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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

FOINAVEN
SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE

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Site Details

Site name: Foinaven

Map: https://sitelink.nature.scot/site/8260

Location: Highlands and Islands

Site code: UK0013141

Area (ha): 14,853.66

Date designated: 17 March 2005

Qualifying features	**Assessed condition on this site**	**SCM visit date**	**UK overall Conservation Status**
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable Maintained	16 June 2016	Unfavourable - Bad
Acid peat-stained lakes and ponds (also known as 'dubh lochans')	Favourable Maintained	16 June 2016	Unfavourable - Bad
Wet heathland with cross-leaved heath	Unfavourable No change	3 July 2015	Unfavourable - Bad
Dry heaths	Unfavourable Declining	3 July 2015	Unfavourable - Bad
Alpine and subalpine heaths	Unfavourable Declining	22 July 2010	Unfavourable - Bad
Montane acid grasslands	Favourable Maintained	26 October 2004	Unfavourable - Bad
Species-rich grassland with mat-grass in upland areas*	Unfavourable No change	3 July 2015	Unfavourable - Bad
Tall herb communities	Favourable Maintained	25 August 2010	Unfavourable - Bad
Blanket bog*	Unfavourable No change	3 July 2015	Unfavourable - Bad
Depressions on peat substrates	Unfavourable No change	3 July 2015	Unfavourable - Bad
Acidic scree	Favourable Maintained	3 July 2015	Unfavourable - Inadequate
Plants in crevices on acid rocks	Favourable Maintained	25 August 2010	Unfavourable - Bad
Plants in crevices on base-rich rocks	Unfavourable Declining	25 August 2010	Unfavourable - Inadequate
Freshwater pearl mussel (*Margaritifera margaritifera*)	Unfavourable Recovering	15 April 2014	Unfavourable - Bad
Otter (*Lutra lutra*)	Favourable Maintained	21 June 2012	Favourable

/see next page for Notes

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.
* Indicates a Habitats Directive Priority Habitat

Overlapping and linked Protected Areas

Foinaven SAC overlaps with

- the majority of Foinaven Site of Special Scientific Interest (SSSI) https://sitelink.nature.scot/site/647
- part of Foinaven Special Protection Area (SPA) https://sitelink.nature.scot/site/10112

and lies adjacent to

- Loch Stack and River Laxford SSSI https://sitelink.nature.scot/site/1055

Key factors affecting the qualifying features

Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
This feature includes most of the larger named lochs on this site that have inflow and/or outflow streams and a stony, rather than a peaty, bottom. The habitat type overall includes both oligotrophic (nutrient-poor), mesotrophic (moderate nutrient level) waters, and intergrading types. The lochs found at Foinaven SAC are at the nutrient-poor end of this range (Palmer (1992) type 2 or 3). The dominant substrates are silt, sand, gravel, stones and boulders. The clear soft water, which characterises this habitat type, contains low 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 factors that could affect this habitat are changes to hydrology, invasive non-native species, surface water pollution and air pollution.

Acid peat-stained lakes and ponds (also known as 'dubh lochans')
Acid peat-stained lochs and lochans (also known as dubh lochans) occur within the blanket bog on Foinaven SAC. This feature includes most of the un-named pool systems and lochans at lower altitude on this site. These water bodies are very acidic and poor in plant nutrients. They usually do not have either inflow or outflow streams, are predominantly rain fed, with the water being held in the pool due to the high water table in the surrounding peat. Their water has a high humic acid content and is usually stained dark brown through exposure to peat. The pools are naturally species-poor and usually have a peaty, rather than a stony, bottom.

The health of these lochs is often closely linked with the surrounding bog. Key requirements for this habitat type are the maintaining of an appropriate hydrological regime and prevention of pollution (from air and surface water).

Wet heathland with cross-leaved heath

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats. Wet heaths occur in several types of ecological gradient. At Foinaven SAC they occur at low altitude in moderate gradients between dry heath or other dry, acid habitats (which are found on steeper ground) and blanket bogs (which are usually found on flatter ground). Wet heath that is rich in lichens and northern or montane species also occurs at high altitude in mosaics with Alpine and subalpine heaths. Flushed wet heaths also occur in channels within heath or grassland vegetation.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to the effects of red deer trampling (which has led to creation of too much bare, disturbed ground) and browsing (which has removed too much growth from dwarf shrubs such as heather).

Other key factors currently (or potentially) affecting this habitat include grazing/trampling by livestock, burning, use of vehicles, forestry, non-native species, air pollution and habitat loss for development.

Dry heaths

Dry heaths occur on freely-draining, acidic to almost neutral soils with generally low nutrient content on this site. Ericaceous dwarf-shrubs dominate the vegetation but all heaths vary in their flora and fauna according to altitude, aspect, soil conditions (especially base-status and drainage), maritime influence, and grazing and burning intensity.

Nearly all dry heath on Foinaven SAC is semi-natural, being derived from woodland through a long history of grazing and burning. On this site, dry heaths are managed mainly as extensive grazing for red deer although there are sheep on parts of the site.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable declining condition at this SAC due to the effects of red deer trampling (which has led to creation of too much bare, disturbed ground) and browsing (which has removed too much growth from dwarf shrubs such as heather).

Other key factors currently (or potentially) affecting this habitat include grazing/trampling by livestock, burning, use of vehicles, forestry, non-native and invasive species, air pollution and habitat loss for development.

Alpine and subalpine heaths

Alpine and subalpine heaths occur on acid rocks on the mountains within Foinaven SAC, both on exposed lower summits and ridges and on sheltered slopes. Exposure or snow-lie, which suppress the growth of dwarf-shrubs, also favours the growth of characteristic lichens and bryophytes. Alpine heaths develop above the natural altitudinal tree-line. On lower slopes, subalpine heaths may grade into floristically similar dry heaths.

Alpine and subalpine heaths that are rich in mosses, lichens and/ or juniper are particularly susceptible to disturbance, especially by fire. Rocky ground can be important in protecting heaths from fire. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable, declining condition at this SAC due to the legacy of high levels of past burning, past grazing (mainly by sheep, whose numbers have since been decreased) and red deer. These high levels of grazing have caused the heaths to be overly dominated by grasses at the expense of the typical species of this habitat.

Other key factors that could potentially affect this habitat include grazing/trampling by livestock, burning, forestry, air pollution and invasive native and non-native species.

Montane acid grasslands

Montane acid grassland is the most extensive type of vegetation in the high mountain zone, i.e., above an altitude of about 750 m. It characteristically forms large continuous tracts, covering the tops of the higher summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by extremes of exposure and snow-lie.

The habitat is vulnerable to nutrient inputs and physical damage such as occur due to dunging and urination by grazing animals, acid deposition, human and animal trampling and use of all-terrain vehicles. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

The key management issues are the nature and extent of red deer grazing/browsing and trampling and grazing/trampling by livestock. Other key factors currently (or potentially) affecting this habitat include burning, use of vehicles, forestry, non-native species and air pollution.

Species-rich grasslands with mat-grass in upland areas

This Habitats Directive Priority Habitat has developed on parts of the site where there is flushing through base-rich strata on siliceous, moderately base-rich metamorphic or igneous bedrock. The soils have an acidic pH (<7.0 and mainly <6.0) and are derived from bedrocks with at least some silica. The altitudinal range varies from near sea level to an upper limit of between 800 and 900 m.

This habitat is particularly susceptible to changed nutrient status e.g., agricultural improvement, burning, over- and under-grazing, forestry, air pollution and damage from recreational pressure. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to the legacy of high levels of grazing in the past by sheep (whose numbers have since been decreased) and red deer. These high levels of grazing have caused a change in the composition of plant species, at the expense of the typical species this habitat.

The other key management issues is trampling by red deer and livestock.

Tall herb communities

Tall herb communities are typically found on ungrazed upland cliff ledges, occasionally extending on to open ground, and are restricted to base-rich substrates and somewhat sheltered situations. This habitat 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 low/no grazing from domestic stock and deer and no invasion by other species. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

The key management issue is preventing any increase in grazing/browsing or trampling of this habitat.

