Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

LADDER HILLS
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 887

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Purpose

This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is notified as an SSSI and provides guidance on how its natural features should be conserved or enhanced. This statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement.

Description of the site

The Ladder Hills is a ridge of rolling hills reaching to 804 m with broad summits dissected by deep steep-sided valleys. It is one of the most easterly mountain massifs in Scotland, with a relatively continental climate. These hills are important for upland habitats. In addition, an area around the disused Lecht Mine is important for its mineral deposits.

Geology

The Lecht mine was worked in the 1730's for iron ore, smelted locally at Nethy Bridge, and in the 1840's for manganese ore, sent to Newcastle for use in the bleach trade. It probably has the largest manganese deposit in Scotland. The rocks exposed around the mine are now a mix of ore deposits and spoil heaps left over from the old workings. They are predominantly dense weathered blocks of ores of iron (weathered yellowish and brown), and manganese (black). The manganese ores include some rare ore-minerals containing zinc and lithium. As well as its large size and rare minerals, the Lecht mine is also important for the process which formed the ore minerals.

As opposed to being the result of veining of the country rocks by hot mineral-rich solutions, it is believed that this deposit formed in a bog between the Miocene (23-5 million years ago) and the Early Pleistocene (~2.6 million years ago), during which time northern Britain was cooling from humid tropical conditions into the Ice Age. Rainfall, seeping groundwater and streams weathered the local iron and

manganese-rich Dalradian rocks (probably around Carn Dulack and Tom na Broighleig), taking iron, manganese and other metals into solution and later precipitating them at the bottom of the bog between the two mountains – hence slowly building up the ore deposit. Unusually, the fluids also seeped into brecciated (fractured/broken) zones within the underlying rock, depositing further ore minerals. The underlying Dalradian rocks, originally sea-floor sediments around 700 million years ago; were bulldozed up into a huge mountain chain by later continental collisions (around 460 million years ago). The brecciated zones, possibly taking the form of pipes, probably formed when volcanic gases from deep below the area forced their way up to the surface during Devonian times (416 – 359 million years ago). The mining at Lecht was of ore preserved in these brecciated zones.

The ore body is relatively high grade (up to 52% iron in the iron ore), and is also of considerable size, originally over 700 000 tonnes.

The site offers a unique opportunity in Britain to study the remains of a prehistoric soil horizon. The site is also significant for the large size of its manganese ore deposit and because of the presence of rare ore-minerals.

Habitats

Variations in geology, altitude and topography influence the range of habitats. The Dalradian geology is more varied than the granites of the neighbouring Cairngorms but the soils are generally acidic and peaty. The combination of slope, aspect and altitude supports a wide, distinct and scientifically important range of heather and blaeberry heaths and blanket bog, which occur in a variety of altitudinal progressions from the sub-montane (< 600 m) to the montane (600-850 m). In addition, small areas of base-rich influence are evident locally around the lower margins of the site.

The main heath community at lower altitudes is a dry heath dominated by heather and feather mosses with varying amounts of blaeberry, cowberry and bell heather, which can become especially visible in new post-muirburn growth. On damp slopes, especially at higher altitudes, particularly extensive areas of damp heath have sphagnum mosses prominent beneath the heather. The Orkney notchwort, a liverwort that is more typical of the west of Britain and rarer in the east, is found in this habitat. The south-west slopes above the A939 Lecht road support extensive areas of grassy blaeberry heath, which may have developed from heather-dominated heath by many years of burning and grazing.

On wind-blasted slopes and summits where the soils are thin and well drained, the two main forms of alpine heather heath typical of the Eastern Highlands are found. These are dominated by prostrate mats of heather, or on the highest summits blaeberry and crowberry, with varying amounts of lichens. Bushy *Cladonia* lichens are characteristically abundant and include reindeer moss *Cladonia rangiferina*. A number of rare lichens are also found in this alpine heath habitat, including *Flavocetraria nivalis* and *Alectoria vexillifera* ssp. *sarmentosa*. In addition, the especially protected lichen *A. ochroleuca* has recently been recorded here. The Ladder Hills is one of the most important sites in Britain for the extent and good condition of lichen-rich alpine heath.

The site is also important for its blaeberry-dominated snowbed heaths, with species such as dwarf cornel and northern bilberry.

