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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

CREAG MEAGAIDH SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE

Site Details

Site name:	Creag Meagaidh
Map:	https://sitelink.nature.scot/site/8235
Location:	Highlands and Islands
Site code:	UK0012955
Area (ha):	6,143.46
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	10 June 2010	Unfavourable - Bad
Wet heathland with cross-leaved heath	Unfavourable No change	30 September 2005	Unfavourable - Bad
Dry heaths	Unfavourable No change	30 September 2005	Unfavourable - Bad
Alpine and subalpine heaths	Favourable Recovered	2 October 2015	Unfavourable - Bad
Mountain willow scrub	Unfavourable No change	1 September 2005	Unfavourable - Bad
Montane acid grasslands	Favourable Maintained	2 October 2015	Unfavourable - Bad
Tall herb communities	Favourable Recovered	29 September 2015	Unfavourable - Bad
Blanket bog*	Unfavourable No change	30 September 2005	Unfavourable - Bad
Acidic scree	Favourable Recovered	29 September 2015	Unfavourable - Inadequate
Plants in crevices on acid rocks	Favourable Maintained	2 October 2015	Unfavourable - Bad
Plants in crevices on base-rich rocks	Favourable Maintained	2 October 2015	Unfavourable - Inadequate

Notes:
Assessed Condition refers to the condition of the SAC feature assessed at a site level as part of NatureScot's Site Condition Monitoring (SCM) programme.
Conservation status is the overall condition of the feature throughout its range within the UK as reported to the European Commission under Article 17 of the Habitats Directive in 2019.
* Habitats Directive Priority Habitat

Other overlapping Protected Areas:

Creag Meagaidh SSSI, Creag Meagaidh SPA, Creag Meagaidh National Nature Reserve

Key factors affecting the qualifying features

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

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

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

Wet heathland with cross-leaved heath

Wet heath occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. Wet heaths occur in several types of ecological gradient between dry heath and blanket bogs.

At high altitude wet heaths occur in mosaics with Alpine and Boreal heaths; in these situations lichens and northern or montane species may be well-represented. At Creag Meagaidh SAC wet heaths are found mostly on the lower slopes, particularly on the southern side.

The key issues at Creag Meagaidh SAC are a combination of excessive browsing, trampling, historical burning, and drainage which were highlighted during the last condition monitoring assessment. Recent impact assessments have reported a decline in herbivore impacts on the SAC, although there are still areas of high impact which should be addressed through restoration measures.

European dry heaths

Dry heath is one of the most extensive habitats on Creag Meagaidh SAC forming vast tracts of moorland and is found on the steeper slopes throughout the SAC. European dry heaths typically occur on freely-draining, acidic to almost neutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation but all heaths vary in their flora and fauna according to climate, altitude, aspect, soil conditions (especially base-status and drainage), and grazing and burning intensity.

Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most dry heaths are managed as extensive grazing (sheep, cattle and deer) or, in upland areas, as grouse moors. Additional influences are tracks and paths that can cause fragmentation, degradation and erosion. Other

key management issues include forestry, problematic native and non-native species and currently renewable energy proposals.

Following the last condition assessment, the key management issues at Creag Meagaidh SAC are a combination of excessive browsing, trampling and burning practices. Recent impact assessments have reported a decline in herbivore impacts on the SAC, however the current focus of management should be to continue to restore the habitat until another formal condition assessment can be completed.

Alpine and subalpine heaths

Alpine and subalpine (Boreal) heaths occur on acid rocks on mountains, both on exposed lower summits and ridges and on sheltered slopes. At Creag Meagaidh SAC it is found on lower parts of the ridge and rocky terrain on thin soils, usually below 900m. Exposure or snow-lie, which suppress the growth of dwarf-shrubs, also favour the growth of characteristic lichens and bryophytes. Alpine heaths develop above the natural altitudinal tree-line. Boreal heaths develop below the tree-line in gaps among scrubby high-altitude woods or as replacements for those subalpine woods lost due to grazing and burning. On lower slopes, Boreal heaths may grade into floristically-similar European dry heaths.

Alpine and Boreal heaths that are rich in bryophytes and also juniper-rich heaths are particularly susceptible to disturbance, especially by fire. Similarly, lichen-rich heaths are susceptible to damage by fire or trampling. Rocky ground can be important in protecting heaths from fire.

Mountain willow scrub

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

On Creag Meagaidh this habitat is widely scattered at moderately high altitude (600-750m) in corries on crags and ungrazed rock ledges, along rocky or steep burn-sides, in boulder fields and in flushes. The largest continuous stand of this habitat type is about 0.5ha in extent and most stands are much smaller.

