GREEN HILL OF STRATHDON SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE

Site Details

Site name:	Green Hill of Strathdon
Map:	https://sitelink.nature.scot/site/8268
Location:	North Eastern Scotland
Site code:	UK0030159
Area (ha):	640.91
Date designated:	17 March 2005

Qualifying features

Qualifying feature	SCM assessed condition	SCM visit date	UK overall Conservation Status
European dry heaths [H4030]	Favourable Maintained	15 August 2008	Unfavourable - Bad
Juniper on heaths or calcareous grasslands [H5130]	Favourable Maintained	2 August 2002	Unfavourable - Bad
Grasslands on soils rich in heavy metals [H6130]	Favourable Maintained	15 August 2008	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.

Overlapping Protected Areas

Green Hill of Strathdon Site of Special Scientific Interest (SSSI)

Key factors affecting the qualifying features

European dry heaths

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

At Green Hill of Strathdon, an interesting heathland transition from species rich serpentine to less base-rich ground can be seen and is apparent in the south-east of the site on Breagach Hill (556 m). Although the heath on this hill is generally less species rich, bearberry and petty whin are present, neither of which are found on the serpentine. This adds diversity to the site, and demonstrates the difference between serpentine-influenced and more typical heaths of less base-rich ground.

Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. The whole of the Green Hill of Strathdon is managed as a grouse moor with burning the key management issue. Sheep graze extensively across the site along with roe deer. Tracks are associated with the sporting management of the site and regeneration of non-native conifers from adjacent plantations is an issue on parts of the site. SNH's (NatureScot's) programme of SCM has found the feature to be in favourable condition.

Further information about European dry heath can be found here.

Juniper on heaths or calcareous grasslands

The composition and structure of the juniper habitat is influenced by factors such as the nutrient status of soils (particularly the amount of calcium), altitude, and the grazing regime. Juniper habitat may occur along a transition between other habitats, including grassland, dwarf-shrub heath and woodland, with the result that different types of juniper habitat may occur within an individual location.

Green Hill of Strathdon represents an unusual form of *Juniperus communis* formations in the eastern Scottish Highlands with a species-rich basiphilous flora influenced by the underlying serpentine rocks. Juniper scrub is associated both with Calluna-dominated heaths and grassland. There are many junipers scattered over a large area, especially in the Calluna heath, but smaller, denser stands also occur in both heath and, unusually, in species-rich grassland.

Key management issues are grazing, by sheep and roe deer, burning and colonisation by non-native conifers from adjacent plantations. SNH's (NatureScot's) programme of SCM has found the feature to be in favourable condition.

Further information about Juniper on heaths or calcareous grasslands can be found here.

Grasslands on soils rich in heavy metals

This habitat occurs on soils that have levels of heavy metals, such as lead, zinc, chromium and copper that are toxic to some plant species. The greatest extent of the habitat occurs on artificial sites associated with past mining activities with near-natural examples much more localised. There are three main situations where this habitat type has developed:

- Near-natural, open vegetation of serpentine rock and mineral vein outcrops with skeletal soils

- Stable river gravels rich in lead and zinc and that are near-natural

- Artificial mine workings and spoil heaps

This habitat can be highly variable in composition and structure. The defining characteristic is the substrate, which must be ultra-basic.

Green Hill of Strathdon represents Calaminarian grasslands on open serpentine debris within Calluna moorland at low altitude in the eastern Scottish Highlands. There are a number of small, scattered areas of serpentine outcrops and debris similar in character to those on Hill of Towanreef. The vegetation includes frequent spring sandwort *Minuartia verna*, scurvygrass *Cochlearia officinalis*, mossy saxifrage *Saxifraga hypnoides* and thrift *Armeria maritima*.

Key management issues include burning, inappropriate levels of grazing and air pollution leading to eutrophication of the nutrient poor soils. SNH's (NatureScot's) programme of SCM has found the feature to be in favourable condition.

Further information about grasslands on soils rich in heavy metals can be found here.

Conservation Priorities

Juniper on heaths or calcareous grassland, and grassland on soils rich in heavy metals are the primary reasons for site selection. There has been no obvious conflict identified between the qualifying features to date. However, changes in grazing pressures could potentially affect the extent of juniper heath and European dry heath, which already exist in an intricate mosaic in parts of the site. If a conflict were to arise between these two features, priority would likely be given to allowing the maintenance or expansion of the juniper habitat.

Site Condition Monitoring has not identified any significant changes in extent to date. As all of the features are in favourable condition we would not seek any changes to the current management.