Blanket bog

This Habitats Directive Priority Habitat is found in areas of moderate to high rainfall and a low level of evapotranspiration which allow 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 feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to the effects of red deer trampling (which has led to creation of too much bare, disturbed ground) and browsing (which has removed too much growth from dwarf shrubs such as heather).

Other key factors affecting this habitat on this site include erosion, tracks from vehicles, grazing/trampling by livestock, drainage, burning, peat cutting, changes in the hydrology, recreational use and air pollution.

Depressions on peat substrates

Depressions on peat substrates occur in complex mosaics with lowland wet heath and blanket bog on Foinaven SAC. The vegetation is typically very open, usually characterised by an abundance of white beak-sedge *Rhynchospora alba*. This habitat is found in complex mosaics in hollows and on the edge of bog pools, so tends to be in small patches scattered throughout the blanket bog on this site. They are wet when the water table in the surrounding bog is at surface level, but can dry out in summer when the water can be replaced by an algal mat.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition at this SAC due to creation of too much bare, disturbed ground, mainly as a result of red deer trampling.

Key factors affecting this habitat are changes to hydrology that may alter the water table, inappropriately high or low grazing pressure (by red deer) and burning.

Acidic scree

Scree habitats 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 natural disturbance. Acidic screes are made up of siliceous rocks such as quartzite, granite and sandstone. They may occur at any altitude, but screes in the lowlands are excluded from the Annex I definition.

Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

The key issues affecting this habitat are the nature and extent of grazing/browsing and trampling by animals and people.

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 on Foinaven SAC. 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 and low nutrient availability. They can be sensitive to overgrazing and trampling although many sites are protected by inaccessibility. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

The key management issues affecting this habitat are the nature and extent of grazing/browsing and trampling.

Plants in crevices on base-rich rocks

On Foinaven SAC, this plant community is found in crevices on base-rich rock such as calcareous schists where there is some shelter and moisture. The largest areas of this habitat are between Allt Horn and Creachan Thormaid, and on the north-east slopes of Meall Horn. Plants tend to be sparse and scattered due to the limited soil development and harsh and sometimes extreme conditions. Chasmophytic plant species such as these (which grow in the crevices of rocks) 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 invasive species. Some of the plants that grow in this habitat are at the lower limit of their altitudinal range whilst also occurring on the highest parts of this site.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable declining condition at this SAC due reduction in the cover of typical species due to red deer grazing and the presence of an invasive non-native species - New Zealand willowherb *Epilobium brunnescens* - which has the potential to progressively out-compete the typical species of this habitat.

The key management issues affecting this habitat are the nature and extent of grazing/browsing and trampling and presence of non-native invasive species.

Freshwater pearl mussel

Freshwater pearl mussels are long-lived freshwater molluscs that live in the gravel beds of clear, unpolluted rivers. For part of their lifecycle they are dependent upon a healthy population of salmonids (young salmon or trout) which act as host species. The mussel larvae attach to the gills of salmonid fish in mid to late summer and drop off the following spring. When they detach from their hosts they must land in sandy or gravelly substrates to settle and grow to adulthood.

This feature has been assessed through NatureScot's site condition monitoring programme as being in unfavourable recovering condition at this SAC due to the small number of fresh water pearl mussels present as a result of the legacy of past (now illegal) pearl fishing.

The key factors affecting freshwater mussel populations are changes to water quality (including pollution), hydrological alterations (including river engineering and abstractions), habitat degradation of river beds and banks, illegal pearl fishing and availability of host species.

Otter

Otter require continued access to unpolluted open freshwater at Foinaven SAC. There should be a plentiful food supply and features for providing shelter for both resting and breeding. They are wide ranging and normally occur at low densities.

Key factors which have previously led to population declines in otters were pollution, persecution and habitat loss.

Further information about this SAC's protected habitats and species can be found on the JNCC website.

Conservation Priorities

Blanket bog and species-rich grassland with mat-grass in upland areas are both Habitats Directive Priority Habitats. Appropriate management of these habitats should therefore have priority, followed by features that are in unfavourable condition, if any conflict between management of different habitats or species were to arise.

In practice, there is unlikely to be any conflict between management of the differing features of Foinaven SAC. Habitat and species distribution is mainly determined by environmental conditions and all features listed above would benefit from a low herbivore population in the wider area. Careful consideration would be needed before planting trees adjacent to streams within Foinaven SAC (e.g., to benefit freshwater pearl mussel) as this should be done in a way that does not have negative effects on habitat features (especially priority habitats or features in unfavourable condition).

This SAC overlaps with part of Foinaven SPA. Any management of the SAC, or assessment of plans or projects, will also need to take account of the SPA golden eagle interest.

Conservation Objectives

Overarching Conservation Objectives for all habitat features of Foinaven SAC

1. To ensure that the qualifying features of Foinaven 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 Foinaven SAC is restored by meeting objectives 2a, 2b and 2c for all qualifying features
The aim at this SAC is to maintain or restore all qualifying features at or to favourable condition as a contribution to their wider 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 each 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 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 clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels within the site

This feature includes the larger lochs within Foinaven SAC. The Scottish Loch Survey found that all the larger lochs that were surveyed were oligotrophic lochs (Palmer (1992) type 2 or 3). The results of the Scottish Loch Survey can be found here in the Standing Water Database.

The extent of clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat feature has been estimated at 505 ha. The area figure has been taken from the Standard Data Form. There should be no measurable net reduction in the extent of the habitat and, 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 clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

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 water level fluctuations and 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. Any scrub encroachment could also lead to increased input of leaf-litter.

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
Dissolved oxygen in loch water is vital for respiration of all aquatic plants and animals. 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, such as those found within Foinaven SAC, should have pH of 5.5 to 7.

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. 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.

Nutrients
There should be no unnatural nutrient inputs to lochs, for example from sources such as septic tanks or run-off from intensive land management.

Phosphorus is one of the main nutrients required for plant growth. There is strong correlation between Total Phosphorus (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, and for shallow lochs (mean depth <3m) 20ugP/l.

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 1.5 mg/l with no increase from the baseline level where that is known.

2c. Maintain the distribution and viability of typical species of clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

Most of the larger lochs at Foinaven SAC are oligotrophic (nutrient-poor) lochs. Typical species are:

Litorella uniflora	shoreweed
Lobeliia dortmanna	water lobelia
Subularia aquatica	awlwort
Carex nigra	common sedge
Ranunculus flammula	lesser spearwort
Isoetes lacustris	lake quillwort

Some of the lochs also have a few of the species typical of more mesotrophic (moderate nutrient) lochs:

Potamogeton natans	broad-leaved pondweed
Potamogeton polygonifolius	bog pondweed
Sparganium angustifolium	floating bur-reed
Utricualria species	bladderworts

Many of the lochs that form this feature were surveyed by the Scottish Loch Survey. Species lists for each loch surveyed can be found here in the Standing Water Database.

The viability of the typical 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.

Non-native 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*, *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.

In addition, red-throated *Gavia stellata* and black-throated diver *Gavia arctica* can typically be found breeding on these lochs.

Conservation Objectives for Natural Dystrophic lakes and ponds [H3160] (Acid peat-stained lakes and ponds (also known as 'dubh lochans'))

2a. Maintain the extent and distribution of acid peat-stained lakes and ponds (also known as 'dubh lochans') within the site

This habitat is composed of many relatively small, un-named lochs and pools (known as dubh lochans) scattered throughout the site.

There should be no measurable net reduction to the extent of the habitat and its distribution throughout the site. The extent of the acid peat-stained lakes and ponds has been

estimated at 15 ha (estimate taken from the Standard Data Form).

2b. Maintain the structure, function and supporting processes of acid peat-stained lakes and ponds (also known as 'dubh lochans')

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

Because they tend to be small and rather shallow the surface area of dystrophic lochs may fluctuate naturally more than other lochs. Otherwise see objective 2b for 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'.

Hydrological regime

The habitat is rain fed but may be affected by fluctuations in the water table of the surrounding bog. Otherwise see objective 2b for 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'.

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. Sediment type can be indicative of exposure. The substrate of the majority of dystrophic lochs is dominated by peat although there are rare examples on more mineral gravels. Changes to the substrate character may 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.

