paths	No new access paths/ tracks should be created unless these address desire lines and improve overall condition of habitats. Existing paths/ 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 (damaging both the track and the adjacent habitat).	Land manager, NatureScot, Planning Authority

Current and recommended management for habitats found on rocky mountain slopes and ridges:

- **Mountain willow scrub**
- **Tall herb communities**
- **High-altitude plant communities associated with areas of water seepage**
- **Acidic scree**
- **Base-rich scree**
- **Plants in crevices on acid rocks**
- **Plants in crevices on base-rich rocks**

Issue	Measure	Responsible party
Grazing and browsing	Red deer are the main herbivore on higher parts of the site, although sheep are also able to reach more accessible areas. These habitats benefit from very low levels of grazing and browsing, so stocking levels by both deer and livestock should be kept very low. Agile herbivores (such as goats) should not be introduced to the site.	Land managers, NatureScot, Deer Management Groups
Nutrient input (dunging)	Build-up of dung in sheltered spots can lead to significant nutrient deposition in these areas and habitat change. Low levels of stocking by deer and sheep are needed to prevent this from happening.	Land manager, Deer Management Groups
Trampling (by people and deer/sheep)	Vegetation in these habitats is very sensitive to trampling (either by hill runners/walkers or deer/sheep). People cause some localised damage, but as they mainly stick to established routes, only a low proportion of the habitat is affected. Low levels of stocking by deer and sheep are needed to prevent damage from trampling.	Land manager, Nevis Landscape Partnership, NatureScot, Deer Management Groups
Muirburn	These habitats are very sensitive to burning and should not be burnt. To some extent, they are normally naturally protected from fire as it cannot spread easily on rocky terrain with sparse vegetation.	Land manager
Vehicle use, particularly ATVs	The obvious practical difficulties of using vehicles in steep rocky areas mean that there is currently no vehicle use in these habitats. Vehicles should not be used here as they would cause significant erosion and crush the fragile vegetation.	Land manager
Colonisation or shading by bracken or trees	Ensure colonisation or shading of this habitat by woodland expansion or bracken is minimal to maintain cover of the typical species, including bryophytes.	Land Managers, NatureScot
Colonisation by vigorous native and non-native species	Alien and invasive species should not be introduced to the site.	Land managers, SISI, NatureScot, Nevis Landscape Partnership

Current and recommended management for lower-altitude woodland

- **Western acidic oak woodland**
- **Caledonian forest**

Issue	Measure	Responsible party
Herbivore impacts	Ensure that herbivore impacts are at low levels based on the FCS (Scottish Forestry)/SNH (NatureScot) Herbivore Impact Assessment. Future deer control effort and culls should be informed by monitoring of woodland structure to ensure there is sufficient diversity of tree regeneration whilst also allowing enough light into the canopy to maintain lichens and an understorey of characteristic woodland plants.	Land managers, Deer Management Group & NatureScot
Trampling (human, stock & wild mammal) and other mammalian plant damage	Keep trampling impacts to a low level (e.g., those from deer, livestock and people).	Land manager, Deer Management Group, NatureScot, Nevis Landscape Partnership
Invasion by non-native species	Invasive non-native species such as Rhododendron should not be introduced to the site or planted nearby where they might spread into the site.	Land managers and neighbours, Nevis Landscape Partnership
Hydrology	Ensure natural hydrological processes are maintained where they support significant populations of typical wooded ravine bryophytes and lichens.	Land managers SEPA NatureScot
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, Nevis Landscape Partnership

All habitats

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. Research bodies should have a local contact they can call upon if undertaking field data collection remotely.	NatureScot, University researchers, Nevis Landscape Partnership

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Approved on 05 May 2021 by:

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