

DURNESS SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE



Image: © Valerie Wilson, NatureScot

Site Details

Site name:	Durness
Map:	https://sitelink.nature.scot/site/8246
Location:	Highlands and Islands
Site code:	UK0012786
Area (ha):	1,213.80
Date designated:	17 March 2005

Qualifying features

Qualifying feature	SCM assessed condition on this site	SCM visit date	UK overall Conservation Status
Shifting dunes with marram (Shifting dunes along the shoreline with <i>Ammophila arenaria</i> "white dunes") [H2120]	Favourable Maintained	6 July 2016	Unfavourable - Bad
Dune grassland (Fixed dunes with herbaceous vegetation "grey dunes") [H2130] *	Favourable Maintained	6 July 2016	Unfavourable - Bad
Humid dune slacks (Humid dune slacks) [H2190]	Unfavourable Declining	6 July 2016	Unfavourable - Bad
Calcium-rich nutrient-poor lakes, lochs and pools (Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp) [H3140].	Favourable Maintained	17 August 2016	Unfavourable - Bad
Wet heathland with cross-leaved heath (Northern Atlantic wet heaths with <i>Erica tetralix</i>) [H4010]	Unfavourable No change	22 June 2010	Unfavourable - Bad
Dry heaths (European dry heaths) [H4030]	Unfavourable No change	22 June 2010	Unfavourable - Bad
Alpine and subalpine calcareous grasslands (Alpine and subalpine calcareous grasslands) [H6170]	Unfavourable No change	22 June 2010	Unfavourable - Bad
Tall herb communities (Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels) [H6430]	Favourable Maintained	6 July 2016	Unfavourable - Bad

Base-rich fens (Alkaline fens) [H7230]	Unfavourable No change	5 September 2018	Unfavourable - Bad
Limestone pavements (Limestone pavements) [H8240]*	Favourable Recovered	12 August 2015	Unfavourable - Bad
Otter (<i>Lutra lutra</i>) [S1355]	Favourable Maintained	5 September 2011	Favourable

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 Protected Areas

Durness Special Area of Conservation (SAC) overlaps with part of Durness Site of Special Scientific Interest (SSSI) <https://sitelink.nature.scot/site/580>

Key factors affecting the qualifying features

Shifting dunes with marram

This habitat encompasses the vegetation of unstable dunes where there is active sand movement. Under these conditions sand-binding marram *Ammophila arenaria* is the dominant plant. This habitat is found in a relatively narrow band above the high water mark at Balnakeil beach and in an extensive area towards the southern end of Faraid Head. This is a dynamic vegetation type maintained only by change. Despite there sometimes being large changes in the size and location of individual dunes, cycles of erosion and accretion tend to maintain the extent of the overall dune system at Durness.

Key factors affecting this habitat at Durness include cycles of erosion and accretion (with erosion having the potential to increase in future due to changes in sea level and the severity/frequency of storms), trampling (by cattle and people), camping, unauthorised vehicle use and the maintenance of the track to Faraid Head which passes through the middle of the dunes.

Dune grassland

This Habitats Directive Priority habitat is found inland of the 'shifting dunes with marram' habitat as well as in an extensive area around the golf course on the Keodale headland. It represents the vegetation that replaces marram as the dunes stabilise and the organic content of the sand increases.

The vegetation consists of a short sward characterised by red fescue *Festuca rubra* and lady's bedstraw *Galium verum* and is also rich in species that grow in calcareous (lime-rich) substrates.

Key factors affecting this habitat at Durness include grazing/trampling levels (by sheep and cattle), grazing/burrowing by rabbits, golf course management, damage from vehicles, invasive species (nettles and thistles) and large scale movements of sand.

Humid dune slacks

Dune slacks are found in low-lying areas, inland of Balnakeil beach and at the southern end of the large dune system on Faraid Head. The dune slacks on this site are damp year round due to being close to the water table, despite the free-draining, sandy soil. They are normally only flooded during particularly wet weather in winter.

