Scottish Natural Heritage
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CAM LOCH
Site of Special Scientific Interest

SITE MANAGEMENT STATEMENT

Site code: 301

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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 Cam Loch SSSI	**Condition of feature** (and date monitored)
Moine (geology)	Favourable, maintained (February 2007)
Caledonian Igneous (geology)	Favourable, maintained (February 2007)
Quaternary of Scotland (geology)	Favourable, maintained (February 2007)
Oligotrophic loch (low-nutrient loch)	Favourable, maintained (July 2004)
Upland birch woodland	Favourable, recovered (June 2010)

Features of overlapping Natura sites that are not notified as SSSI natural features	**Feature condition (date monitored)**	**Relevant designation**
Black-throated diver	Favourable, maintained (June 2008)	Inverpolly, Loch Urigill and Nearby Loch Special Protection Area (SPA)

A small part of Cam Loch SSSI overlaps a small part of Inverpolly SSSI and Inverpolly Special Area of Conservation (SAC). Please see the Site Management Statement for Inverpolly SSSI for details of the features of these sites and for our advice on their management.

Description of the site

Cam Loch Site of Special Scientific Interest (SSSI) is located 1km north of the crofting township of Elphin at the southern edge of north-west Sutherland. This site is of national importance for its geology, with excellent exposures of the major geological structure called the Moine Thrust Zone. The sediments preserved on the floor of Cam Loch are also nationally important and record environmental change over the last 13,000 years. Cam Loch itself is nationally important as an example of a low-nutrient loch. The islands within Cam Loch have nationally important areas of birch woodland. Cam Loch is also internationally important for breeding black-throated diver.

Moine (geology)

The slopes of Cnoc an Leathaid Bhig expose an area of rock known as the 'Cam Loch Klippe'. This 'klippe' was once part of a much larger thrust sheet – a displaced rock mass that was driven westwards along a low-angled fault during a series of Earth movements known as the Caledonian Orogeny. The Caledonian Orogeny was a period of mountain building, initiated by continental collisions that occurred around 460 to 430 million years ago. The rocks exposed on Cnoc an Leathaid Bhig are known as a klippe because most of the rest of this thrust sheet has been eroded away leaving the Cam Loch Klippe isolated from the other remnants of the thrust sheet.

The base of the klippe can be identified just north of the eastern end of Cam Loch where it has moved Lewisian gneiss (up to 3000 million years old) on top of younger Cambrian quartzite (around 550 million years old). Older rocks are only found on top of younger ones when major movements in the Earth's crust have disturbed the normal sequence of rock formation - in which younger rocks would be found on top of older ones. The Cam Loch Klippe lies within the Moine Thrust Zone, which is a great dislocation in the Earth's Crust which runs down the western side of the Highlands and which formed during the Caledonian Orogeny. Detailed study of the Cam Loch Klippe in relation to the surrounding faulted and folded terrain has helped geologists to understand the sequence of events which formed the Moine Thrust Zone. It is also an important site for testing methods used for analysing areas of thrust faulting.

The Moine feature was monitored in 2007 and was found to be in favourable condition with the visibility of outcrops maintained from previous surveys. This feature appeared unchanged from the last monitoring visit, other than natural erosion. Paths, parking and bridges associated with angling on Cam Loch are beneficial for access to this feature.

Caledonian Igneous (geology)

The crags at Creag na h-Innse Ruaidhe, to the north east of Cam Loch, contain an important exposure of a small area of rock known as a 'grorudite dyke' (Figure 1). This grorudite dyke is found within the 'Cam Loch Klippe' described in the section above. A dyke is a thin vertical sheet of rock formed from cooled molten rock that was pushed (intruded) into the surrounding rock. 'Grorudite' describes the composition of the dyke, which in this case is quite chemically distinct and unusual. The grorudite dyke can be seen as a band of fine grained, red coloured rock roughly 1m wide which cuts across the beds of pale Cambrian quartzites which are around 550 million years old.

The grorudite dyke formed between 439 and 430 million years ago during the Caledonian Orogeny. Other grorudite dykes of a similar age exist in the Assynt area but only above a thrust fault known as the Ben More Thrust Plane. The occurrence of a grorudite dyke in the Cam Loch Klippe therefore provides the most compelling evidence that the rocks on this site lie above the Ben More Thrust Plane, either in the Ben More Thrust Sheet (which is extensively exposed to the east) or an unnamed thrust sheet lying above it (which is possibly not exposed anywhere else).