The Ladder Hills has extensive areas of blanket bog, on gentle slopes over an altitudinal range of 450 to 790m. Here, low temperatures and high precipitation results in soil saturation and peat formation. At lower altitudes, below about 650 m, heather is co-dominant with hare's-tail cotton-grass. The cover of heather declines at higher altitudes and the bog vegetation becomes increasingly abundant in lichens. This is one of the most important sites in Britain for relatively intact high-altitude blanket bog, little affected by peat cutting, drainage or muirburn. Small areas of intact blanket bog are also found at lower altitudes. Bog plants indicating lack of disturbance include small cranberry and the bog moss *Sphagnum fuscum*, both locally frequent at higher altitudes. The rare bog moss *S. affine* has also been recorded on the blanket bog.

The small areas of base-rich ground around the margins of the site support habitats such as juniper scrub, calcareous grassland with thyme, alkaline fen, and stony flushes with yellow saxifrage. Some areas of acidic grassland derived from blaeberry heath are also present.

Results of Site Condition Monitoring (SCM), Ladder Hills SSSI

Natural features of Ladder Hills SSSI	Feature condition (date monitored)	Other relevant designations
Upland assemblage	Favourable, maintained* (April 2007).	SAC
Alpine heath	Favourable, maintained (Sept 1999)	SAC
Subalpine dry heath	Unfavourable, declining (April 2007)	SAC
Blanket bog	Favourable, maintained (September 1999)	SAC

*But see notes below.

SCM results for River Spey SAC of which Ladder Hills include a small part

Features of overlapping Natura sites that are not notified as SSSI natural features	Feature condition (date monitored)	SPA or SAC
Atlantic salmon	Unfavourable, recovering (October 2004)	River Spey SAC

Surveys of alpine heath, snowbed heath and blanket bog carried out in 1999 for cycle 1 of SNH's SCM programme, found these habitats to be in favourable condition, though muirburn was noted on blanket bog, and previously on alpine heath. The most recent survey of the Sub-alpine dry heath, carried out in 2007 for cycle 2, found it to be in unfavourable condition, due to burning on sensitive areas, principally sphagnum-rich heath, but also on steep slopes and in heather with uneven structure. The survey also recorded locally high levels of browsing in blaeberry heaths.

As well as being features in their own right, sub-alpine dry heath, alpine heath and blanket bog are components of the Upland habitat assemblage feature of the Ladder Hills (minor components include springs and flushes and areas of juniper scrub and calcareous grassland). Surveys of the Upland habitat assemblage carried out in 2007 found this to be in favourable condition but at that time only the presence and overall extent of component habitats were monitored.

Species

The upland habitats support a rich flora and fauna including a number of rare species. The alpine heath (see above), and the Lecht Mine are important for lichens. The especially protected orange-fruited elm-lichen *Caloplaca luteoalba* was recorded in 2008 on buildings of the former mine, just outside the SSSI.

The breeding bird assemblage includes several species listed on Annex 1 of the EC Wild Birds Directive. Hen harrier used to breed on the site. In the late 1990s the site held more than 1% of the total British breeding population of hen harrier and on that basis was proposed as a Special Protection Area under the Birds Directive. Merlin and golden plover also breed on the site and golden eagle, peregrine and short-eared owl hunt over the area. In addition, several migratory species breed on the site including dunlin, curlew, common sandpiper, snipe, common gull, wheatear and ring ouzel. The raven is also found and osprey, teal, dotterel, dipper and twite have been recorded.

Hen harrier is no longer recognised as a notified feature. Previously, monitoring in 1999 recorded its condition as Favourable, maintained. This was based on the national survey of hen harrier in 1998 which recorded ten breeding sites within the SSSI (5 year mean of 5.6).

Past and present management

The Lecht Mine was worked in the 18th and 19th centuries (largely opencast). The last working took place in the 1840s.

Grouse moor is the principal land use. The sporting estates undertake rotational muirburn of heather in traditional areas. This results in a mosaic of small patches of heather of different ages and structures, in particular amongst the most appropriate dry heath habitat around the lower slopes of the SSSI. Grouse are driven, and shot from butts. Grazing of livestock also occurs over parts of the site.

Some past attempts at drainage with moorland grips on some slopes of blanket bog have recently been dammed. Former peat cuttings have generally become well vegetated. The Lecht ski area is surrounded by, but excluded from, the boundary of the SSSI.