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 past grazing (mainly by rabbits, whose numbers have since been decreased) and current levels of cattle poaching.

Key factors affecting this habitat at Durness include grazing/trampling/dunging levels by cattle, camping, grazing/burrowing by rabbits, damage from vehicles, invasive non-native species (monkey flower *Mimulus*) and large scale movements of sand.

Calcium-rich nutrient-poor lakes, lochs and pools

The calcium-rich nutrient-poor lakes, lochs and pools habitat is found where water with a high base content comes from the surrounding limestone bedrock in Loch Borrallie, Loch Croispol, Loch Lanlish and Loch Caladail. These lochs are Duigan (2006) type E. They have very clear water and although they are rich in calcium they have few of the nutrients that most aquatic plants require. Because they are largely fed by ground water, run-off from surrounding land has relatively little influence on water quality unless major changes are made within the catchment.

Key factors affecting this feature include use of Loch Borrallie as a public water supply, potential changes to underground hydrology, pollution from any discharge directly into lochs, nitrogen deposition from air pollution, management of the dam at Loch Caladail or the sluice at Loch Croispol and the potential for invasion by non-native species.

Wet heathland with cross-leaved heath

Wet heath is found on the inland parts of Durness SAC where there are acidic, nutrient-poor substrates, such as shallow peats. They occur most frequently in gradients between dry heath and blanket bogs.

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 cattle and red deer trampling (which has led to creation of too much bare, disturbed ground) and grazing/browsing by cattle, red deer and rabbits (which has removed too much growth from dwarf shrubs such as heather).

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

Dry heaths

Dry heaths occur on the inland part of Durness SAC where there are freely-draining, peaty soils. Ericaceous dwarf-shrubs dominate the vegetation. Some of the dry heath on Durness SAC is likely to be climax vegetation, as trees would not be able to grow here due to exposure to wind and salt. In more sheltered parts of the site, dry heath is probably semi-natural, being derived from woodland through a long history of grazing and burning.

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 grazing/browsing by sheep, cattle, rabbits and red deer (which has removed too much growth from dwarf shrubs such as heather) trampling by sheep, cattle and red deer (which has led to creation of too much bare, disturbed ground) and the spread of bracken into this habitat.

Dry heaths on this site are currently managed mainly as extensive grazing for livestock and red deer. Additional contemporary influences are fragmentation by tracks and (potentially) forestry.

Alpine and subalpine calcareous grasslands

This habitat is found on shallow, lime-rich soils on limestone outcrops and knolls of shell-blown sand as part of an intricate mosaic with the dune grassland feature. It consists of short, grazed, species-rich mixtures of arctic-alpine cushion herbs, grasses and sedges. This is one of the most important upland habitats in the UK for rare arctic-alpine plants.

This feature has been assessed through NatureScot's Site Condition Monitoring programme as being in unfavourable declining condition at this SAC due to the spread of bracken into this habitat.

Appropriate grazing levels (by livestock and rabbits) are key to the maintenance of this habitat as rank vegetation or shrubs and trees would develop instead of this habitat at Durness if grazing levels were too low. 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, so may be vulnerable to climate change in future.

Tall herb communities

The tall herb communities on this site are restricted to the steep limestone cliffs near to Loch Borrallie. Ledges on the cliff face support a rich tall herb vegetation which is typical of lime-rich soils where there is no, or very limited, grazing.

The key management issue for this habitat at Durness is to ensure continuation of low/no grazing by any herbivore.

Base-rich fens

There are a large number of small base-rich fens within Durness SAC, many of which are embedded within wet heath or dry heath habitat. There is also an extensive area of base-rich fen adjacent to Loch Caladail which has formed as a result of water seeping from further up the slope. These base-rich fens have developed where relatively nutrient-rich water from underground comes to the surface forming isolated patches that are damp or wet year round. These patches have vegetation that is

markedly different from the surrounding vegetation. As base-rich fen is scattered in small patches within other, more extensive, habitats, management of base-rich fen is difficult to separate from that of the surrounding (drier) habitats.