The key management issues for this habitat is grazing pressure which is considered to be the major factor in restricting the current extent of this habitat on Creag Meagaidh. The previous condition assessment also found that many stands were not producing seed. In common with many sites its continued future at Creag Meagaidh is precarious, since it is confined to often unstable rock ledges and reproducing populations are very small, isolated, and of uncertain long-term viability.

Montane acid grasslands

Montane acid grasslands are the most extensive type of vegetation in the high mountain zone at Creag Meagaidh SAC, i.e. above an altitude of about 750 m, forming large continuous tracts, covering summit plateaux and the tops of the higher

summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by contrasting extremes of exposure and snow-lie.

The habitat at Creag Meagaidh is in good condition but it is vulnerable to nutrient inputs and physical damage from grazing animals, human trampling and use of all-terrain vehicles.

Tall herb communities

On Creag Meagaidh SAC this is found on ungrazed cliff ledges, in corries and in boulder fields, mainly on the north and east facing slopes. Tall herb communities habitat restricted to base-rich substrates and somewhat sheltered situations. It provides a refuge for rare, grazing-sensitive, montane plants.

Variation within the habitat type is related chiefly to geographical position, altitude, and soil conditions and rock type.

Key management issues include ensuring only low/no grazing from domestic stock and deer and invasion by other species

Blanket bogs

At Creag Meagaidh SAC blanket bog is mostly found on the lower more gently sloping ground of the glens, the bottom of corries and some of the gentle-sloped shoulders of the hills. Blanket bogs are found in areas of moderate to high rainfall and a low level of evapotranspiration, allowing peat to develop over large expanses of undulating ground. Blanket bogs are considered active when they are supporting a significant area of vegetation that is peat-forming. This is a Habitats Directive Priority habitat.

This habitat at Creag Meagaidh SAC failed the previous assessment due to excessive levels of disturbed bare ground, drainage and factors relating to herbivore impacts. Therefore key management issues include a combination of excessive trampling, and to a lesser extent browsing, historical burning and drainage issues. Recent impact assessments have reported a decline in herbivore impacts on the SAC, however the current focus of management should be to continue to restore the habitat until another formal condition assessment can be completed.

Acidic scree

Scree habitats are found on the steeper slopes on the side of the main ridge and outlying summits of Creag Meagaidh SAC. They consist of rock fragments covering the frost-shattered summits of mountains or accumulating on slopes below cliffs. Scree is intrinsically unstable and rocks will frequently move meaning that this habitat is vulnerable to disturbance naturally. Acidic screes are made up of siliceous rocks such as quartzite, granite and sandstone.

Plants in crevices on acid rocks

The chasmophytic (grows in the crevices of rocks) vegetation that colonises siliceous (silica based, acidic) rock faces is widespread in upland areas. 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. On Creag Meagaidh SAC this habitat is quite widespread and

is found in in corries and on the steep south-east facing slopes of the ridge and outlying summits. It is also closely associated with acidic scree where the same rock type is also found forming the scree. Chasmophytic plant species are adapted to the stresses of drought and low nutrient availability. They can be sensitive to overgrazing and trampling although many sites are protected by inaccessibility.

Plants in crevices on base-rich rocks

Chasmophytic vegetation consists of plant communities that colonise the cracks and fissures of rock faces and is widespread in upland areas but is localised and fragmentary in its occurrence. The type of plant community that develops is largely determined by the base-status of the rock face. On Creag Meagaidh SAC base-rich rock is less widespread and so this habitat is found in two main corries, Coire Ardair and Coire Choille-rais.

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

Further information on these habitats found on Creag Meagaidh SAC can be found on the JNCC website.

Conservation Priorities

Montane willow scrub

Given its restricted range in Scotland and this SAC, montane willow scrub should be allowed to increase onto the other SAC habitats. Ideally expansion of montane willow would be by natural regeneration, and achieved by reducing grazing by herbivores. However, it is likely that expansion would need to be achieved by planting on inaccessible ledges. Natural regeneration of montane willow scrub should be retained unless removal is critical to maintain another European habitat.

It is allowed to expand at the expense of other SAC habitats because:

- Montane willow is a primary reason for selection of this site (with montane acid grassland and tall herb communities).
- The extent of the willow scrub is extremely small (<1%) compared to the area of alpine and boreal heath across the SAC. This means it is not always ecological sustainable, especially when it is just a small number of single sex trees.
- There would be no fragmentation, and no impact on the structure and function of the other habitats over the vast majority of its area.
- The surrounding habitats can support a degree of structural diversity through restoration of scrub providing it does not exceed 25% cover on dry/wet/boreal heath habitats.