Natural sediment load

Accumulation of nutrient-rich sediment may have a strong effect on the water quality and biology of the loch. Enrichment can be caused by the release of nutrients bound to silt. 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. Release of sediment from afforested catchments particularly during site preparation and harvesting is a particular issue. Eroding peat within the catchment may also be an issue for this type of loch. Evidence is growing that an increase in storm events associated with climate change may increase the amount of sediment deposited in lochs. Poaching of loch margins and feeder burns by grazing animals may also be important.

Connectivity between the loch and the surrounding area

Poaching of loch edges should be avoided as this can damage or destroy the characteristic edges and marginal vegetation. Otherwise see objective 2b for 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'.

Water Quality

Dissolved Oxygen

See objective 2b for 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'.

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. Dystrophic lochs should have pH of less than 5. Careful consideration should be given to afforestation of catchments with low buffering capacity.

Nutrients
See objective 2b for 'clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels'.

Filamentous algae
Filamentous algae are a negative indicator associated with high nutrient levels. Some species can form dense floating rafts or coat macrophytes. Filamentous algae should only generally be found at low levels in dystrophic lochs. Presence of *Batrachospermum* sp. filamentous algae is acceptable as this species occurs naturally in pools on this site.

2c. Maintain the distribution and viability of typical species of acid peat-stained lakes and ponds (also known as 'dubh lochans')

There should be a low to medium diversity and typical species with a macrophyte community typical of the lake type with appropriate species richness and a natural assemblage.

Dystrophic lochs vary greatly in their macrophyte communities, some having none at all. Typical species found in this habitat on Foinaven SAC are:

Aquatic *Sphagnum* species	bog mosses
Menyanthes trifoliata	bogbean
Eriophorum angustifolium	common cottongrass
Juncus bulbosus	bulbous rush
Eleocharis multicaulis	many-stemmed spike rush

There should be no loss or significant decline in the distribution or abundance of these species.

In addition, red-throated diver *Gavia stellata* can be found breeding on some of the larger lochans of this type. Scarce dragonfly species are often associated with this habitat.

Conservation Objectives for Northern Atlantic wet heaths with *Erica tetralix* [H4010] (Wet heathland with cross-leaved heath)

2a. Maintain the extent and distribution of wet heathland with cross-leaved heath within the site

Maintain the extent of this habitat to approximately 3089 ha. The area figure has been taken from the Standard Data Form, and is an estimate.

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 subalpine heath, usually in areas with some shelter. There should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

2b. Restore the structure, function and supporting processes of wet heathland with cross-leaved heath

Wet heath is sensitive to inappropriate trampling, grazing or burning that may affect the habitat structure and function in two main ways. A combination of overgrazing and frequent

burning can lead to creation of a grassy sward if this is continued over many years. Inappropriately high stocking levels (by red deer and/or livestock) can also result in high levels of nutrient input and trampling.

Whilst scattered native trees are compatible with wet heath habitat a complete lack of grazing or burning can lead to wet heath being colonised by species that are not typical of this habitat (such as dense areas of trees) if this management is continued over many years. A low level of grazing is therefore needed to maintain this habitat. Most of the grazing/browsing at Foinaven SAC is currently by red deer although there are a few sheep on parts of the site.

Wet heath on Foinaven SAC should be restored from the legacy of damage from past trampling, overgrazing and burning. The restoration objectives are to:

- restore the height structure of the vegetation by reducing grazing/browsing by red deer and sheep 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 sheep 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.

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 and non-native species.
- Native trees and shrubs should occupy no more than 20% of the vegetation cover. This is roughly equivalent having up to 20 native trees per hectare.
- Active drainage should be minimised. No new drains should be dug and existing ones should be blocked.

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

2c. Restore the distribution and viability of typical species of wet heathland with cross-leaved heath

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. The distribution of typical plant species should be restored throughout the habitat by appropriate red deer management and avoiding frequent burning (see Objective 2b). This habitat is currently used by red deer on this site. High levels of herbivore use have damaged this habitat in the past and led to a reduction in the distribution of typical species. A low level of grazing and browsing is necessary to allow this habitat to recover and be maintained in future.

At Foinaven the typical species include:

Arctostaphylos species	bearberry/Arctic bearberry
Calluna vulgaris	common heather
Erica cinerea	bell heather
Erica tetralix	cross leaved heath
Eriophorum angustifolium	common cottongrass

Cladonia species	lichens
Racomitrium lanuginosum	woolly fringe-moss
Sphagnum species	bog mosses
Trichophorum species.	deer grass

In addition, typically associated birds include red grouse (*Lagopus l. scotica)*, golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina schinzii)*, greenshank (*Tringa nebularia*), golden eagle (*Aquilla chrysaetos*), merlin (*Falco columbarius*) and hen harrier (*Circus cyaneus*).

Conservation Objectives for European dry heaths [H4030] (Dry heath)

2a. Maintain the extent and distribution of dry heath within the site

Maintain extent of habitat to approximately 371 ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that 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 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 (low) 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.

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

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. Red deer and sheep are the main herbivores on Foinaven SAC, and 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. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on the dry heath habitat. Scattered native trees are compatible with dry heath habitat but a complete lack of grazing or burning can lead to dry heath being colonised by species that are not typical of this habitat (such as dense areas of trees) if this management is continued over many years. A low level of grazing is therefore needed to maintain this habitat.

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 (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 sheep so that less than 10% of ground cover is disturbed bare ground (with an emphasis on 'disturbed' rather than 'bare').

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. Examples of inappropriate species are bracken and non-native species.
- Native trees and shrubs should occupy no more than 20% of the vegetation cover. This is roughly equivalent having up to 20 native trees per hectare.

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

2c. Maintain the distribution and viability of typical species of dry heath within the site

The dry heath at Foinaven SAC is dominated by heather *Calluna vulgaris*, blaeberry *Vaccinium myrtillus* and crowberry *Empetrum nigrum* with some bearberry *Arctostaphylos uva-ursi*.

In addition, typical associated birds of upland heaths are red grouse *Lagopus l. scotica*, golden plover *Pluvialis apricaria*, twite *Carduelis flavirostris*, hen harriers *Circus cyaneus*, merlin *Falco columbarius* and golden eagle *Aquila chrysaetos*.

This habitat is used by populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* 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 extent of the habitat to approximately 550 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 subalpine heaths can grade into other heath types, especially the latter into floristically-similar 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 acid rocks on mountains, both on exposed lower summits and ridges and on sheltered slopes. 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 Alpine heath throughout the SAC. The distribution of subalpine heath is also influenced by continuation of the historic browsing/grazing and/or burning that converted woodlands into subalpine heath many centuries ago.

2b. Restore the structure, function and supporting processes of the Alpine and subalpine heaths

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 several other habitats at Foinaven, maintaining Alpine and subalpine heaths is a fine

balance between degrading to grasslands (which tends to happen if grazing/browsing and burning levels are too high) and succession to scrub/ woodland/ dense juniper thicket (which happens if browsing/grazing is too low at lower altitudes within the site).

At Foinaven, typical heath species composition should be allowed to continue to recover from being overly dominated by grasses due to past grazing by large numbers of sheep and past burning. This should be achieved with a low level of grazing by sheep and red deer that allows typical plants (listed in 2c) to grow and set seed. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on this habitat.

Additional objectives for the structure of the habitat are:

- Bracken *Pteridium aquilinum* should be kept to less than 10% of the ground cover.
- Less than 10% of the ground cover should be disturbed bare ground (the emphasis is on 'disturbed' rather than 'bare'.)

Alpine and subalpine heath 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 Alpine and subalpine heaths

This habitat comprises a wide range of heath types, with variation related to climate, local exposure and snow-lie. At Foinaven SAC, there are large areas of the Alpine heath NVC type H20 *Vaccinium myrtillus – Racomitrium lanuginosum* on areas of quartizite rock debris on summit ridges. Alpine heath type H14 *Calluna vulgaris – Racomitrium lanuginosum* heath also occurs extensively on the site as does H15 *Calluna vulgaris – Juniperus communis* ssp. *nana* heath. H17 *Calluna vulgaris – Arctostaphylos alpinus* heath is also extensive here.