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 cattle trampling and red deer wallowing which have converted some patches of this habitat into bare, disturbed ground.

The key factors currently affecting this habitat at Durness are levels of grazing and trampling by livestock and red deer. Any changes in the hydrology or pollution of ground water would also have the potential to affect this habitat.

Limestone pavements

This Habitats Directive Priority habitat is found wherever there are limestone outcrops on this site. The largest area of relatively flat limestone pavement is found on the low hills to the east of Loch Borrallie. A few steeply inclined outcrops also occur here as well as being scattered throughout the site.

Limestone pavements have been formed by water gradually dissolving the limestone outcrops over millions of years into 'paving blocks' with a complex pattern of crevices between them. The vegetation of limestone pavements is unusual because northern and arctic-alpine species that are tolerant of full sunshine and drought grow in small crevices in exposed parts of outcrops next to taller species that have their roots in the base of large crevices and which would normally require the sort of shady, humid environment found in woodlands.

The key management issue for this habitat at Durness is to ensure continuation of low grazing from rabbits, domestic stock and deer.

Otter

Otter at Durness require continued access to unpolluted open water, fresh and coastal. There should be a plentiful food supply and habitats for providing shelter for both resting and breeding. They are wide ranging and normally occur at low densities. At this site, otter associated with the SAC are likely to have holts or resting places adjacent to the site boundary as well as within the site itself. Recreational disturbance can have an effect but they have large ranges and can largely avoid people.

In general, previous declines in the otter population were thought to have been due to a mixture of pollution and persecution. They are regularly killed on roads by traffic. Occasionally damage may be caused to otter holts or resting places due to development.

Further information about this SAC's protected [habitats](#) and [species](#) can be found on the JNCC website.

Conservation Priorities

Limestone pavements and dune grassland 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. However, the impact of any proposed management measure on all the qualifying features should first be considered as part of a Habitats Regulations Appraisal.

In practice, there is unlikely to be any conflict between management of the differing features of Durness SAC. Habitat and species distribution is mainly determined by environmental conditions and all habitat features would benefit from a low herbivore population in the wider area.

Overarching Conservation Objectives for all habitat features of Durness SAC

1. To ensure that the qualifying features of Durness 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 Durness SAC is restored by meeting objectives 2a, 2b and 2c for each qualifying feature.

The aim at this SAC is to maintain or restore the qualifying habitats in a favourable condition as a contribution to their wider conservation status. Therefore any impacts to the objectives shown in 2a, 2b or 2c below must not persist so that they prevent the achievement of this overall aim. When carrying out appraisals of plans or projects the focus should be on 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 they do not prevent the ability of a feature to recover and there is certainty that the features will be able to quickly recover.

This objective recognises that the qualifying habitats are 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 habitats’ 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 shifting dunes with marram (shifting dunes along the shoreline with marram *Ammophila arenaria* white dunes)

2a. Maintain the extent and distribution of shifting dunes with marram within the site

The extent of the shifting dune along shoreline with marram feature has been estimated at 28 ha (area taken from the Standard Data Form). This should be maintained within a reasonable range taking into account natural changes.

This habitat, by its very nature, is restricted in the area it can occupy as dune systems are dynamic. Its extent may be subject to sudden changes, due to natural cycles of erosion and accretion as well as potential future losses due to rising sea level and the severity/frequency of storms.

2b. Maintain the structure, function and supporting processes of shifting dunes with marram

This habitat can occur on both accreting and eroding dunes, and can rapidly change. Cycles of erosion followed by stability are part of the natural development of shifting dunes with marram and are essential to the maintenance of diversity. It does not occur in isolation because of its dynamic nature and because the inland edge of this habitat transitions into the dune grassland SAC habitat behind the dunes along Balnakeil beach and into the maritime grassland SSSI habitat on Faraid Head.