There could be a conflict between tall herb communities and Willow scrub, as they both tend to be restricted to inaccessible areas where browsing pressure is low and they are both listed as primary reasons for site selection. The site should be managed to promote conditions for both habitats. If a conflict occurs then willow scrub should be favoured over tall herb communities due to its localised distribution (the largest continuous stand in Scotland is 0.5ha) and the restricted range in Europe and Scotland (it is one of the UK's most rare and endangered habitats).

Willow scrub can expand into scree and chasmophytic communities providing it contributes to less than 25% cover. As the species of willow scrub at Creag Meagaidh tends to avoid the most acidic soils this is less likely to conflict with acid scree and acidic chasmophytic communities.

Upland birch woodland

The Creag Meagaidh NNR management plan has an objective to increase the area of native woodland on the NNR through natural regeneration. Native woodland expansion will be focussed on the lower altitude areas of the NNR and SSSI which are outside the SAC. Upland birch woodland is a feature of the underlying SSSI for Creag Meagaidh but not a feature of the SAC. There are some areas of birch woodland inside the SAC. To ensure good woodland condition for the SSSI there needs to be a range of life stages and natural regeneration, which may colonise adjacent SAC habitats, particularly dry heath. Expansion of native woodland onto SAC features should be managed to ensure the conservation objectives are met for the SAC. To achieve this for dry heath it will mean ensuring that less than 20% of the dry heath vegetation cover is made up of scattered native trees and scrub.

River Spey SAC

There is slight overlap with the River Spey SAC to the north of Creag Meagaidh SAC. Riparian woodland would benefit the Atlantic salmon feature of the River Spey SAC, and in this area this could be favoured over wet or dry heath. Currently this area is mostly wooded so there is not conflict.

Creag Meagaidh SPA

This SAC overlaps with Creag Meagaidh SPA. Any management of the SAC, or assessment of plans or projects, will also need to take account of the SPA feature.

Conservation Objectives

Overarching Conservation Objectives for all habitat features

1. To ensure that the qualifying features of Creag Meagaidh 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 improving 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 assessment 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 assessments 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 assessment.

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 Creag Meagaidh SAC is restored by meeting objectives 2a, 2b and 2c for each qualifying feature.

The aim at this SAC is to maintain or restore the protected habitats at or to favourable condition as a contribution to their wider favourable 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 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 habitat within the site

The extent of Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat feature has been estimated at 25ha.

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

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

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

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

Physical Attributes

-Surface Area

Changes to surface area can indicate pressures on the structure and function of lochs. The surface area of a loch may fluctuate slightly naturally. However changes to surface area and the associated change to depth can adversely affect the character of the loch, particularly the edge vegetation. Artificial fluctuations to depth found in controlled water bodies such as reservoirs can adversely affect the 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 both water level fluctuations and annual and within year flushing patterns. Flushing is important as it is strongly related to dilution and removal of nutrients and plankton. Changes to the flushing pattern can be caused by factors similar to those affecting area; abstraction, regulation, construction, excessive sediment deposition and natural succession which may occur in the catchment.

-Loch substrate character

The type and distribution of sediment particles within a loch will affect the biology of the loch and the availability of habitats. Changes to the substrate character may also be indicative of changes to the area and hydrological regime. Reduction in area or flushing may affect the substrate character as finer sediments become trapped and there is increased input of leaf-litter from scrub encroachment.

-Natural sediment load

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

-Connectivity between the loch and the surrounding area

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

Water Quality

-Dissolved Oxygen

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

-pH

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

-Chlorophyll a

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

-Total Phosphorus
Phosphorus is one of the main nutrients required for plant growth and there is strong correlation between TP concentration and phytoplankton biomass. The target for TP is based on an annual mean; for deeper lochs (mean depth >3m) 15ugP/l maximum annual mean TP, very shallow (Mean depth <3m) 20ugP/l.

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

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

Typical species of the oligo-mesotrophic lochs are:

Callitriche hamulata	Intermediate water-starwort
Fontinalis antipyretica	
Glyceria fluitans	
Isoetes lacustris	lake quillwort
Litorella uniflora	shoreweed
Myriophyllum alterniflorum	
Nitella sp (each species)	
Subularia aquatic	awlwort

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

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

Maintain to approximately 559 ha. The area figure has been taken from the Standard Data Form, and is an estimate. This is because wet heath typically covers large areas, forming

complex mosaics with areas of blanket bog, and in dryer areas dry heaths and grassland. Baseline surveys will include smaller areas of other habitats. The vegetation is very variable in composition. Dwarf shrub cover and structure is variable, similar to dry heath in some areas, and to blanket bog in other, usually wetter areas, particularly on degraded bog. At high altitudes wet heath can be found in mosaics with Alpine and Boreal Heath, usually in areas with some topographic shelter. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

At Creag Meagaidh SAC wet heaths are found mostly on the lower slopes, particularly on the southern side.