Grazing is primarily by sheep, managed by several tenants. One estate has promoted heather regeneration, mainly by reducing stocking levels. Red and roe deer are seen, though there are no hefted red deer on the hill and their contribution to the grazing pressure is limited. Both species are controlled, as are pest species

such as fox and crow. Mountain hares vary in abundance from year to year and are shot for sport.

Water is abstracted from the site at several locations. Water from two springs within the SSSI is bottled as mineral water at a plant at Braes of Glenlivet. Water is also abstracted from the SSSI for estate and domestic use.

There is a formal picnic area on the margins of the SSSI by the A939, near the Lecht Mine. Another car park along the Lecht road is found on the southern margins of the SSSI, with views in to the Cairngorms.

Objectives for management (and key factors influencing the condition of natural features)

We aim to work with owners and occupiers to protect the site and to maintain and where necessary enhance its features of special interest. SNH will carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features.

The EU Habitats and Birds Directives oblige Government to avoid, in SACs and SPAs, the deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of these Directives. The objectives below have been assessed against these requirements. All authorities proposing to carry out or permit to be carried out operations likely to have a significant effect on the European interests of this SSSI must assess those operations against the relevant Natura conservation objectives (which are listed on our website through the SNHi - SiteLink facility).

1. **To maintain the overall assemblage of upland habitats and in particular the habitats of European importance**

   Favourable condition of dwarf shrub heath habitats is best maintained by light to moderate grazing levels and good muirburn practice.

   The survey in 1999 concluded that whilst grazing pressure from sheep (and deer) is sometimes high, in general it does not appear to be having a deleterious effect on the dwarf-shrub heaths. Recently, stocking levels have been increased on parts of the site, with the aim of ‘mopping-up’ ticks and thus benefitting grouse. This could lead to an increase in grassland species in blaeberry heaths and other habitats.

   Muirburn can maintain the condition of heather-dominated dry heath communities but can damage the moss and lichen layers of other habitats such as alpine heath, damp heath and blanket bog, and can also potentially lead to erosion. It is therefore important that good muirburn practice is carried out and is directed at the appropriate heather-dominated heath communities and, specifically, away from the most sensitive habitats such as sphagnum-rich blanket bog, liverwort-rich damp heath and lichen-rich alpine heath, and more generally away from habitats above 600m. To avoid erosion, the following habitats should continue to be

avoided: areas of exposed peat, areas with thin soils and very steep slopes greater than 1 in 2.

Careful attention should also be given when carrying out muirburn on steep slopes, between 1 in 2 and 1 in 3, and in the vicinity of sensitive habitats. Appropriate precautions for protecting sensitive habitats include only burning when conditions for fire control are optimal and fire control staff and equipment are on hand, and the careful burning of firebreak strips, swiping or using foam barriers.

One estate has produced Muirburn Plans, the most recent under a Rural Development Contract. The estates should be encouraged, in particular through RDC, to develop muirburn plans with appropriate muirburn regimes and prescriptions, which reflect the requirements of the SAC. These should target appropriate habitats and avoid sensitive habitats, in particular areas that have seldom been burnt that are likely to support burning-sensitive species.

2. To avoid disturbance to the important ore deposits at the Lecht Mine but encourage *bona fide* research on these deposits.

The important ore deposits at the Lecht Mine could be damaged by earthworks, excessive mineral collecting, or by land management operations such as drainage and tree planting. There is no evidence of unacceptable levels of mineral collecting. Consideration should be given to providing additional interpretation on the geological interest at the picnic site located by the Lecht Mine.

Other factors affecting the natural features of the site

These include recreational use, and potential impacts from atmospheric pollution and global warming. Little recreational activity takes place within the SSSI, since the Lecht ski area is excluded from the SSSI, cross country skiing is only occasional and hill walking is not as popular as in the Cairngorms. The main route in the SSSI is probably to the summits to the west of the Lecht road, which has led to localised damage to the alpine heath. Atmospheric pollution may impact on the lichens and decrease their abundance and alter species composition. Certain bog mosses are known to respond to high nitrogen inputs which may affect the composition within the blanket bog. Global warming impacts are most likely to affect species sensitive to changes in temperature and rainfall.

Sections of the Ladder Burn, its tributary the Cul Allt and two tributaries of the Crombie Water within the Ladder Hills SSSI form part of the River Spey SAC. Works along or adjacent to these watercourses, for example along the Ladder Burn track, could affect the River Spey SAC. SNH will work with the estates to ensure that the River Spey SAC is not adversely affected by any such works.

Date last reviewed: 2 February 2012.