



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

ERIBOLL
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 612

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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 designated as an SSSI and provides guidance on how its special 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.

This statement is available in Gaelic on request.

Natural features of Eriboll SSSI	Condition of feature (and date monitored)
Cambrian (geology)	Favourable, maintained (June 2007)
Moine (geology)	Favourable, maintained (June 2007)
Quaternary of Scotland (geology)	Favourable, maintained (June 2007)
Dryas heath	Unfavourable, no change (June 2008)
Upland birch woodland	Unfavourable, declining (June 2010)
Open water transition fen	Favourable, maintained (July 2001)

Description of the site

Eriboll Site of Special Scientific Interest (SSSI) is located in northern Sutherland, 11km southeast of Durness. The site rises from the shore of Loch Eriboll to an altitude of 310m and is divided into two parts. The main part of the site has been notified for the Cambrian and Moine geological features, and woodland and heathland habitats. The smaller part of the site is enclosed within farmland near Eriboll House and includes the loch sediments and fen vegetation at Lochan an Druim.

Cambrian geology

Exposures of relatively undisturbed Cambrian rocks (around 500 million years old) can be found on the An t-Sron peninsula. These sedimentary rocks were formed from layers of sediment, such as sand and mud, which have been buried, heated and compressed to form rock. The oldest sediments were very pure sands deposited in a tidal environment, which now form striking white quartzites. Traces of the tidal ripples can be found in the lower parts of the quartzite in the form of patterns known as cross-bedding or false-bedding. The upper parts of the quartzite contain traces of pipe-like worm burrows and this is often called pipe rock. Above the quartzite is a layer of

muddy sediment deposited in deeper, calmer water. This now forms soft, brown crumbly rock called the Furoid beds. Traces of worm casts in the rock were originally misidentified as early seaweed or furoid. Above the Furoid beds is a layer of rock formed from coarser-grained sands and known as Salterella grit. The Salterella grit and Furoid beds contain a range of fossils including olenellid trilobites, which allow the rocks to be dated to the Lower Cambrian period (542-513 million years ago). Above the Salterella grit is a limestone known as Durness limestone, which is the youngest rock layer in the sequence. The sedimentary structures and fossil fauna of these rocks have been studied in detail here and have contributed greatly to our understanding of the changing environments and geography of this area during the Cambrian period.

When monitored in 2007 the area, composition and visibility of this feature had been maintained since the previous survey. Minor broken rock 'spires' at the contact between the Salterella Grit unit and overlying Durness Limestone may have been due to hammering by geologists. This feature was assessed as being in favourable condition.

Moine geology

The Loch Eriboll area contains the most northerly exposures of the Moine Thrust Zone. This major fracture in the Earth's crust was formed during a mountain-building event around 430 million years ago when continental drift caused Scandinavia to collide with Scotland, putting the rocks in Scotland under compression in an east-west direction. This compression produced a series of thrust faults, or thrusts, where rock originally far to the east was pushed westwards on top of neighbouring rock. The thrusts themselves, therefore, are lines of fracture that dip at a low angle towards the east, extending for tens of kilometres through the Earth's crust. One of the main features of thrusts is that they move older rocks on top of younger ones - a process known as overthrusting. The extraordinary nature and magnitude of overthrusting during mountain building processes was first appreciated here.

The Moine Thrust itself, which is the most easterly, and one of the largest thrusts in the Moine Thrust Zone, cuts through the hills near Eriboll around 1km east of the A838. Outcrops on the north side of Ben Arnaboll superbly expose the Arnaboll Thrust (see Figure 1), where Lewisian gneiss (more than 1700 million years old) has been moved on top of the much younger Cambrian pipe rock (500 million years old). There are also important exposures of Cambrian rock with numerous small-scale thrusts around Heilam. These small thrusts produce upright stacks of rock slices known as imbricate structures. The significance of imbricate structures and their relationship to overthrusting was first appreciated here and brought about major advances in the study of mountain building processes. More recent studies near Eriboll continue to shed light on the exact processes and timing of overthrusting, further adding to the site's international importance.

When monitored in 2007 the area, the composition and visibility of the Moine feature had been maintained since the previous survey. The feature was assessed as being in favourable condition.

Quaternary of Scotland geology

The pollen and plant remains preserved in the clay and mud at the bottom of Lochan an Druim provide evidence of the vegetation history of the far northwest of Scotland

during the last 14,500 years. This is the most recent part of the Quaternary geological period, which began around 2 million years ago. Lochan an Druim is the only site in the area covering this period that has been studied in detail. It is a key part of the national network of sites that demonstrate the patterns of vegetation development since the last ice sheets melted after 18,000 years ago. It shows that this part of Scotland remained relatively cold, even during the late glacial interstadial (approximately 15,000 – 12,900 years ago), a time when conditions improved elsewhere. During the Holocene (the last 11,500 years), the area was first colonised by juniper and birch, with birch and hazel woodland developing by 10,700 years ago. Elm arrived in the area about 8,000 years ago, but oak did not extend this far north and pine was probably only locally present. Clearance of the woods and expansion of grassland began about 6,000 years ago when people arrived and there is evidence of arable cultivation from 2,500 years ago. By this time, the woodland had been extensively cleared, resulting in the virtually treeless landscape of the area today.