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

Northern Atlantic wet heath with *Erica tetralix* is sensitive to inappropriate grazing or burning that may affect the habitat structure and function in two main ways. Overgrazing/burning, can lead to creation of a grass sward. Overgrazing, by livestock, can also result in high levels of nutrient input and trampling. Under grazing/burning can lead to the habitat type being colonised by non-typical species.

Wet heath on Creag Meagaidh SAC should be restored from the legacy of damage from past trampling, overgrazing, burning as well as man-made drainage. The objectives of this are to:

- restore the height structure of the vegetation by reducing grazing/browsing by red deer 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 livestock 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.
- Active drainage should be minimised. No new drains should be dug and existing ones should be blocked.

Additional objectives for the structure of the habitat are:

- The area of disturbed bare ground should not be increased. Activities that might cause this to 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 such as Rhododendron.

Therefore the predominant requirement for wet heath is suitably managing active drainage in conjunction with the appropriate levels of grazing and burning. Management effort should therefore be directed to restore species composition, vegetation mosaics and ground/soil structure and integrity. This should also avoid surface erosion and deposition, introduction of alien and invasive species and scrub and habitat fragmentation.

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

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. Wet heath on Creag Meagaidh SAC should be restored to increase the distribution of typical species of this habitat, especially dwarf shrubs which in some areas are dominated by competitive grasses.

The typical species for the habitat at Creag Meagaidh SAC are:

Calluna vulgaris	common heather
Carex spp.	sedges
Drosera spp.	sundews
Empetrum nigrum	crowberry
Erica spp.	heaths
Eriophorum angustifolium	common cottongrass
Narthecium ossifragum	bog asphodel
Non-crustose lichens	(lichens)
Pleurocarpous spp.	(mosses)
Sphagnum spp.	(mosses)
Trichophorum cespitosum	deer grass
Vaccinium spp	(heaths)

Typically associated vertebrates are red deer (*Cervus elaphus*), red grouse (*Lagopus l. scotica)*, golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina schinzii)* and greenshank (*Tringa nebularia*) golden eagle (*Aquilla chrysaetos*), merlin (*Falco columbarius*) and hen harrier (*Circus cyaneus*).

Conservation Objectives for European dry heaths [H4030]

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

Maintain to approximately 1400 ha The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that European dry heaths can form complex mosaics with habitats such as grasslands, wet heaths and bogs. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site. Some expansion of scatted native trees and shrubs onto dry heath will not adversely affect the condition and therefore the extent, of the feature provided it is driven by natural regeneration. This includes the development of a degree of structural diversity of scrub including creeping/dwarf willow, bog myrtle, holly, rowan, birch and juniper providing this doesn't expand beyond 25% of the cover.

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

- appropriate level of grazing and muirburn.
- avoidance of any loss of habitat through increased extent of successional or adjacent natural habitats, afforestation or invasion by alien species.
- avoidance of negative effects of access and recreation

Dry heath is one of the most extensive habitats on Creag Meagaidh SAC forming vast tracts of moorland and is found on the steeper slopes throughout the SAC.

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

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

On Creag Meagaidh SAC red deer and sheep are the main herbivores on dry heath. 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.

The objectives for restoring dry heath on this site are to:

- restore the height structure of the vegetation 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 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').
- Any burning on Creag Meagaidh SAC should follow the Muirburn Code to avoid damage to the structure, function and supporting processes of dry heath

Additional objectives for the structure of the habitat are:

- 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. 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. An example of inappropriate species is bracken.

Some scrub including creeping/dwarf willow, bog myrtle, holly, rowan, birch and juniper will be tolerated over this habitat providing this doesn't expand beyond 25% of the cover.

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

The dry heaths at Creag Meagaidh SAC are dominated by heather (*Calluna vulgaris*), blaeberry (*Vaccinium myrtillus*) and crowberry (*Empetrum nigrum*). The conservation measures should aim to maintain the vegetation composition of typical indicator species, and the appropriate cover of dwarf-shrub species of dry heath.

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

This habitat is important for red deer *Cervus elaphus* 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.