Conservation Objectives

Overarching Conservation Objectives for all features

1. To ensure that the qualifying features of Green Hill of Strathdon 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 Green Hill of Strathdon SAC is maintained by meeting objectives 2a, 2b and 2c for each qualifying feature

The aim at this SAC is to maintain the habitats in a favourable condition as a contribution to their wider conservation status. Therefore any impacts to 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 maintaining site integrity, specifically by meeting the objectives outlined in 2a, 2b and 2c. If these are met then site integrity will continue to be maintained. 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 maintenance 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 habitat is exposed to a wide range of drivers of change. Some of these are natural and are not a direct result of human influences. Such changes in the habitat's extent, distribution or condition within the site which are brought about by natural processes, directly or indirectly, are normally considered compatible with the site's conservation objectives. An 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 European dry heaths

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

Maintain to approximately 416.59ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that European dry heaths can form complex mosaics with habitats such as grasslands, wet heaths and bogs. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

The habitat is found on both freely-drained, nutrient-poor, acidic soils and serpentine influenced (more base-rich) ground on the Green Hill of Strathdon. 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.

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

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

The structure of the habitat is based around the presence of at least 25% cover of dwarf shrub heath species, but can be up 90%. In particular heather *(Calluna vulgaris)*, as a dominant species, should be present in all phases of growth (pioneer, building, mature and degenerative) to provide a wide range of ecological variety and conservation benefit to a variety of species. At least 10% of the heather cover should be in the late mature/degenerative phase. Appropriate burning or cutting can contribute to the variation in age phase, but it is important that this does not result in a monoculture of large areas of same age heather.

Further targets to achieve suitable habitat structure include:

Grazing/browsing
- 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*)) should show signs of browsing.

Trampling/disturbance
- less than 10% of the ground cover should be made up from disturbed bare ground (i.e. where a substrate of bare humus, bare peat, bare mineral soil, bare gravel, or soil covered only by an algal mat, has its surface broken and imprinted by hoof marks, wallows, human foot prints, or vehicle and machinery tracks. The emphasis is on 'disturbed' rather than 'bare').
- Current levels of disturbed bare ground should not be increased. Activities that might cause an increase include excessive use of vehicles, the creation of grit mounds, introducing heavier livestock such as cattle or increasing use of the habitat by red deer and sheep.

Invasive native and non-native species
- Cover by species that are not typical of this habitat should not increase. Examples of inappropriate species are bracken, trees and non-native species.
- The heath cover should be open with no more than scattered native trees (including seedlings and bushes) and scrub present. An exception to this is juniper *Juniperis communis*.

Muirburn
- Any burning on the SAC should follow the Muirburn Code to avoid damage to the structure, function and supporting processes of dry heath.

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

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

The sub-montane heaths are dominated by heather (*Calluna vulgaris*), blaeberry (*Vaccinium myrtillus*) and crowberry (*Empetrum nigrum*).

The moorland habitats support a representative upland fauna including red and black grouse, golden plover, curlew and mountain hare.

In summary the indicator species for European dry heath are:

Arctostaphylos species	Bearberry heath
Calluna vulgaris	Heather
Erica species	Bell heather, cross-leaved heath
Empetrum nigrum	Crowberry
Loiseleuria procumbens	Trailing azalea
Racomitrium lanuginosum	Woolly fringe-moss
Vaccinium species	Blaeberry and Cowberry
Genista anglica	Petty whin
Salix repens	Creeping willow
Juniperus communis	Juniper
Pyrola media	Intermediate wintergreen

Conservation Objectives for Juniper on heaths or calcareous grasslands (also known as *Juniperus communis* formations on heaths or calcareous grasslands)

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

Maintain to approximately 32.05ha.

The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that juniper on heaths or calcareous grasslands is often transitional at lower levels into Caledonian forest or birch woodland and at upper levels extends into dwarf-shrub heaths in the alpine zone. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

The extent and distribution of the habitat type could be reduced through actions that alter the conditions unfavourably such as muirburn, over- or under- grazing, cutting by hand or machine, liming and fertilising for agriculture or changes to land use such as afforestation or, invasion by alien species.

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

Maintaining juniper on heaths or calcareous grasslands is a fine balance between degrading to open heath or grassland with intensive grazing/browsing or burning and succession to scrub/woodland where the level is too low.

To ensure recruitment of new seedlings and reduce the main threats from over–grazing/browsing, trampling damage and burning damage, and therefore maintain the appropriate structure, the following conditions should be met:

- Cover of “pioneer” bushes (less than 75cm tall) should exceed the cover of old, ‘ailing’ or dead bushes (full-grown, well-branched but losing branches with thin or incomplete canopy usually more than 100 years old).

- Less than 10% of bushes should show evidence of bark stripping.

- Less than 1/3rd of the current years shoots (pale fawn to pale orange brown), should show evidence of having been browsed.

- Less than 1/3rd of shoots should show evidence of having been browsed into shoot or stem material older than the current year's growth (mid-tone orange brown to dark brown).

- Severe disturbance should minimised by avoiding heavy browsing and trampling or fire such that less than 5% of the feature area should show signs of severe disturbance

The appropriate levels of grazing/browsing, disturbance and burning will vary according to a number of factors such as altitude, aspect, and location (i.e. scattered within serpentine heath or dense stands in grassland).