When monitored in 2007 the area of the Quaternary of Scotland feature had been maintained since the previous survey and the feature was assessed as being in favourable condition.

Dryas heath

There is exceptional development of a very local type of Dryas heath vegetation that is dominated by mountain avens *Dryas octopetala* and rock sedge. This mountain avens/rock sedge heath is associated with the limestone areas and shows remarkable cover over the limestone ridges at Heilam. Mountain avens and rock sedge are both nationally scarce species and their abundance on the rocky slopes within the site is such that Eriboll SSSI has the finest examples of this heath type in the Highlands. Other flowering species in this community include frog orchid and mountain everlasting. Roseroot, Scots lovage and crowberry can be found in areas where grazing pressure is low or absent, such as rocky crevices and inaccessible ledges.

The mountain avens heath was monitored in June 2008 and found to be in unfavourable condition due to overgrazing and, to a lesser extent, trampling. Observations suggest that the resident sheep population favours the richer grazing on the limestone outcrops and associated Dryas heath rather than the extensive areas of dry and wet heaths and blanket bog on the surrounding ground. This concentration of sheep on a relatively small area leads to the effect of a very high stocking density despite what is actually a low to moderate density when considered over the whole agricultural unit.

Upland birch woodland

The birch/rowan woodland at Arnaboll lies on the east facing slopes on the west side of Loch Hope and extends upwards from the loch shore occupying many of the crags and rock outcrops in this area. The woodland is enriched in places by nutrients that have been brought to the surface by ground water. These areas support hazel and a more diverse ground flora including the uncommon Mackay's horsetail.

The area of woodland had not changed when this feature was monitored in June 2010. Birch, hazel, rowan and willow were the most common tree species recorded with aspen also present. Bracken was noted across the site at a density that may be hindering regeneration. Grazing and browsing impacts were considered to be medium at 8 out of 10 sample points although some regeneration was evident along the slope

at the western edge of the woodland. The ground flora at Arnaboll included typical woodland species such as wood-sorrel, common dog-violet, primrose and selfheal. The conclusion was that the woodland was in unfavourable, declining condition.

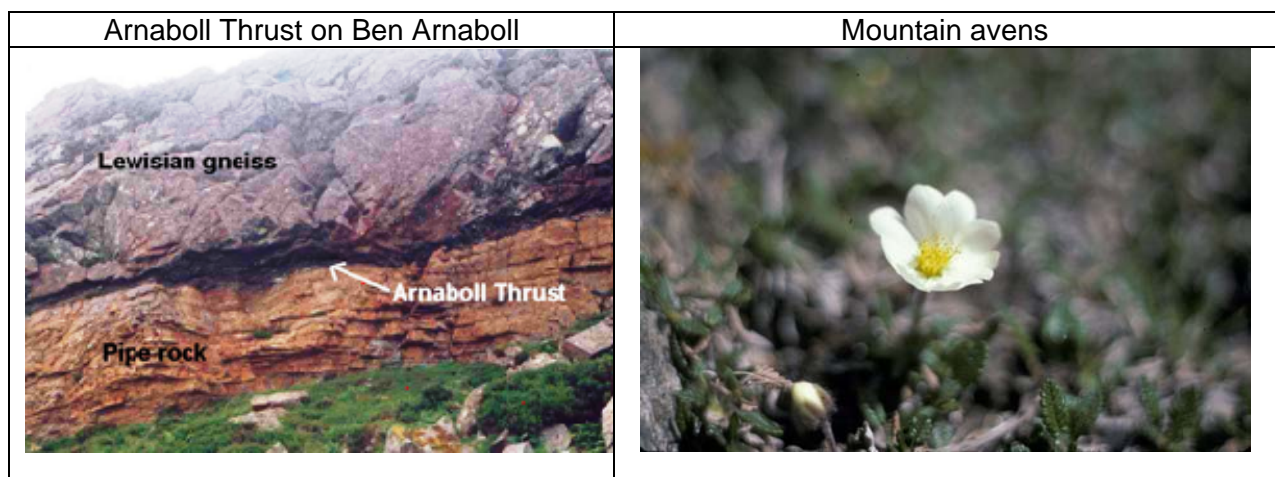
Open water transition fen

Lochan an Druim is important for the fen vegetation as well as the sediments at the bottom of the loch described above as the Quaternary of Scotland geological feature. The fen is fed by calcium-rich water which is unusual in northwest Scotland. This allows species to grow here such as hairy sedge which is very uncommon in north Scotland.

When monitored in 2001 the fen contained the plant species appropriate for this type of habitat. Three non-native plant species were also found, which were presumed to be garden-escapees. The spread of mare's tail into areas that used to be open water may be occurring as part of a natural succession in the vegetation. Some willow was also regenerating within the fen. The feature was assessed as being in favourable condition.