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 to approximately 283 ha. The area figure for this SAC has been taken from the Standard Data Form, and is an estimate based on the fact that both Alpine and Boreal heaths can grade into other heath types, especially the latter into floristically-similar European dry heaths. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

Alpine and subalpine heaths are generally found on on acid rocks on mountains, both on exposed lower summits and ridges and on sheltered slopes where the dominant plants can cope with harsh climatic conditions such as high winds and prolonged snow cover. These conditions will largely determine the extent and distribution of the habitats throughout the SAC, although the habitat's long-term existence will also be affected by:

- an appropriate level of grazing and muirburn
- habitat loss through increased extent of adjacent natural habitats, afforestation or invasion by alien species
- the effects of access and recreation.

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

Alpine and subalpine heaths are climax vegetation in exposed and extreme conditions which result in slow growth; they are therefore very sensitive to disturbance and are slow to recover.

As with many other Scottish upland habitats, maintaining Alpine and 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. This is especially the case with the sub-alpine heaths where there may be only subtle differences between them and some adjacent habitats.

Alpine and subalpine heath should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.

In popular walking areas bare ground can be disturbed by human trampling. Recreation management might be necessary if excessive trampling is affecting the structure and function of the habitat.

The structure of the habitat is based around:

- the presence of at least 25% cover of dwarf shrub heath species, but can be up 90%.
- less than 10% of live leaves should show signs of grazing
- less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively) should show signs of browsing
- no signs of burning inside the feature boundaries
- less than 10% of the ground cover should be disturbed bare ground (ie where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks. The emphasis is on 'disturbed' rather than 'bare'.)

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

This habitat comprises a wide range of heath types, with variation related to climate, local exposure and snow-lie. The most common NVC types of this habitat on Creag Meagaidh SAC are:

- *Calluna vulgaris – Cladonia arbuscula* heath
- *Vaccinium myrtillus – Cladonia arbuscula* heath
- *Vaccinium myrtillus – Racomitrium lanuginosum* heath

The dominant plants in UK examples of Alpine and subalpine heaths are usually dwarf-

shrubs of heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus* or juniper *Juniperus communis*, which are low-growing or prostrate owing to exposure to high winds or prolonged snow cover at moderately high altitudes.

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.

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

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

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

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

Maintain the extent of existing mountain willow scrub at greater than 3ha. The area figure has been taken from the Standard Data Form, and is an estimate.

This habitat is a very local habitat type found usually on ungrazed ledges on steep rocky slopes or boulder fields, occurring only as small discrete stands or more scattered bushes (0.5ha or smaller). Therefore current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision. On Creag Meagaidh this habitat is widely scattered at moderately high altitude (600-750m) in corries on crags and rock ledges, along rocky or steep burn-sides, in boulder fields and in flushes. Given its restricted distribution, then expanding the area of this habitat to make it more robust is an objective of the SAC. This habitat is allowed to increase in area over other Natura habitats.

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

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

However, over-grazing/browsing is believed to have reduced and restricted the occurrence of this habitat. At many sites its continued future is precarious, since it is confined to often unstable rock ledges and reproducing populations are very small, isolated, and of uncertain long-term viability. Excessive trampling can damage the habitat. At Creag Meagaidh herbivore browsing and trampling levels should be low in these areas, and agile herbivores, such as goats, should not be allowed to establish at this site. Any goats within the SAC should be controlled.

Where grazing/browsing occurs it should be of a level where distinct browse lines or shaping of the canopy (topiary-like effects) does not occur.

Some stands of montane willow scrub require specific conservation action if they are to survive, for example planting of new stock of appropriate provenance (subject to appropriate assessment).

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

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

This habitat consists of a mixture of willow species which have arctic-alpine and arctic-subarctic distributions in Europe. The indicator sub-arctic species are:

downy willow	*Salix lapponum*
mountain willow	*S. arbuscula*
dark-leaved willow	*S. myrsinifolia*

As willows are dioecious to maintain a viable population it is important that there is a suitably large population size with both male and female plants present.

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*,

Since this habitat is small and fragmented and generally occurs within a wider landscape-scale, maintenance of the typical species will need to be managed as part of the wider site management.

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

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

Maintain to approximately 1843 ha.

The area figure has been taken from the Standard Data Form, and is an estimate based on the amount and complex, yet often limited, mosaic of several different high altitude communities. Fundamentally however there should be no measurable net reduction 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.

Creag Meagaidh SAC contains the full range of community types of this habitat type characteristic of the central Highlands.

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

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

Appropriate levels of grazing/browsing are needed to allow survival of component species of the habitat and to maintain its structure, throughout the site. This should be achieved by a low level of grazing that allows typical plants (listed in 2c) to grow and set seed.