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

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

At the Green Hill of Strathdon juniper is associated with areas of serpentine influenced heath and grassland. On grassier parts of the site the community approaches NVC type *Juniperus communis* ssp. *communis – Oxalis acetosella* woodland. The understorey is rich in acidophilous species, such as blaeberry *Vaccinium myrtillus*, harebell *Campanula rotundifolia,* tormentil *Potentilla erecta*, and heath bedstraw *Galium saxatile*. Species with a northern distribution, including chickweed wintergreen *Trientalis europaea*, occur locally. There is usually a well-developed layer of pleurocarpous mosses and ferns.

For long-term maintenance of the habitat continuation of a, sustainable grazing/browsing regime (at designation) is paramount alongside prohibition of burning within the dense stands.

The following species are typical of the communities at this site:

Betula pubescens	downy birch
Sorbus aucuparia	rowan
Vaccinium myrtillus	blaeberry
Oxalis acetosella	wood-sorrel
Galium saxatile	heath bedstraw
Luzula pilosa	hairy wood-rush
Trientalis europaea	chickweed wintergreen
Viola riviniana	common dog-violet

Conservation Objectives for grasslands on soils rich in heavy metals (also known as Calaminarian grasslands of the *Violetalia calaminariae*)

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

Maintain to approximately 12.82ha.

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.

At Green Hill, the habitat is found on open serpentine debris in a number of small areas, which are scattered throughout the dry heath and some grassy flushes in the north of the site.

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

The structure and function of the habitat is most dependent upon the underlying peculiar and toxic soils and so the characteristics of these soils should be maintained.

Appropriate levels of grazing, that will not negatively affect the structure, function or supporting processes of the habitat, can be measured as;

- For fens and flushes, at least 50% of live leaves and/or flowering shoots of vascular plants should more than 5 cm above the ground surface.

For the habitat found on rocky outcrops and debris, changes in grazing pressure are unlikely to have a major impact, however, disturbance from trampling and tracking may do.

Appropriate levels of disturbance, that will not negatively affect the structure, function or supporting processes of the habitat, can be measured as;

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

- Less than 10% of the total feature area should show signs of active drainage, resulting from ditches or heavy trampling or tracking. Drainage should be considered active if it has altered, or is likely to alter, or remove, the original vegetation, and facilitate the removal of water from the site.

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

In Scotland soils derived from serpentine, having more magnesium than calcium, along with the generally plant-toxic nickel and chromium, occur in the eastern Highlands and on Shetland and have a very distinctive flora. Such soils are typically species-poor but contain a number of species principally found in this habitat, most notably spring sandwort *Minuartia verna* and scurvy grass *Cochleria* species*,* although a number of other species, such as sheep's fescue *Festuca ovina*, mossy saxifrage *Saxifraga hypnoides,* black spleenwort *Asplenium adiantum-nigrum* and thrift *Armeria maritima* are genetically adapted to survive there.

Many metallophyte species (plants that can tolerate heavy metals) that grow on this habitat type are shade intolerant. Care should be taken when assessing nearby activities that may cause shading e.g. forestry plantation.

In summary, the typical species of this feature at this site are:

Avenula pratensis	meadow oat grass
Asplenium adiantum-nigrum	black spleenwort
Armeria maritima	thrift
Campylium stellatum	yellow starry feather-moss
Carex flacca	glaucous sedge
Carex pulicaris	flea sedge
Cerastium fontanum	chickweed mouse ear
Cochlearia spp.	scurvy grasses
Euphrasia spp.	eyebrights
Linum catharticum	purging flax
Minuartia verna	spring sandwort
Plantago maritima	sea plantain
Scorpidium scorpioides	hooked scorpion-moss
Selaginella selaginoides	lesser clubmoss
Thymus polytrichus	wild thyme

Conservation Measures

Green Hill of Strathdon 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 the site

Issue	Measure	Responsible party
Grazing & grazing levels	The whole site is grazed extensively during the summer months by sheep. Roe deer are also present. The current levels of grazing are considered to be sustainable. Recent clearfelling, replanting and deer fencing of adjacent woodland may change the browsing pressure going forward.	Land manager
Muirburn	Muirburn must be carried out in accordance with the muirburn code. Muirburn and cutting occurs on dry heath throughout the site, either in accordance with SSSI consent, or AECS contracts. Muirburn must avoid flushes, rocky outcrops and debris, wind-clipped heath, and dense stands of juniper.	Land manager

Vehicle tracks	Several rough vehicle tracks lead up to and across the site associated with sporting management. ATV use should be kept to a minimum, and routes varied to avoid tracking.	Land manager
Drainage	Moorland grips exist, particularly in the south of the site. These are due to be blocked under an AECS scheme.	Land manager Funding authority
Alien and invasive species	Spruce and larch regeneration remains an issue particularly in the northeast of the site and so ongoing management to remove these trees is required.	Land manager, NatureScot
Plant pests and diseases	*Phytopthora austrocedri* has been recorded in the wider area. Any visitors to the site should be vigilant and report any signs of juniper die back to NatureScot or Scottish Forestry. Good biosecurity procedures should be followed when visiting any juniper sites.	All

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