There are extensive areas of the subalpine heath types H10 *Calluna vulgaris – Erica cinerea* heath and H21 *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heath at lower altitude on the site. There are also smaller areas of H12 *Calluna vulgaris – Vaccinium myrtillus* heath and H18 *Vaccinium myrtillus – Deschampsia flexuosa* heath.

On less-exposed ground at the lower altitudinal range of the habitat, *Calluna* generally dominates, 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 together with *Racomitrium* moss. Heather may also be combined with dwarf juniper *Juniperus communis* ssp. *nana* or with *Arctostaphylos alpinus*. At higher altitudes, where conditions are too extreme for heather, short or prostrate *Vaccinium* spp. and *E. nigrum* ssp. *hermaphroditum* dominate. Mossy cyphel *Minuartia sedoides* and seapink *Armeria maritima* are also found in exposed parts of this habitat in some parts of the site. On sheltered slopes where snow lingers, the dominant shrub can be *V. myrtillus*.

At Foinaven SAC woolly fringe-moss *Racomitrium lanuginosum*, bell heather *Erica cinerea* and Atlantic liverworts and mosses (especially the species of the northern Atlantic hepatic mat) are abundant in *Calluna – Racomitrium*, *Calluna – Juniperus*, *Calluna – Arctostaphylos alpinus* and *Vaccinium – Racomitrium* heaths. Mountain bearberry *Arctostaphylos alpinus* and trailing azalea *Loiseleuria procumbens* are abundant (characteristically in *Calluna – Arctostaphylos alpinus* heath, but also in *Calluna – Racomitrium* and *Calluna – Juniperus* heath). Different structural forms of heath also occur, owing to differences in exposure,

giving rise to closed or open heaths with crescentic waves.

In some stands of Alpine 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*.

In addition, typical associated birds include ptarmigan *Lagopus muta*, dotterel *Charadrius morinellus*, golden eagle *Aquila chrysaetos* and snow bunting *Plectrophenax nivalis*. Alpine and subalpine heath is important for maintaining populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. High levels of herbivore use can be damaging, but a low level of grazing and browsing is necessary to maintain this habitat.

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

2a. Maintain the extent and distribution of montane acid grasslands within the site

Maintain extent of the habitat to approximately 743ha. The area figure has been taken from the Standard Data Form, and is an estimate based on montane acid grassland being part of a 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.

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 pollutant deposition.

2b. Maintain the structure, function and supporting processes of montane acid grasslands

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 continuing a low level of grazing by sheep and red deer that allows typical plants (listed in 2c) to grow and set seed. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on montane acid grasslands.

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 montane acid grasslands

Montane acid grasslands on Foinaven are represented by *Carex bigelowii-Racomitrium lanuginosum* moss-heath (U10) and *Nardus stricta-Carex bigelowii* grass-heath (U7).

Foinaven is typical of the hills of the north-west Highlands in the development of *Carex-Racomitrium* moss-heath with thick, dense carpets of *Racomitrium lanuginosum* moss of the typical sub-community (U10b) with an abundance of the cushion herbs *Silene acaulis, Armeria maritima* and *Minuartia sedoides*. More exceptional is the large extent of the species-rich *Silene acaulis* sub-community (U10c) which is developed here on base-rich dolomitic Serpulite grits and Fucoid Beds as well as schistose rocks where it more commonly occurs. Examples of *Nardus-Carex* grass-heath with much *Racomitrium lanuginosum* and *Trichophorum* sp. characteristic of the north-west are well developed. Unusually a mosaic of *Nardus-Carex* grass-heath and *Juncus squarrosus-Festuca ovina* grassland (U6) occurs in snow-bed hollows. The occurrence of apparently natural snow-bed montane *Juncus-Festuca* grassland is very local.
Typical species found in montane acid grassland on this site are:

Alchemilla alpina	alpine lady's mantle
Carex bigelowii	stiff sedge
Empetrum nigrum	crowberry
Gnaphalium supinum	dwarf cudweed
Juncus trifidus	three-leaved rush
Nardus stricta	mat-grass
Racomitrium lanuginosum	woolly fringe-moss
Salix herbacea	dwarf willow

In addition, this habitat is important for maintaining populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. High levels of herbivore use can be damaging, but a low level of grazing and browsing is necessary to maintain this habitat.

Conservation Objectives for Species-rich *Nardus* grassland, on siliceous substrates in mountain areas [H6230] (Species-rich grasslands with mat-grass in upland areas)

2a. Maintain the extent and distribution of species-rich grasslands with mat-grass in upland areas within the site

Maintain extent of the habitat to approximately 134 ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the fact that species-rich grasslands with mat-grass can grade into other adjacent montane habitats. However there should be no measurable net reduction in the extent of the habitat and its distribution throughout the site.

2b. Restore the structure, function and supporting processes of species-rich grasslands with mat-grass in upland areas

As with many upland habitats maintaining species-rich grasslands with mat-grass in upland areas is mainly reliant on appropriate levels of grazing. Reduction in grazing may cause a change towards tall herb communities. Overgrazing or muirburn tends to cause increases in unpalatable species (i.e., *Prunella vulgaris, Cirsium* spp and mosses) and local trampling to communities with *Lolium, Plantago* and *Poa*.

Red deer and sheep are the main herbivores on Foinaven SAC, and appropriate management of their numbers and distribution across the site is important to restore species-rich grasslands with mat-grass. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on this habitat.

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

continuing a low level of grazing by sheep and red deer that allows typical plants (listed in 2c) to grow and set seed.

Additional objectives for the structure of the habitat are:

- Alpine and subalpine heath should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.
- Bracken *Pteridium aquilinum* and trees/scrub should be kept to less than 10% of the ground cover.
- Less than 10% of the ground cover should be disturbed bare ground (the emphasis is on 'disturbed' rather than 'bare'.)

2c. Restore the distribution and viability of typical species of species-rich grasslands with mat-grass in upland areas

This habitat is represented on Foinaven by moderately extensive *Festuca ovina-Agrostis capillaris-Thymus praecox* grassland (CG10) and *Festuca ovina-Agrostis capillaris-Alchemilla alpina* grass-heath (CG11) developed on base-rich dolomitic Serpulite grits, Fucoid Beds, Moine schist and Lewisian gneiss. The grasslands are notable for the occurrence of an oceanic form of *Festuca-Agrostis-Alchemilla* grass-heath with abundant *Racomitrium lanuginosum* and *Plantago maritima*. Other species present include wild thyme *Thymus praecox,* alpine lady's mantle *Alchemilla alpina, Festuca vivipara* and *Diphasiastrum alpinum*. Foinaven is also notable for a form of *Festuca-Agrostis-Thymus* grassland rich in arctic-alpines or northern species including *Silene acaulis, Thalictrum alpinum, Saxifraga oppositifolia, S. aizoides* and *Galium boreale*.

Red deer management should aim to reduce grazing in parts of the habitat where grasses predominate, to encourage the more palatable forbs to spread. Grazing/browsing levels should be reduced in these areas to restore at least 33% of the vegetation to be forbs (rather than grasses).

This habitat is important for maintaining populations of red deer *Cervus elaphus* and mountain hares *Lepus timidus* on this site. Whilst high levels of herbivore use can be damaging, a low level of grazing and browsing is necessary to maintain this habitat.

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 tall herb communities within the site

Maintain the extent of the habitat to approximately 59 ha. The area figure has been taken from the Standard Data Form, and is an estimate based on the tall herb communities often being small and fragmented and being part of a 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 as it has typically been limited by grazing pressure.

2b. Maintain the structure, function and supporting processes of tall herb communities

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. Management of grazing pressure has the ability to restore or extend this scarce habitat. Introduction of additional grazing pressure, especially from highly agile species such as goats, should be avoided as this would cause major losses.

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. This is not happening at Foinaven at present, but if it were to happen in future it could be controlled by additional grazing.

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 tall herb communities

This is a species-rich habitat corresponding to NVC type U17 *Luzula sylvatica – Geum rivale* tall-herb community.