A continued supply of sand is vital for the continued existence of the shifting dune community and the long-term survival of the dune ecosystem. Dunes form a natural buffer against coastal erosion, performing best when they are allowed to adjust themselves to changing natural forces. The sand supply from the beach and from offshore can fluctuate naturally over periods of years, and the dunes react to this by advancing or retreating. This process should not be interfered with as that may lead to consequences for sediment movement over a wider area. An appreciation of the behaviour of sediment is thus essential to the understanding of the dune habitat. Dune dynamism should not be confused with coastal erosion.

The natural mobility and transition of the shifting dunes with marram and continuity with associated habitats should be maintained and not disrupted by extraction of sand. Any artificial movement of sand should be kept to the minimum necessary to keep the long-established access route to Faraid Head passable.

Healthy marram grass *Ammophila arenaria* and lyme grass *Leymus arenarius* is essential to bind the sand together, which is key to maintaining the structure, function and supporting processes of this habitat. These grasses can survive harsh environmental conditions but are sensitive to trampling by beach users, disturbance (such as lighting fires and toileting) by people camping or crushing by vehicles. All these things should be avoided, as loss of marram cover can cause accelerated erosion in localised areas with the potential to spread uncontrollably leading to large scale loss of habitat.

2c. Maintain the distribution and viability of typical species of shifting dunes with marram

The species composition of shifting dunes with marram is constrained by the harsh conditions and should continue to consist mainly of marram *Ammophila arenaria* and lyme-grass *Leymus arenarius* with a high proportion of bare sand.

Zonation is a fundamental attribute of a dynamic sand-dune ecosystem. The range of vegetation zones and the transitions between them should be maintained. Unless the dunes are undergoing a phase of natural erosion, there should be a strandline zone (with pioneer plants such as sea rocket *Cakile maritima*, sea sandwort *Honckenya peploides* and orache spp. *Atriplex* spp.), embryonic dune (where there may be sparse cover of common couch *Elytrigia juncea* as well as marram and lyme-grass) as well as more stable dunes that are dominated by marram. Further inland, there should be gradual transition to dune grassland (with the typical species described below for this habitat) or maritime grassland.

Artificial movement of sand should be limited to that required to maintain the track to Faraid Head which passes through the middle of the dunes.

Excessive tracking/trampling/disturbance by vehicles, visitors or people camping should be avoided as this can lead to erosion of the shifting dunes and therefore a reduction or loss in the typical/indicator species and a deterioration in the habitat structure.

This habitat also supports breeding shelduck and eider duck.

Conservation Objectives for dune grassland (fixed coastal dunes with herbaceous vegetation “grey dunes”)*

2a. Maintain the extent and distribution of dune grassland within the site

The extent of the dune grassland feature has been estimated at 355 ha (area taken from the Standard Data Form). This should be maintained within a reasonable range taking into account natural changes.

Dune grassland occurs inland of the ‘shifting dunes with marram’ habitat where the dunes become more stabilised, or ‘fixed’ and represents a zone inland where sand deposition decreases. There may be an element of sand mobility, but such mobility should be minor.

The inland extent of the dune grassland forms a gradual transition to maritime grassland and dune slack on Faraid Head and to improved grassland inland of Balnakeil beach. On the Keodale headland dune grassland occurs across the golf course area where it transitions into alpine and sub-alpine calcareous grasslands on the limestone knolls and to maritime heaths and grasslands nearer the coast.

This conservation objective is considered to be met if the conditions to ensure the habitats’ long-term existence are in place.

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

This habitat occurs inland of the zone dominated by marram *Ammophila arenaria* on coastal dunes. It represents the vegetation that replaces marram where accretion is no longer significant and the dune stabilises, or becomes ‘fixed’, and the organic content of the sand increases. The largely closed swards that are formed generally are maintained by grazing, by sheep, cattle and rabbits.