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 habitat

There are multiple NVC communities that can form Montane acid grassland habitat. These vary geographically with the relevant types for this site listed below:

Carex – Racomitrium moss-heath occurs on windswept ground blown clear of snow during winter, and is the most extensive sub-type of the habitat on the high plateau. Where snow-lie builds up, such moss-heath gives way initially to *Nardus – Carex* grass-heath, and then to *Carex – Polytrichum* sedge-heath where snow-lie is more prolonged. The longest lying snow-beds (*Polytrichum – Kiaeria* snow-bed and *Salix – Racomitrium* snow-bed community) are dominated by mosses and hardy herbs. These communities occur around the edges of high plateaux on steep slopes where a snow cornice develops in high corries or in gullies where deep snow accumulates. They can also occur in snow hollows on the highest summits. The *Alchemilla – Sibbaldia* dwarf-herb community requires a certain amount of base-rich flushing to develop its distinctive flora of small herbs.

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

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

Maintain to approximately 10 ha.

The area figure has been taken from the Standard Data Form, and is an estimate based on the amount and complex, yet often limited, mosaic of several different high altitude communities. Fundamentally however there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site. Where possible opportunity should be taken to restore and/or extend this habitat.

On Creag Meagaidh SAC this is found on cliff ledges, in corries and in boulder fields, mainly on the north and east facing slopes.

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

The extreme sensitivity of this habitat to grazing pressure is responsible for its scarcity. Whilst this habitat would have once been more abundant it is now largely confined to areas inaccessible to grazers. Introduction of additional grazing pressure, especially from highly agile species such as goats, has the ability to cause major losses. Agile herbivores, such as goats, should not be introduced to this site as they would be likely to damage this habitat. Should goats colonise the SAC, then they should be controlled to prevent establishment. Direct management of grazing pressure has the ability to extend this scarce habitat.

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 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.

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 habitat

This is a species-rich habitat characterised by an abundance of tall, broad-leaved herbs, most of which are otherwise rare in the uplands owing to their sensitivity to grazing. It corresponds to NVC type *Luzula sylvatica – Geum rivale* tall-herb community that is made up of lady's-mantles (*Alchemilla sp*), wild angelica (*Angelica sylvestris*), water avens (*Geum rivale*), great wood-rush (*Luzula sylvatica*), roseroot (*Sedum rosea*), and globe-flower (*Troillius eurpoaeus*).

Conservation Objectives for Blanket bog [7130]

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

Blanket bog typically covers very large areas, forming complex mosaics with other wetland habitats as well as heath and grass habitats in drier areas. There should be no measurable net reduction in the extent of the habitat on the site such that the area of blanket bog is maintained at approximately 620 ha.

At Creag Meagaidh SAC blanket bog is mostly found on the lower more gently sloping ground of the glens, the bottom of corries and some of the gentle-sloped shoulders of the hills.

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

The predominant requirement for blanket bog is to be <u>actively</u> 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.

The objectives for restoring blanket bog on Creag Meagaidh SAC are to:

- maintain the ground cover structure of the bog 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') or where more than 10% of the *Sphagnum* moss is crushed or pulled up.
- Restore areas of disturbed bare ground. Activities that might cause an increase include excessive use of vehicles (including ATVs), introducing heavier livestock such as cattle or increasing use of the habitat by red deer.
- maintain the structure of the vegetation by setting grazing/browsing by red deer and livestock 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:

- Cover by species that are not typical of this habitat should not increase. Examples of inappropriate species are bracken, trees and non-native species.
- Active drainage should be minimised. No new drains should be dug and existing ones should be blocked.

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

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

Typical species include the important peat-forming species, such as bog-mosses Sphagnum species and cotton grasses *Eriophorum spp*., or purple moor-grass *Molinia caerulea* in certain circumstances, together with heather *Calluna vulgaris* and other ericaceous species and forbs such as bog asphodel *Narthecium ossifragu* and the carnivorous sundews *Drosera spp*.

Other typical species include:

Carex bigelowii	stiff sedge
Erica spp.	heaths
Myrica gale	sweet gale
Pleurocarpous mosses	(mosses)
Racomitrium lanuginosum	wooly hair moss
Trichophorum cespitosum	deer grass
Vaccinium spp	

Conservation measures should aim to maintain 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 deer , sufficient to maintain a diverse open structure but without causing surface damage/erosion or loss of more grazing-sensitive species. Goats would damage this feature and therefore should not be allowed to establish at this site. Any goats within the SAC should be controlled.

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 the habitat within the site
The extent of the acidic scree feature has been estimated at 270 ha. This should be maintained. However, due to the localised and fragmentary nature of this habitat current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision. On Creag Meagaidh SAC this habitat is found on the side of the main ridge and outlying summits. It is also closely associated with plants in crevices on acidic rock where the same rock type is also found forming the scree.