It is characterised by the abundance of a species-rich mix of tall, broad-leaved herbs, most of which are otherwise rare in the uplands owing to their sensitivity to grazing. Agile herbivores, such as goats, should not be introduced to this site as they would be likely to damage this habitat.

Species typically found in tall-herb communities at Foinaven SAC are:

Alchemilla species	lady's-mantles
Angelica sylvestris	wild angelica
Crepis paludosa	marsh hawk's-beard
Geum rivale	water avens
Luzula sylvatica	great wood-rush
Oxyria digyna	mountain sorrel
Ranunculus acris	meadow buttercup
Rubus saxatilis	stone bramble
Saussurea alpina	alpine saw-wort
Sedum rosea	roseroot
Solidago virgaurea	goldenrod
Succisa pratensis	devil's-bit scabious

Trollius europaeus	globe-flower
Ferns (excluding bracken)	

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 wet 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 the area stated on the Standard Data Form (approximately 5006 ha).

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

The predominant requirement for blanket bog is to be actively 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.

Blanket bog habitat requires a high water table, and so 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.

The objectives for restoring blanket bog on Foinaven SAC are to:

- Restore the height structure of the vegetation by reducing grazing/browsing by red deer and sheep 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.
- Restore 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 any significant areas of currently eroding peat by re-establish peat-forming vegetation.

Additional objectives for the structure of the habitat are:

- 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. 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 blanket bog

Foinaven SAC has a large area of M17 *Trichophorum cespitosum-Eriophorum vaginatum* blanket bog at low altitude. This is an oceanic form of blanket bog with abundant woolly fringe-moss *Racomitrium lanuginosum.* At higher altitude, there is a large area of more montane blanket bog (M19 *Calluna vulgaris-Eriophorum vaginatum*).

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

Other typical species found in this habitat at Foinaven SAC are:

Arctostaphylos species	bearberry/Arctic bearberry
Betula nana	dwarf birch
Erica species	heaths
Empetrum nigrum	crowberry
Menyanthes trifoliata	bogbean
Myrica gale	bog myrtle
Non-crustose lichens	
Pleurocarpous mosses	
Rubus chamaemorus	cloudberry
Rhynchospora alba	white beak-sedge
Trichophorum species	deer grass
Vaccinium species	cowberry and similar species

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.

This habitat is important for maintaining populations of red deer *Cervus elaphus* on this site. Whilst high levels of herbivore use can be damaging, a low level of grazing and browsing by red deer and/or livestock is necessary to maintain this habitat.

In addition, red grouse *Lagopus l.scotica*, greenshank *Tringa nebularia*, dunlin *Calidris alpina*, golden plover *Pluvialis apricaria*, hen harrier *Circus cyaneus*, merlin *Falco columbarius* and golden eagle *Aquila chrysaetos* depend upon this habitat.

Conservation Objectives for [H7150] Depressions on peat substrates

2a. Maintain the extent and distribution of depressions on peat substrates within the site

Maintain the extent of existing depressions on peat substrates at 282 ha (estimate taken from the Standard Data Form).

This habitat is found in complex mosaics in hollows on lower parts of Foinaven SAC surrounded by blanket bog habitat and can sometimes be found in narrow strips around the edges of dubh lochans. It is generally fragmented 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.

2b. Restore the structure, function and supporting processes of depressions on peat substrates

This habitat is found in close association with blanket bog within Foinaven SAC, so pressures that effect blanket bog will also affect depressions on peat substrates.

See Objective 2b for blanket bog for details of measures needed to restore the structure,

function and supporting processes of depressions on peat substrates.

2c. Maintain the distribution and viability of typical species of depressions on peat substrates

This habitat occurs in hollows and depressions in complex mosaics in wetter areas of bog and heaths. It can also be found in a narrow transitional zone on the edges of deeper pools and dubh locahns. It is mainly characterised by an abundance of white beak-sedge *Rhynchospora alba* which is the key species.

Other typical species for this habitat are those found in NVC types M1 and M2 such as the bog moss *Sphagnum denticulatum* and round-leaved sundew *Drosera rotundifolia*. Excessive grazing/browsing/trampling by deer and/or livestock can contribute to a deterioration in the habitat structure, leading to a reduction or loss in the typical/indicator species for this habitat. Due to the fragmented nature of the habitat, stocking levels need to be set within the context of wider site management.

This habitat is used by red deer *Cervus elaphus* on this site, and can sometimes be damaged by deer forming large wallows. Although high levels of herbivore use can be damaging, a low level of grazing and browsing is necessary to maintain this habitat.

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 acidic scree within the site

The extent of the acidic scree feature has been estimated at 1530ha (the area stated on the Standard Data Form). This should be maintained.

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 Foinaven SAC this habitat is found on the slopes and ridges of the mountains and is also closely associated with the plants in crevices on acidic rock habitat.

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

Scree is intrinsically unstable and rocks will frequently move so this habitat is naturally adapted to a certain level of disturbance due to rock movement and grazing/browsing which prevents colonisation by trees and scrub (where there are seed sources and the climate allows).

Acidic scree is also vulnerable to excessive disturbance. Inappropriate grazing regimes have the potential to harm this feature through over-grazing and trampling damage. Red deer and sheep are the main herbivores on Foinaven SAC. Inaccessibility means that they have limited effects on larger, steeper areas of acidic scree habitat, particularly where there are larger boulders. However sheep and deer can reach smaller patches of acidic scree where it occurs in a mosaic with grassland or heath. Mountain hares are also present, but due to their relatively small size and population, they currently have little effect on this habitat. Agile herbivores, such as goats, should not be introduced to this site as they would be likely to damage this habitat.

Colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion should be avoided as this can reduce or eliminate cover of indicator species, including bryophytes. Fire is unlikely to spread easily in this habitat due to the sparse vegetation and

rocky ground, however acidic scree should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.

Trampling from walkers can contribute to deterioration in the habitat structure by moving stones more frequently than plants are able to recolonise the disturbed ground, this is exacerbated if walkers deliberately slide down the scree slopes. On Foinaven SAC, hillwalkers typically stick to a small number of routes, so only a small proportion of the habitat is affected.

2c. Maintain the distribution and viability of typical species of acidic scree

This habitat is characterised by large areas of stone scree with little soil or vegetation. The flora is mostly important for Atlantic bryophytes and crustose lichens. It is colonised by a small number of pioneer species which are able to tolerate the harsh conditions but are not able to grow in other places because they are sensitive to grazing and not able to compete with more vigorous plants. It is important for its rich fern flora and provides shelter for many species sensitive to frost such as parsley fern *Cryptogramma crispa* and species requiring a humid microclimate such as Wilson's filmy-fern *Hymenophyllum wilsonii*. Species sensitive to grazing such as stone bramble *Rubus saxatilis* find a refuge here as do the nationally scarce northern rock-cress *Arabis petraea* and the nationally rare curved woodrush *Luzula arcuata*. Large patches of juniper can be found in this habitat on Foinaven SAC.

In addition, typical bird species found in this habitat include ring ouzel *Turdus torquatus* at lower altitude and ptarmigan *Lagopus muta* on higher parts of the site.

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

2a. Maintain the extent and distribution of plants in crevices on acid rocks within the site

The extent of the plants in crevices on acid rocks feature should be maintained at 508 ha (as stated on the Standard Data Form).

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 Foinaven SAC this habitat is found on the slopes and ridges of the mountains and 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 plants in crevices on acid rocks

This habitat is found in harsh and sometimes extreme conditions with limited soil development. Plants are sparse and scattered and often limited to where there is some shelter and moisture. Some of the plant species that grow mainly in crevices in rocks 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 should be avoided as this could reduce or eliminate cover of typical species including bryophytes.

This habitat is not particularly attractive to grazing/browsing animals such as red deer or sheep as the vegetation is sparse and inaccessible due to the rocky ground. However, it is sensitive to over-grazing and trampling damage. Introduction of agile herbivores (such as goats) should not be introduced to the site as they would have potential to damage this habitat.

Trampling from walkers can contribute to deterioration in the habitat structure, having harmful effects on the typical species. On Foinaven SAC, hillwalkers typically stick to a small number of routes, so only a small proportion of the habitat is affected.