Excessive trampling by beach users, disturbance (such to the vegetation, lighting fires and

toileting) by people camping, use by livestock in concentrated areas, vehicles and burrowing by rabbits should be avoided as these can cause localised destabilisation through loss of surface vegetation. Regular use of vehicles can also cause compaction of the soil which alters the species composition. Occasional, small areas of bare ground are desirable as some of the typical plant species need these conditions to seed into. However, large areas of bare ground should be avoided as these can lead to large-scale destabilisation via blowouts, loss of structure and extent within the system, followed by fragmentation of the habitat and loss of continuity with adjacent associated habitats. Increases in mowing or changes in golf course infrastructure should also be avoided.

The structure of this habitat at Durness should be maintained by keeping grazing levels low enough that the sward should be 2-10cm high and the typical plants (listed in 2c) should be able to grow, flower and set seed, but high enough that a thatch, which would result in smaller species being out-competed, is not allowed to develop. Control of rabbit numbers has been needed in the past when they caused excessive burrowing, which led to significant erosion, and intensive grazing; this may be needed in the future if rabbit numbers increase again.

2c. Maintain the distribution and viability of typical species of dune grassland

Typical species of the dune grasslands should include: lady's bedstraw *Galium verum*; early hair-grass *Aira praecox*; purple milk-vetch *Astragalus danicus*; field wood-rush *Luzula campestris*; sand sedge *Carex arenaria*; glaucous sedge *Carex flacca*; ribwort plantain *Plantago lanceolata*; white clover *Trifolium repens*; birdsfoot trefoil *Lotus corniculatus*; wild thyme *Thymus praecox*; common mouse-ear *Cerastium fontanum*; self-heal *Prunella vulgaris*; mouse-ear hawkweed *Pilosella officinarum*; germander speedwell *Veronica chamaedrys*; red fescue *Festuca rubra*; eyebright *Euphrasia spp*; yellow rattle *Rhinanthus minor*; heath dog violet *Viola canina*; common dog violet *Viola riviniana*; smooth hawksbeard *Crepis capillaris*; red bartisa *Odontites verna*; cypress-leaved plait-moss *Hypnum cupressiforme*; springy turf-moss *Rhytidiadelphus squarrosus*; big shaggy-moss *Rhytidiadelphus triquetrus*; white flax *Linum catharticum*, frog orchid *Coeloglossum viride*, kidney vetch *Anthyllis vulneraria* and fragrant orchid *Gymnadenia conopsea*.

This habitat should have a low level of grazing to maintain the short, closed sward. Grazing should not be removed entirely, as this can lead to the development of taller, coarser, species-poor vegetation of lower botanical interest, such as coarse grassland, and loss of sensitive species. Equally, levels of grazing in summer should be low enough that typical species can grow, flower and set seed. Stock feeding, especially by hay should be avoided on or near this feature because hay is likely to introduce seeds from vigorous plants e.g. ragwort that are undesirable in this habitat and uneaten hay can smother dune grassland vegetation.

Excessive colonisation of this habitat by vigorous native species such as common ragwort *Senecio jacobaea*; creeping thistle *Cirsium arvense*; perennial ryegrass *Lolium perenne*, burdock *Arctium minus*; or bracken *Pteridium* should be avoided as this can cause irreversible losses in the longer term, through loss of typical species and eventually conversion to other habitats.

Excessive tracking/trampling by visitors /livestock /vehicles e.g. quad bikes for stock feeding, can contribute to deterioration in the habitat structure, and a consequent reduction or loss in the typical/indicator species for this habitat, and could lead to conversion to other habitats.

Whilst burrowing and grazing by large numbers of rabbits can damage this habitat, this is also an important habitat for rabbits due to the ease of borrowing. A significant population of badgers is also present and like rabbits, burrow into the dunes and dune grassland.