2b. Maintain the structure, function and supporting processes of the habitat
Scree is intrinsically unstable and rocks will frequently move so this habitat is vulnerable to disturbance naturally. Additional disturbance may be seen through herbivore grazing, trampling and recreation activities. There is also the possibility of colonisation, particularly of more stable scree, by other species, including trees and scrub where there are seed sources. Inappropriate grazing regimes have the potential to harm this feature through over-grazing and trampling damage.

2c. Maintain the distribution and viability of typical species of the habitat
This habitat may be colonised by a range of pioneer species. It also provides shelter for many species sensitive to frost such as parsley fern *Cryptogramma crispa*, species requiring a humid microclimate such as Wilson's filmy-fern *Hymenophyllum wilsonii*, and species sensitive to grazing such as stone bramble *Rubus saxatilis*. It is important for its rich fern flora and act as refugia for a number of rare species. Excessive grazing/browsing/trampling by deer and/or livestock can contribute to a deterioration in the habitat structure, having harmful effects on the typical species. This habitat is also very sensitive to burning. Colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion can reduce or eliminate cover of indicator species, including bryophytes. Trampling from walkers can contribute to a deterioration in the habitat structure, having harmful effects on the typical species.

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

2a. Maintain the extent and distribution of the habitat within the site
The extent of the plants in crevices on acid rocks feature has been estimated at 154 ha. This should be maintained. However, due to the localised and fragmentary nature of this habitat current baseline estimates may not be very precise and any changes in extent estimates as a result of new

survey may not represent real change but greater precision. On Creag Meagaidh SAC this habitat is quite widespread and is found in in corries and on the steep south-east facing slopes of the ridge and outlying summits. It is also closely associated with acidic scree where the same rock type is also found forming the scree, and/or plants in crevices on base-rich rocks where calcareous bands of rock are found within siliceous rock.

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

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

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

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

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

This habitat typically comprises mixtures of a limited number of species, most of which may also occur in other adjacent habitats, with mosses and ferns often prominent. There are no indicator species for this habitat.

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

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

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

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

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

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

The extent of the plants in crevices on base-rich rocks feature has been estimated at 10ha. This should be maintained.

However, due to the localised and fragmentary nature of this habitat current baseline estimates may not be very precise and any changes in extent estimates as a result of new survey may not represent real change but greater precision. On Creag Meagaidh SAC base-rich rock is less widespread and so this habitat is found in two main corries, Coire Ardair and Coire Choille-rais.

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

This habitat is found in harsh and sometimes extreme conditions with limited soil development, but where there is some shelter and moisture, and so plants are sparse and

scattered. Chasmophytic plant species are adapted to the stresses of drought.

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

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

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

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

The typical species for this habitat on this site are: Alpine lady's mantle *Alchemilla alpina; Carex atrata;* brittle bladder-fern *Cystopteris fragilis;* hawkweed spp *Hieracium spp.;* alpine bistort *Persicaria vivipara; Poa alpina; Polystichum lonchites;* alpine cinquefoil *Potentilla crantzii; y*ellow saxifrage *Saxifraga aizoides;* alpine saxifrage *Saxifraga nivalis*; purple saxifrage *Saxifraga oppositifolia; Sedum rosea;* moss campion *Silene acaulis;* alpine meadow-rue *Thalictrum alpinum;* wild thyme *Thymus polytrichus*

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

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

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

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

Conservation Measures

Creag Meagaidh 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). A significant part of the SAC, including the main massif, is owned by SNH and managed as a National Nature Reserve according to a management plan.

Current and recommended management for Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

Issue	Measure	Responsible party
Natural sediment load	The hydrological flushing regime should be naturally occurring, without carrying an un-	SEPA

	naturally high sediment load especially peat from erosion.	
Water quality	Maintain high water quality as defined under the Controlled Activities Regulations. No use of fertilisers near lochs or other factors which would decrease water quality.	Land manager SEPA
Water quantity	No artificial drainage or abstraction without CAR license or notification	Land manager SEPA
Alien and exotic species	Avoid spread and introduction of new species into the site, including non-native fish. Control if found before they become established.	SEPA River Board Scottish Government SNH

Current and recommended management for

- **Wet heathland with cross-leaved heath**
- **European dry heath**
- **Alpine and Boreal heaths**
- **Montane acid grasslands**
- **Blanket bog**