Fire is unlikely to spread easily in this habitat due to the sparse vegetation and rocky ground, however it should not be burnt to avoid damage to the structure, function and supporting processes of plants in crevice on acid rocks.

2c. Maintain the distribution and viability of typical species of plants in crevices on acid rocks

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.

Excessive grazing, browsing and trampling by deer and/or livestock can contribute to deterioration in the habitat structure, having harmful effects on the typical species. Herbivore numbers should be controlled to an appropriate (low) level that helps to maintain the habitat by preventing colonisation or shading of this habitat by bracken, tree growth and/or woodland expansion. Shading can reduce or eliminate cover of indicator species, including bryophytes.

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

2a. Maintain the extent and distribution of plants in crevices on base-rich rocks within the site

The extent of the plants in crevices on base-rich rocks feature has been estimated at 199 ha (as stated on the Standard Data Form). This should be maintained.

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 Foinaven SAC this habitat is found on mountain slopes and ridges where there are bands of calcareous rock. This habitat consists largely of ferns and mosses growing out of crevices and cracks in calcareous rocks. The best examples are seen in the general area of Meall Horn and its corries. This habitat is found in a mosaic with two structurally similar habitats that form on more siliceous rock types (plants in crevices on acid rocks and acidic scree).

2b. Restore the structure, function and supporting processes of plants in crevices on base-rich rocks

Plants in crevices on base-rich rocks should be restored by:

- Reducing grazing pressure by red deer (to allow Objective 2c to be achieved).
- Removal of the non-native plant Zealand willowherb *Epilobium brunnescens* - which has the potential to progressively out-compete the typical species of this habitat.

For further details, see Objective 2b for ‘plants in crevices on acid rocks’.

2c. Restore the distribution and viability of typical species of plants in crevices on base-rich rocks

This habitat 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,* glaucous meadow-grass *Poa glauca* and rock whitlow grass *Draba norvegica*.

Typical species for this habitat on this site are: Alpine lady's mantle *Alchemilla alpine;* green spleenwort *Asplenium viride;* hair sedge *Carex capillaris;* flea sedge *Carex pulicaris; Cystopteris fragilis;* rock whitlow grass *Draba norvegica,* hoary whitlow grass *D. incana;* glaucous meadow grass *Poa glauca;* holly fern *Polystichum lonchitis* holly fern *P. lonchitis;* yellow saxifrage *Saxifraga aizoides;* Alpine saxifrage *Saxifraga nivalis;* purple saxifrage *Saxifraga oppositifolia; Sibbaldia procumbens;* moss campion *Silene acaulis;* alpine meadow-rue *Thalictrum alpinum;* wild thyme *Thymus polytrichus.*

Red deer grazing pressure (see Objective 2b) should be reduced to allow recovery of the distribution of indicator species so that at least four of them are found in each sample area.

Overarching Conservation Objectives for all species features of Foinaven SAC

1. To ensure that the qualifying features of Foinaven 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 and, for freshwater pearl mussel, part d). 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 Foinaven SAC is restored by meeting objectives 2a, 2b and 2c (and 2d for freshwater pearl mussel) for each qualifying feature

The aim at this SAC is to restore and maintain the freshwater pearl mussel and otter features in a favourable condition as a contribution to their wider conservation status. Therefore any impacts on the objectives shown in 2a, 2b, 2c or 2d (for freshwater pearl mussel only) 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, 2c and 2d. 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, 2c or 2d 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 species are exposed to a wide range of drivers of change. Some of these are natural (e.g., population fluctuations/ shifts or habitat changes resulting from natural processes) and are not a direct result of human influences. Such changes in the qualifying species' distribution and use of the site, which are brought about by natural processes, directly or indirectly, are normally considered compatible with the site's conservation objectives. 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 [S1029] Freshwater pearl mussel

2a. Restore the population of freshwater pearl mussel as a viable component of the site

The main requirement for restoring the freshwater pearl mussel population within this SAC is that the population should be allowed to recover from past (now illegal) pearl mussel fishing both within the site and downstream on the River Laxford. Other than this, current management should encourage and allow the number and density of mussels to increase.

This conservation objective is considered to be met if the conditions for the species' long-term existence are in place. These conditions include:

- avoiding effects that could lead to an inability of the population to successfully reproduce and recruit sufficient juveniles into the population (e.g., >20% of the population should be juvenile (<65mm long). Very young juveniles (<30mm long) should also be present).
- avoiding effects that could lead to a permanent reduction in the density and number of freshwater pearl mussels in the population, or that prevent a recovery in density and numbers, through mortality, injury or impacts caused by disturbance. These effects could be caused by development, water pollution, river engineering, land-use change, abstractions, and wildlife crime.

For a healthy mussel population the aim is to have at least 5 mussels per m^2.

- ensuring high quality habitat in river reaches that support freshwater pearl mussels (see conservation objective 2c)
- allowing the species distribution within the site to be maintained or expanded (see conservation objective 2b)
- maintain the distribution and viability of the freshwater pearl mussel's host species, and their supporting habitat (see conservation objective 2d).

Temporary short-term changes to a SAC qualifying interest due to anthropogenic influences may be considered not to compromise the conservation objectives within a site provided it can be demonstrated beyond reasonable scientific doubt that the population can fully recover. However, freshwater pearl mussels are in unfavourable condition at this site so the aim should be to avoid any further reduction in their population.

Recovery of freshwater pearl mussel populations is notoriously difficult. This is partly due to their unusually long lifecycle and also due to their requirement for very high water quality and other habitat requirements, with the species requiring near natural conditions for important factors such as fine sediment and nutrients. These conditions generally need to be provided for all of the time. The early stages of the pearl mussels' lifecycle is also complex and delicate, as it relies on the presence of healthy, abundant, juvenile, native salmonid populations. It is therefore also important that the local salmonid populations are robust and able to access all relevant areas of an SAC.

When assessing the effects of any plan or project consideration should be given to whether impacts outwith the SAC could affect achievement of this conservation objective.

2b. Maintain the distribution of freshwater pearl mussel throughout the site

Distribution of mussels within the site can be affected by disturbance originating both within and outwith the site. Factors such as abstraction, water pollution, illegal pearl fishing, river engineering and intensification of land use can risk directly affecting freshwater pearl mussels. The species can be directly affected, or the species' habitat quality reduced such that recruitment is unsuccessful, leading to a contraction in the species' distribution in the site. It is important that both up- and down-stream distribution is maintained within the site. Freshwater pearl mussels may be present in the main river within a site, as well as in tributaries (and tributaries may contain populations that are not currently known).

Plans and projects that cause disturbance, displacement and barrier effects to the host species can also affect mussel distribution (see conservation objective 2d).

2c. Maintain the habitats supporting freshwater pearl mussel within the site and availability of food

Freshwater pearl mussels are typically found in soft-water, gravel bed rivers, with extremely high water quality. They feed by inhaling river water and filtering out fine organic particles.

In order to maintain the supporting freshwater pearl mussels' habitat it is important that the species' high quality river habitat requirements are met. Freshwater pearl mussel populations are particularly vulnerable to nutrient enrichment and fine sediment increases, both of which can affect the juvenile mussels that predominantly live buried in river gravels. River engineering can also directly damage populations, as well as interrupt the supply of sediment that maintains habitat. Changes in land use have the potential to increase nutrient and fine sediment concentrations in the river. However land use changes, such as the establishment of native riparian woodlands, also have the potential to improve habitat by providing shade that can mitigate damaging temperature peaks, stabilising river banks and reducing erosion.

Specific targets for some water quality parameters include:

- Nutrient concentrations should be near-natural. Soluble reactive phosphorus is particularly important (the annual mean should be <0.005mg/l).
- Mean Biochemical Oxygen Demand should be <1 mg/l.
- Filamentous algae should have <5% coverage of the river bed during the summer months.
- Excess fine sediment is a considerable danger to freshwater pearl mussels and there should be no pronounced difference in the redox potential between open water and interstitial water at 5cm depth.

2d. Maintain the distribution and viability of freshwater pearl mussel host species and their supporting habitats

Salmonid fish (native salmon and trout) are an integral part of the freshwater pearl mussels' lifecycle and should be available in sufficient numbers to ensure continued recruitment of juvenile mussels to the population. It is important that juvenile host salmonids, including any range of genetic types, are present in all areas of the catchment to which they, and adult fish, have natural access and where freshwater pearl mussels have historically been present.