Other interests

Eriboll SSSI forms part of the foraging range of breeding golden eagles.



Past and present management

The SSSI falls completely within Eriboll Estate. The estate manages the land predominantly for sheep grazing. Under a recent Scotland Rural Development Programme (SRDP) contract, sheep grazing levels have been agreed that should bring the Dryas heath feature back into favourable condition. The SRDP contract includes refraining from muirburn and reducing stock numbers. New fencing will also help control access to the Dryas habitats whilst increased shepherding will reduce grazing pressure on the areas favoured by sheep. In addition, the estate is committed to reducing deer numbers and reaching the target deer population as set by the Deer Commission for Scotland (DCS) and maintaining this as a maximum deer population. This should reverse the increase in deer numbers that has occurred over recent years.

Tree seed has been collected from Arnaboll woods for growing on and planting out elsewhere on the Eriboll Estate. Several methods of ground disturbance in order to assist tree regeneration have been tested in an area of bracken and rank grassland

near Eriboll farm (although this woodland does not form part of the woodland feature which is found exclusively at Arnaboll). Bracken clearance has also been carried out in some areas. The track to Arnaboll cottage and cemetery is maintained to allow passage of 4x4 vehicles.

Other management activities include maintenance of existing sea defences, fences walls and tracks, occasional use of low ground pressure vehicles taking care to avoid sensitive wet areas, small-scale removal of sand and loose rock and peat cutting for domestic use from existing banks.

Scottish and Southern Energy have laid a new underground cable and carry out maintenance and repair of existing power lines, including cutting back trees below the power lines. There is a mobile telecommunications mast on the hill above Eriboll Farm.

The area is visited by large numbers of geologists, both for research and education purposes.

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

We wish to work with land managers to protect the site and to maintain and where necessary enhance its features of special interest. SNH aims carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features and to monitor the effectiveness of the management.

The list of Operations Requiring Consent, and the discussions on land management involved in the issuing of formal consents, are intended to minimise the threat of any damage to the natural features.

1. To maintain the extent, visibility and accessibility of the Cambrian and Moine geological features

The Cambrian and Moine outcrops are remote so it is unlikely that any developments or excavations would be proposed that might reduce their extent. Surrounding vegetation is not encroaching upon the features and the current level of grazing seems sufficient to maintain the visibility and accessibility of the outcrops. There were some signs of over-zealous hammering of the smaller outcrops by geologists and, if the opportunity arises, it would be helpful to point out to visiting parties of geologists that they should use their hammers in moderation and follow the Geological Code - www.geologists.org.uk/downloads/GAfieldworkcode.pdf.

2. To allow the sediments and fen vegetation in Lochan an Druim to remain undisturbed

The sediments in the lochan should remain undisturbed. It is important that they remain in their original sequence to allow further studies of the development of the vegetation of the area. This can be achieved by allowing the natural vegetation succession to continue and not altering the drainage in the area close to the loch. This management will also benefit the fen vegetation.

3. To improve the condition, extent and regeneration of the upland birch woodland at Arnaboll

The woodland should support a good range of tree ages: seedlings and saplings, young and mature trees and dead wood, both standing and fallen. Each stage provides habitats for a range of invertebrates, lower plants (e.g. mosses, lichens) and birds.

It is crucial that there is continued recruitment of seedlings and saplings of the full range of tree species. Grazing should be at a level that secures an adequate level of regeneration while allowing the woodland ground flora to flower and set seed successfully. The bracken element of the woodland flora also needs to be at suitable levels to allow successful regeneration and to allow the woodland ground flora to flourish.

Light grazing is not damaging to the woodland and it can be beneficial by creating small open patches that allow seedlings and ground flora to establish. It is recognised that the deer using the site may be coming from surrounding areas outwith Eriboll Estate. Strict adherence to the prescribed DCS cull targets (which forms part of the current SRDP contract) should reduce grazing and trampling to levels that would allow successful woodland regeneration when combined with a bracken control programme.

Fire is very damaging to woodland so care should be taken not to allow any fires to spread into the woodland.

4. To improve the condition and extent of the mountain avens (*Dryas*) heath

This can be achieved by ensuring that grazing is at a level that is great enough to prevent dwarf shrubs (such as heather) spreading into the heath but is also low enough to allow the heathland plants to flower and set seed. Stock reduction, increased shepherding, the new stock fence and the monitoring as agreed in the current SRDP contract should achieve the required level of grazing. Burning is not a desirable form of management for this habitat as short vegetation is maintained through a combination of grazing and wind clipping. Burning within the SSSI is not permitted under the SRDP agreement. Vehicle use on the mountain avens heath is likely to damage the fragile vegetation on this part of the site. Use of vehicles other than on existing tracks should therefore be restricted to use of low ground pressure vehicles on the lower parts of the site, taking care not to damage the vegetation by avoiding soft wet areas and by not using the same route too often.

Other factors affecting the natural features of the site

Non-native plant species: Spread of non-native plants from gardens (such as those round Eriboll House) could potentially damage the habitats on the site.

Date last reviewed: 19 August 2010