The Caledonian Igneous feature was monitored in 2007 and was found to be in favourable condition with all the key exposures remaining visible. Other than natural erosion, this feature appeared unchanged since the last time it was monitored.

Quaternary of Scotland (geology)

The sediments on the bottom of Cam Loch have been accumulating since the last ice sheet melted towards the end of the Ice Age, around 15,000 years ago. They contain a valuable record of environmental changes during the latter part of the Devensian glacial period, between about 15,000 and 11,500 years ago. Between about 30,000 and 15,000 years ago, much of Britain was covered by a huge ice sheet similar to that covering Greenland today. Around 15,000 years ago, the climate warmed rapidly and the ice sheet melted. Pollen, diatom and chemical analyses, together with radiocarbon dating of the sediments in Cam Loch, show that the warming of the climate was twice interrupted by colder phases, the latter corresponding with the Loch Lomond Stadial when glaciers re-advanced over much of the Scottish Highlands. Pollen grains preserved in the sediments at Cam Loch have been used to identify the types of vegetation that existed in this area at the time when the sediment was deposited and it is this information that provides the detailed history of environmental change. This also makes the site a key reference locality for northwest Scotland, allowing comparisons with sites elsewhere in the British Isles and north west Europe.

The Quaternary of Scotland feature was monitored in 2007 and was found to be in favourable condition as the sediments on the bottom of Cam Loch have not been disturbed.

Oligotrophic loch (low-nutrient loch)

Cam Loch is a nationally important low-nutrient loch lying at 124m altitude. The shallow waters around the edge of the loch, together with some of the open water areas, support a particularly diverse range of plant species including some with a very restricted distribution. Common sedge, bottle sedge and marsh horsetail are locally abundant in shallow water. Submerged species, including quill-wort and shore-weed, are widely distributed and the occurrence of the nationally scarce pillwort is especially noteworthy. Several species of pondweed, including the nationally scarce long-stalked pondweed, occur in deeper water.

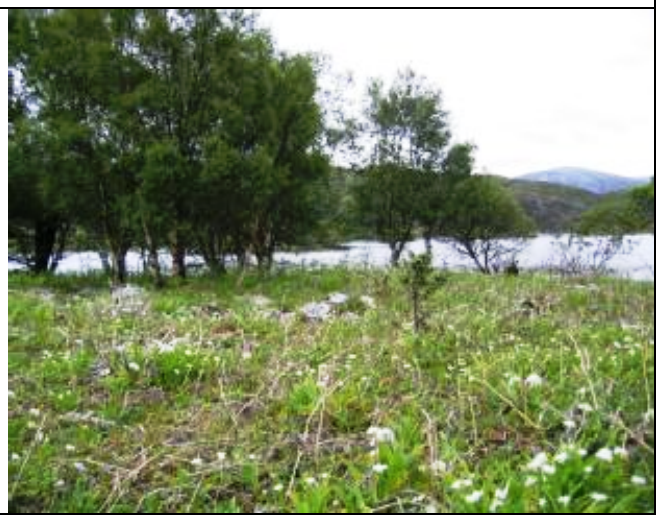
The loch was monitored in 2004 and was found to be in favourable condition. The natural hydrological regime, natural shoreline and natural and characteristic substrate had been maintained. The low water levels at the time of the survey particularly favoured the growth and spread of the pillwort populations as it requires shallow water in which to establish. No invasive species were recorded in the loch and characteristic species such as lake quillwort, alternate water-milfoil, water awlwort and shoreweed were present.

Upland birch woodland

There are seven wooded islands within the loch with the most significant area of woodland being on Eilean na Gartaig, a partly wooded island lying towards the south end of the loch. The tree and shrub layer is dominated by downy birch with rowan, holly and several species of willow. Some of the smaller islands support alder, bird cherry and juniper. The brown earth soils of the flood zone on the islands are enriched by the loch water during winter floods, giving rise to a ground flora which is exceptionally good for a northern birch wood. Ramsons (Figure 2), goldilocks buttercup and bluebell are found here, as well as the blaeberry that is more typical of other woodlands in the area.