At Foinaven trout are the primary salmonid host known to be used by the local freshwater pearl mussel population although salmon are also present. An abundance of > 0.1 native juvenile host salmonid per m^2 should ensure sufficient host species are available. More

generally, the density of host juvenile salmonids should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.

Freshwater pearl mussel population viability is dependent upon host salmonid population viability, so any threats to host species stocks should be avoided. Factors that can affect the viability of host species include those that affect freshwater pearl mussel, but potential barriers to fish migration, inappropriate fish stocking and biosecurity are also further increased risk factors. Although trout are the primary salmonid host in this SAC, impacts upon the marine health and survival, and in turn the viability, of Atlantic salmon and sea trout populations within the SAC should also be considered.

Host species should be able to continue to use and access all areas of importance within the site. Plans and projects that cause disturbance, displacement and barrier effects to host species can affect their distribution and in turn the distribution of freshwater pearl mussels.

To ensure a viable population of host species is present supporting salmonid habitat should be maintained throughout the site. Atlantic salmon and trout, both require the presence of clean gravels for spawning. For Atlantic salmon and large trout, these typically occur at the tail of pools, although spawning may take place if suitable gravels and flows are present. On emergence, usually between March and early May, the young fry disperse and set up territories which they defend aggressively. Atlantic salmon fry prefer fast flows (>30 cm/s) and favour areas with surface turbulence (riffle habitat). They require a rough bed of pebble, cobble and gravel. Trout fry prefer areas of relatively low velocity water near the streambed. Cover from stones, plants or debris is required and good cover is essential for maintaining high fry densities.

Atlantic salmon that have survived their first winter (parr) prefer deeper water than fry (typically 15-40 cm) and a coarser substrate of pebbles, cobbles and boulders. Trout parr generally favour areas of relatively low current speed where cover is available. Juvenile trout are often to be found in cover alongside the banks, in undercuts, among tree roots or in marginal vegetation. Cover remains important for adult trout and Atlantic salmon particularly in smaller streams such as those on this site.

Conservation Objectives for [S1355] Otter

2a. Maintain the population of otter as a viable component of the site

An estimate of the number of otters occupying the site is not available and therefore there is no numerical baseline that can be given for the site. This conservation objective is considered to be met if the conditions for the species' long-term existence are in place. This includes:

- avoiding effects that could lead to a permanent reduction in the otter population through mortality, injury, or impacts caused by disturbance or displacement. This includes for example the effects caused by development, river engineering, water pollution, roads without adequate crossing provision for otters or suitable culverts, or entanglement in fishing gear.
- maintaining the species' ability to use all areas of importance within the site (to be considered under conservation objective 2b).
- maintaining access to, and availability of, undisturbed resting places.
- maintaining access to, and availability of, supporting habitats and prey (to be considered under conservation objective 2c).

Otters are wide-ranging and highly mobile. The population at Foinaven SAC is reliant on suitable habitat in the surrounding wider countryside, including the marine environment, and

is unlikely to be viable (capable of functioning) in isolation. The home range of an otter will vary depending on their sex, habitat quality and food availability. It will also vary between freshwater and coastal environments. At this SAC some otters that have parts of their territories within the site may also feed in coastal waters that lie outwith the boundary of the site (for example in Loch Inchard). In coastal areas otter densities may be as high as 0.5 - 0.7 animals/km. Males living in rivers and streams can have a mean linear range size of 48 km and females living in the same habitat can have a mean linear range of 21 km. Males have been known to range as far as 80 km. When assessing the effects of any plan or project consideration should be given to whether impacts outwith the SAC could affect achievement of this conservation objective.

Temporary short-term changes to otter due to anthropogenic influences may be considered not to compromise the conservation objectives within the site provided it can be demonstrated beyond reasonable scientific doubt that the population can fully recover. Recovery will need to be considered in the context of the species life history traits and the scale and duration of the impact being assessed.

Otters are a European protected species (EPS) and it is an offence to deliberately or recklessly capture, injure, kill, harass or disturb them in certain circumstances, or to damage or destroy their breeding or resting places anywhere in Scotland unless a licence has been issued to do so. A licence can only be issued for particular purposes which the law allows. Further, there must be no satisfactory alternative and no detrimental impact on the contribution to the maintenance of otter at a favourable conservation status for a licence to be issued. This assessment considers impacts on the otter population at a local and regional level. The licensing requirement is in addition to considering whether a plan or project will result in any impacts (including incidental impacts) to the otter population within the SAC.

2b. Maintain the distribution of otter throughout the site

Distribution of otters within the site can be affected by disturbance originating both within and outwith the site. Plans and projects that cause displacement and barrier effects to the species can also affect species distribution. Examples include use of night-time floodlighting of watercourses, road and bridge construction works and general disturbance from human activity (and dogs) by watercourses especially at dusk/night-time.

2c. Maintain the habitats supporting otter within the site and availability of food

Otters require suitable habitat for foraging, breeding and resting.

Abundant boulders, crevices and/or peat, or other cavity-forming features such as tree root systems are needed to provide secure holt sites above high water. Dense scrub is also valuable for providing lie-ups and couches. Suitable areas supporting a healthy fish population within a nearby watercourse or still water body are required within each otter's home range, to enable foraging for key prey species such as salmonids and eels. Access to ponds, ditches and wetlands where amphibians may breed is also important. Otters which forage along the coast as well as using the SAC also need freshwater within the SAC to remove salt from their fur.

Changes to water flow and water quality can adversely affect otter habitat and prey on which they depend. Otters' food supply is normally associated with good water quality and therefore the water quality standards set out under the Water Framework Directive (2000/60/EC) should be met. Several streams run though the site, however these are below the size threshold for SEPA's freshwater classification system and so separate water quality monitoring is needed.

Conservation Measures

Foinaven 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).

Current and recommended management for lochs and dubh lochans:

- **Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**
- **Acid peat-stained lakes and ponds**

Issue	Measure	Responsible party
Abstraction	Ensure timing and volume of abstraction from any of the lochs or dubh lochans does not alter water levels or the hydrological flushing regime to a damaging extent through discussions with regulator. Ensure that drought plans adequately address the interests of the site.	SEPA Scottish Water NatureScot North and West District Salmon Fisheries Board West Sutherland Fisheries Trust
Afforestation	Ensure that any forestry is not beyond the carrying capacity of the catchment and that design and management strictly follow the guidelines.	Land Manager Scottish Forestry NatureScot
Water quality	Implement and maintain monitoring of key water quality parameters.	NatureScot/SEPA
	Any development proposals in the catchment should include appropriate measures to minimise sediment run-off and prevent pollutants from entering the lochs e.g. track creation	Land Manager The Highland Council NatureScot
	Ensure no adverse impacts from diffuse or point sources. Raising awareness of the importance of maintaining septic tanks, and upgrading existing systems to tackle point source pollution. Any significant artificial inputs of nitrogen and phosphorus are likely to lead to undesirable nutrient enrichment.	Land Manager SEPA NatureScot The Highland Council
Sediment	Activities such as ATV use should be carried out with care so that they do not lead to creation of bare peat that can be washed into lochs or dubh lochans. Any track maintenance, creation or other development proposals should avoid sediment from disturbed ground being washed into lochs.	Land Manager Planning Authority NatureScot SEPA
Grazing/Trampling	Ensure stocking levels by both deer and livestock are sufficiently low to avoid	Land Manager NatureScot

	poaching of edges and peat erosion. Avoid activities related to stock management such as supplementary feeding and fencing close to lochs.	SGRPID
Development	Ensure any development proposals do not adversely affect lochs and dubh lochans.	Land Manager Planning Authority NatureScot
Invasive species	Avoid deliberate introduction of invasive species. Maintain surveillance for invasive species and agree action with regulator. All anglers and other water users (such as canoeists, wild swimmers or researchers) should follow the Check, Clean, Dry biosecurity procedures to help prevent the spread of invasive species.	SEPA NatureScot Land managers Members of the public North and West District Salmon Fisheries Board West Sutherland Fisheries Trust