Issue	**Measure**	**Responsible party**
Grazing & grazing levels by livestock	Livestock (mostly sheep) have be grazed on the SAC, although red deer are considered the main herbivore (see below). As a guide to achieving the correct balance the herbivore impact on the features should be mostly 'low' based on Habitat Impact Assessments	Land manager
Grazing & grazing levels deer	Red deer are managed under specific management plans. These habitats require low grazing and trampling levels to maintain a varied habitat structure. High levels of grazing can weaken sensitive plants making them more vulnerable to competition, and reduce their reproductive productivity. Excessive trampling can increase bare soil and exacerbate erosion. Plants such as Sphagnum moss in soft wet habitats such as blanket bog or wet heath are particularly susceptible to damage from trampling where concentrations of animals can break the moss into fragments or create bare ground. As a guide to achieving the correct balance the herbivore impact on the features should be mostly 'low' based on Habitat Impact Assessments	
Muirburn	Any burning of these habitats should be done in accordance with the Muirburn Code to avoid damage to the structure, function and supporting processes of the habitats. Burning should avoid sensitive areas	Land manager

	including blanket bog, alpine and subalpine heaths and montane acid grasslands.	
Hydrology	These habitats should not be actively drained and natural hydrology should be restored by blocking existing drains where feasible.	Land manager Funding authority
Afforestation	Any expansion of native woodland onto these open habitats would need to ensure the conservation objectives for the site are met. Natural regeneration is likely to be determined by grazing/browsing levels, ground conditions and exposure. Some expansion of scatted native trees and shrubs, or development of structural diversity, onto dry & wet heath will not adversely affect the condition of the feature provided it is driven by natural regeneration and does not exceed 25% of the cover. Non-native tree saplings should be removed before they establish.	"
Alien and invasive species	Alien and invasive species should not be introduced to the site	Land manager SISI (SNH)
Habitat damage from vehicle use	Avoid vehicle use that damages habitats. Any vehicles used on these habitats should be low ground pressure ATVs and should avoid areas recovering from past damage.	Land Manager
Erosion	Activities that might cause erosion (such as vehicle use or deer management that encourages animals to concentrate in small areas) should be avoided. Areas of current erosion should be left undisturbed until the vegetation has recovered.	Land manager
Access tracks and paths	Existing tracks should be maintained within their existing footprint and without having significant effects on the surrounding hydrology. Use of drainage ditches should be minimised in flatter areas. Culverts should be used to allow streams to pass underneath existing tracks or paths. In steeper areas, water should be diverted from existing paths and tracks at regular intervals. This will prevent substantial amounts of water collecting on paths/tracks that can lead to deep erosion gullies.	Land manager (Recreation interests)
Recreation	Ensure trampling by walkers is minimal to maintain cover of typical species.	Land manager, Local authority, SNH

Current and recommended management for Mountain willow scrub

Issue	**Measure**	**Responsible party**
Herbivore impacts (grazing and/or trampling	Ensure that herbivore (currently mostly red deer on this site) impacts on the feature are 'low' based on the FCS/SNH Herbivore	Land managers, SNH, Deer Management

	Impact Assessment Process to prevent browsing and/or loss of typical species. On Creag Meagaidh it is considered that grazing pressure is the major factor restricting the current extent of sub-arctic willow scrub, so ensuring very low browsing impacts are essential to maintain this habitat.	Groups
Habitat Management	The Creag Meagaidh NNR management plan has actions to enhance and increase the extent of montane willow habitat.	SNH, landowners, land managers.
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.	SNH

Current and recommended management for

- **Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels**
- **Acidic scree**
- **Siliceous rocky slopes with chasmophytic vegetation**
- **Calcareous rocky slopes with chasmophytic vegetation**

Issue	**Measure**	**Responsible party**
Grazing	The extreme sensitivity of this habitat to grazing pressure means this habitat requires very low grazing and trampling impacts. Grazing will be from red deer (although limited through inaccessibility) and in some areas sheep may be able to access accessible areas. Deer are managed on the SAC through the local DMG. Targeted culls near to sensitive habitats could be beneficial.	Land manager
Goats	Grazing pressure, especially from highly agile species such as goats, has the ability to cause major losses. Goats should not be allowed to establish at this site. Any goats within the SAC should be controlled.	Land manager
Conversion to woodland	Allow colonisation by montane willows unless assessment shows that this would threaten these habitats. Ensure that colonisation of other trees or bracken is minimal to maintain cover of the typical species. Remove any non-native species.	Land manager SISI (SNH)
Muirburn	These habitats are very sensitive to burning and should not be burnt.	
Recreation activity	Ensure trampling by walkers is minimal to maintain cover of typical species.	Land owners, land managers.

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