Figure 1. The contact between the pink/red grorudite dyke and Cambrian grey/pink quartzite just above a small knoll at the northern end of Creag na h-Innse Ruaidhe.

Figure 2. Woodland on Eilean na Gartaig with ramsons in the foreground



The upland birch woodland on the islands was monitored in 2010 and assessed as being in favourable condition. A woodland profile survey was also carried out in 2007. Both surveys found evidence of browsing and grazing by deer which had swum across the loch, but this was generally at an acceptable level. Deer had been making quite heavy use of Eilean na Gartaig with some tracking and medium levels of browsing. Sustained or increased deer browsing could lead to the loss of characteristic species such as honeysuckle, holly, willow, alder, bird cherry and juniper. Deer numbers on the islands therefore need to be kept under review. Deer management on adjacent ground should help keep numbers on the islands at a suitable level.

Raspberry and redcurrant were found on Eilean an Tighe. These are ‘non-native’ species and there is clear evidence of this island being used by man over a long period, possibly originally as an iron-age settlement or crannog. The raspberry and redcurrant may therefore be associated with early habitation. Redcurrant also occurs in low numbers in places along the shoreline of Eilean na Gartaig, to which it may have spread from Eilean an Tighe. Any further spread of either species on Eilean na Gartaig should be monitored closely and managed to prevent damage to the native woodland.

Levels of tree regeneration were quite low, but the woodland survey in 2007 concluded that this was inevitable at this site because the dense cover of mature trees only allows room for a few saplings to establish. Birch is the main tree species on the islands. Birch does not normally regenerate successfully in the shade of mature trees. In contrast, rowan is more shade-tolerant species and some rowan saplings have established successfully, particularly where protected from deer amongst fallen trees.

Characteristic woodland plants were found growing beneath the trees, but there was some concern that sustained or increased grazing and trampling by deer could damage these plants. Signs of camping and campfires were noted, suggesting that the islands have been used for recreation by fishermen and/or canoeists. Future monitoring will continue to assess any threats to the woodland habitat from these activities.

Black-throated diver

Cam Loch is part of the Inverpolly, Loch Urigill and Nearby Lochs Special Protection Area (SPA) which is designated for black-throated diver. One pair of black-throated diver breed on Cam Loch.

Black-throated divers nest on the banks of relatively remote, undisturbed upland lochs. All breeding and feeding activities are normally carried out on these or nearby lochs. This species usually feeds at sea after the breeding season and during the winter. The British breeding population of black-throated diver is less than 200 pairs, so the pair that nest on one of the small islands within Cam Loch are an important part of the national population.

Black-throated divers are excellent swimmers but they are relatively immobile when on land. They nest close to the edges of lochs where they have easy access to water but this makes their nests vulnerable to flooding. Divers can live a long time – at least 20 years – but they generally have low breeding success, raising a maximum of two young each year. The black-throated divers on this site are notably unsuccessful at producing chicks. This may be a result of flooding of the nest site and disturbance from anglers or canoeists.

Other interests

Two unusual plants, melancholy thistle and globe flower, grow on the islands.

Cam Loch lies within the Assynt – Coigach National Scenic Area. Maintaining the quality of the landscape thus plays a key part in the management of this area.

Past and present management

The SSSI has three owners, and is part of Elphin Common Grazings. The site is used mainly for grazing of sheep and cattle on the loch margins and deer stalking takes place on the surrounding estates. Several owners and tenants fish the loch. Water from the loch is used to supply a fish farm on Loch Veyatie but this does not affect the water level and quality of the loch directly. Boats are used for fishing and occasional recreational canoeing takes place.

At least one of the islands - Eilean an Tighe - used to be inhabited as there are the remains of a house and a dry stone wall, as well as raspberries and redcurrant here. Current management of the islands mainly consists of non-intervention.

There are extensive forestry plantations near the rivers that flow into the loch and a marble quarry also operates within the catchment but there is no evidence that these affect the hydrology of the loch.

Part of Cam Loch SSSI lies within Glencanisp Estate and is covered by a 50 year Management Agreement between the estate and SNH that ensures that all management activities are undertaken in an environmentally sustainable manner.

This site is used for recreation by anglers. Canoeists also sometimes use the loch.