Current and recommended management for heathery/grassy habitats:

- **Wet heathland with cross-leaved heath**
- **Dry heaths**
- **Alpine and subalpine heaths**
- **Blanket bog**
- **Depressions on peat substrates**
- **Montane acid grasslands**
- **Species-rich grasslands with mat-grass in upland areas**

Factor affecting the feature	**Measure**	**Responsible party**
Herbivore impacts (grazing and trampling)	Manage a low level of grazing and trampling by deer and livestock within these habitats. Grazing/browsing should be at a level that prevents succession to woodland in drier areas, and avoids domination of habitats by more vigorous species, but avoids damage to habitats by preventing growth or seeding or more palatable plants. Concentrations of animals should be avoided in soft wet habitats such as blanket bog or wet heath where plants such as *Sphagnum* moss are particularly susceptible to damage from trampling and use by large numbers of animals is likely to create bare ground. As a guide to achieving the correct balance the herbivore impact on the features should be 'low' based on the NatureScot Herbivore Impact Assessment Process.	Land managers, NatureScot, Deer Management Groups
Supplementary feeding of deer	Sustainable deer populations should be in balance with their environment so that natural foraging is sufficient to sustain	Land managers, NatureScot, Deer Management Groups

	healthy animals and supplementary feeding is not necessary. If any supplementary feeding is proposed within or close to the site, NatureScot advice should be sought on how to avoid localised damage to habitats that could be caused by concentrated trampling or dunging.	
Nutrient input (dunging)	Livestock and deer management should avoid encouraging large numbers of animals to concentrate in small areas as the dung can cause significant nutrient enrichment and consequent habitat change.	Land managers, NatureScot, Deer Management Groups
Muirburn	Any burning should be carried out in accordance with the Muirburn Code, avoiding burning in sensitive areas.	Land manager
Hydrology	No new drains should be dug and natural hydrology should be restored by blocking existing drains. Re-profiling of hags and gullies in peatland would be beneficial where they are not re-vegetating naturally.	Land manager, Local authority, NatureScot, SEPA
Afforestation/ woodland expansion	Native and non-native tree planting should be avoided and natural woodland expansion should be discouraged by an appropriate level of grazing.	Land managers, NatureScot, Deer Management Groups, Scottish Forestry
Alien and invasive species	Alien and invasive species should not be introduced to the site	Land manager, Scottish Invasive Species Initiative (SISI), NatureScot
Habitat damage from vehicle use	Avoid using ATVs or other vehicles in a way that damages habitats and leads to an increase in exposed bare peat. Vehicle use should be entirely avoided in areas where the vegetation is still recovering from past vehicle damage. Any vehicles driven on these habitats should have low ground pressure tyres and avoid breaking through the vegetation by avoiding soft wet ground or sharp turns.	Land manager, NatureScot
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, Deer Management Groups, NatureScot
Access tracks and paths	No new access tracks should be created. 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	Land manager, NatureScot, Planning Authority

	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 (damaging both the track and the adjacent habitat).	
Recreation	The mountains within the site attract hillwalkers and mountain runners although in relatively small numbers. Although hillwalkers cause some trampling and erosion, this is localised and affects only a small proportion of these habitats. Mountain biking has a greater potential to cause erosion. Although very few people take mountain bikes onto the site at present, active management to promote responsible access may be needed in future.	Land manager, Local Authority, NatureScot

Current and recommended management for habitats found on rocky mountain slopes and ridges:

- **Tall herb communities**
- **Acidic scree**
- **Plants in crevices on acid rocks**
- **Plants in crevices on base-rich rocks**

Factor affecting the feature	**Measure**	**Responsible party**
Grazing and browsing	Red deer are the main herbivore on higher parts of the site, although sheep are also able to reach more accessible areas. These habitats benefit from very low levels of grazing and browsing, so stocking levels by both deer and livestock should be kept very low. Agile herbivores (such as goats) should not be introduced to the site.	Land managers, NatureScot, Deer Management Groups
Nutrient input (dunging)	Build-up of dung in sheltered spots can lead to significant nutrient deposition in these areas and habitat change. Low levels of stocking by deer and sheep are needed to prevent this from happening.	Land manager, Deer Management Groups
Trampling (by hillwalkers and deer/sheep)	Vegetation in these habitats is very sensitive to trampling (either by hillwalkers or deer/sheep). Walkers cause some localised damage, but as they mainly stick to established routes, only a low proportion of the habitat is affected. Low levels of stocking by deer and sheep are needed to prevent damage from trampling.	Land manager, NatureScot, Deer Management Groups

Muirburn	These habitats are very sensitive to burning and should not be burnt. To some extent, they are normally naturally protected from fire as it cannot spread easily on rocky terrain with sparse vegetation.	Land manager
Vehicle use, particularly ATVs	The obvious practical difficulties of using vehicles in steep rocky areas mean that there is currently no vehicle use in these habitats. Vehicles should not be used here as they would cause significant erosion and crush the fragile vegetation.	Land manager
Colonisation or shading by bracken or trees	Ensure colonisation or shading of this habitat by woodland expansion or bracken is minimal to maintain cover of the typical species, including bryophytes.	Land Managers, NatureScot
Colonisation by vigorous native and non-native species	Alien and invasive species should not be introduced to the site.	Land managers, SISI, NatureScot

Current and recommended management for freshwater pearl mussels

Factor affecting the feature	**Measure**	**Responsible party**
Low number and density of mussels present	Freshwater pearl mussels are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 as amended. Offences include intentionally or recklessly killing, injuring or taking from the wild a freshwater pearl mussel.	All
	Continue to monitor for signs of illegal freshwater pearl mussel fishing, report any findings to the Police and implement agreed actions to deter criminal activity.	Public, Police, river managers, NatureScot, West Sutherland Fisheries Trust
	Management planning to evaluate and manage potential pressures arising from marine finfish aquaculture in Scotland.	Marine Scotland/NatureScot North and West District Salmon Fisheries Board
	Research to better understand the reason for the low number and density of freshwater pearl mussels at the site.	NatureScot, University researchers
Improvements to river morphology	Restore riparian and catchment peatlands to reduce fine sediment concentrations, improve floodplain connectivity and restore more natural hydrological regime.	All
	Applications for funding for improved water margin management, reduction of diffuse pollution and creation of native riparian woodlands through the Scottish Rural Development Programme that will be of benefit to the freshwater pearl mussel population are encouraged.	All

	Ensure minimal poaching, tracking, or trampling by red deer, livestock, visitors and vehicles to prevent an unnatural sediment load from being washed into the catchment of streams where pearl mussels are present.	Land managers, NatureScot, SGRPID (GEAC)
	Allowing natural processes to determine river flow and morphology, rather than carrying out in-stream or bank re-enforcement engineering works.	Land/fisheries managers
Flow management and sediment/ nutrient load in river	Monitor fine sediment concentrations in watercourses, including the catchment downstream of the site boundary, to improve the evidence base and ensure targets meet the water quality requirements for freshwater pearl mussel and salmonids.	NatureScot/SEPA
Water quality monitoring	Implement and maintain monitoring of key water quality parameters, including in areas downstream of the site boundary.	NatureScot/SEPA
Maintain population of salmonid host species	Voluntary catch and release policy	Fisheries managers, North and West District Salmon Fisheries Board, West Sutherland Fisheries Trust
Invasive species	All anglers and other water users (such as canoeists, wild swimmers or researchers) should follow the Check, Clean, Dry biosecurity procedures to help prevent the spread of invasive species.	All

Current and recommended management for otters

Factor affecting the feature	**Measure**	**Responsible party**
Ongoing species protection	Otter are a European Protected Species, therefore the species protection provisions of the Habitats Regulations apply.	All
Water quality monitoring	Implement and maintain monitoring of key water quality parameters.	NatureScot/SEPA
Ongoing site protection	Encouraging natural processes of stream flow and morphology, and recruitment and survival of otter prey, by a policy of non-intervention.	All

All habitats and species

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. Research bodies should have a local contact they can call upon if undertaking field data collection remotely.	NatureScot, University researchers

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