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 to carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and its natural features and monitor the effectiveness of the management agreement.

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 where 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).

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 structure and visibility of the Moine and Caledonian Igneous geological features on the north shore of Cam Loch

Any proposals that might obscure the Moine and Caledonian Igneous geological exposures, such as large areas of new woodland, should be avoided. This objective can readily be achieved by maintaining the present management that allows natural processes to continue with minimal intervention or disturbance.

2. To avoid disturbance of the sediments on the bottom of Cam Loch

It is important that the sediments in Cam Loch are left undisturbed to ensure that the layers of sediment remain in sequence. This will allow future research on the layers of sediment that have accumulated since the Ice Age to take place. Significant activities which may require substantial mooring or anchoring, such as fish farming, should be avoided in the loch.

3. To maintain the condition, extent and distribution of the upland birch woodland

There is currently relatively little tree regeneration on the islands. Long term survival of the woodland clearly requires young trees to become established at some point before the old trees die out. The surveys carried out in 2007 and 2010 both concluded that the dense canopy of mature trees on the islands in Cam Loch is the main reason for the low levels of tree regeneration.

Grazing and browsing by deer also affects this site. Total exclusion of deer from the islands would not be desirable as some grazing is necessary to maintain a relatively open ground flora which benefits not only the flowering plants that grow beneath the trees but also provides small gaps in the vegetation in which young trees can become established. The red deer that swim across to the islands spend a relatively short time there before returning to the much larger population of deer in the surrounding area outwith Cam Loch SSSI. The condition of the woodland ground flora can be maintained by reducing deer impacts on these islands through control of deer in the wider area. This should be addressed as part of the Joint Working programme which is in place for Inverpolly SSSI. It may also be necessary to investigate winter shooting of deer on the islands themselves, as this would reduce the impacts of deer more directly. We will discuss this with the Estate that owns the islands.

We will monitor any spread of redcurrant and raspberry on Eilean na Gartaig as this may need to be managed to prevent these non-native species from out-competing the native vegetation.

4. To maintain the condition, extent and distribution of the freshwater and loch side habitats

This objective can readily be achieved by maintaining the present management of Cam Loch, allowing natural processes to continue with minimal intervention or disturbance. Activities in or around the loch that would alter water levels, release sediment and excessive nutrients or chemicals into the water should be avoided. Where possible, any increase in drainage, abstraction or other activities affecting the hydrology of the river catchment should be avoided. Agricultural or forestry operations within the catchment should be carefully managed to prevent the input of sediment, chemicals or nutrients into watercourses.

Scottish Environment Protection Agency (SEPA) guidance on Best Management Practice to reduce diffuse pollution of water bodies should be followed if any works are planned in or around Cam Loch. Controls over potentially damaging changes in management of lochs and streams are covered by the Controlled Activities Regulations (CAR) which is regulated by SEPA. The booklet 'Controlled Activity Regulations: a Practical Guide' can be downloaded from the SEPA website at http://www.sepa.org.uk/water/water_publications.aspx

5. To maintain populations of black-throated diver and avoid significant disturbance of the birds during the breeding season

Activities on the site should be carefully planned to safeguard the nesting black-throated diver. Black-throated divers are particularly sensitive to human presence and are protected by special legislation. Disturbance during the nesting season (April – June inclusive) can lead birds to desert their nests and increase the opportunities for

predators to take eggs or chicks. While young are on the water (June – July), disturbance should be avoided. Anglers should look out for divers and keep as far away from their nests as possible. A leaflet on 'Black-throated divers and anglers' explains how anglers can help divers by avoiding their nests, is available from SNH on request.

The use of power boats/jet skis should be discouraged during the breeding season.. Frequent visits to the area near the nest site by canoeists should also be discouraged.

Fluctuations in water levels and pollution or excessive release of sediment within the catchment of the loch should be avoided. Fluctuations in water levels can flood diver nests and affect the availability of their food supply.

Black throated divers are vulnerable to predation during the egg and early chick stages. Foxes, crows and mink are potential predators of diver eggs or young. Legal control of these species as part of general estate management is likely to be beneficial to the divers. Minimising human disturbance to nesting divers is also important because predators can take eggs or small chicks more easily if the adult birds are not there to protect them.

Date last reviewed: 2 December 2010