Conservation Objectives for humid dune slacks

2a. Maintain the extent and distribution of humid dune slacks within the site

The extent of the humid dune slack feature has been estimated at approximately 4 ha (figure taken from the Standard Data Form). This should be maintained within a reasonable range taking into account natural changes.

This habitat occurs in low-lying areas within the dune systems inland of Balnakeil beach and near the inland end of Faraid Head. They are seasonally flooded and soil nutrient levels are naturally low. The site boundary appears to be at the natural inland extent of the dune system. Therefore although there is improved grassland inland of the site boundary, it is unlikely that this restricts the inland extent of the distribution of humid dune slacks.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

2b. Restore the structure, function and supporting processes of humid dune slacks

Humid dune slacks at Durness are found in the depressions between mature dunes near the inland edge of the sand dune system.

Dune slacks form a mosaic with shifting dunes with marram and dune grassland in this area. Transition and interchange between mobile dune, dune grassland and dune slacks is likely to occur through natural processes, although these changes tend to take many decades at Durness.

Natural hydrological processes should be maintained as the water table should be close to the surface in dune slacks year round, with seasonal flooding in wet weather.

Control of rabbit numbers has been needed in the past when they caused intensive grazing, this may be needed in the future if rabbit numbers increase again.

Trampling by cattle in concentrated areas should be avoided as this can lead to fragmentation of the habitat because alteration of the soil structure and nutrient level can be difficult to reverse. Cattle should not be fed in the dune slacks as this would encourage them to make intensive use of small areas, leading to a high proportion of the vegetation being smothered with cattle dung, as well as being damaged by trampling and excessive nutrient load from dunging or uneaten food.

Similarly, concentrated use of the area by people camping, even over a period of a few weeks each year, could lead to changes to the soil structure through the use of fires, while littering and toileting could lead to changes to the soil chemistry through enrichment.

2c. Restore the distribution and viability of typical species of humid dune slacks

The vegetation of humid dune slacks varies depending on the underlying sediment and the extent and duration of flooding. At Durness, the dune slacks occur on calcareous sand and only have standing surface water during wet conditions.

The distribution of the following typical species should be restored so that at least six of these species is widespread in each dune slack: glaucous sedge *Carex flacca*; sand sedge *Carex arenaria*; birdsfoot trefoil *Lotus corniculatus*; lesser spearwort *Ranunculus flammula*; silverweed *Potentilla anserina*; marsh pennywort *Hydrocotyle vulgaris*; pointed spear-moss *Calliergon cuspidata*; marsh bedstraw *Galium palustre*; variegated horsetail *Equisetum variegatum*; self-heal *Prunella vulgaris*.

This can be achieved partly through grazing that is light enough to allow typical plants to grow, flower and set seed. Grazing should not be removed altogether as this would lead to loss of typical species through a build-up of a thick layer of dead vegetation or being out-competed by rank vegetation.

It is also important to avoid excessive trampling by cattle during wet weather as typical species are likely to be lost from individual dune slacks if there is a high proportion of churned up bare mud.

Colonisation of this habitat by vigorous or non-native species such as, monkeyflower *Mimulus guttatus*, common ragwort *Senecio jacobaea*, creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, marsh thistle *Cirsium palustre*, stinging nettle *Urtica dioica*, perennial ryegrass *Lolium perenne*, false oat-grass *Arrhenatherum elatius* or trees/scrub should be avoided as these could reduce the distribution of typical plants by out-competing them.

The concentrated use of the area by people camping, and associated activities, could also lead to areas of disturbed or bare ground and enrichment or changes to the local soil chemistry, which would favour a different species composition to that which is typical of the habitat.

Conservation Objectives for calcium-rich nutrient-poor lakes, lochs and pools (hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp)

2a. Maintain the extent and distribution of calcium-rich nutrient-poor lakes, lochs and pools within the site

Lochs Borrallie, Croispol, Lanlish and Caladail are all part of the calcium-rich nutrient-poor lakes, lochs and pools habitat feature. The combined area of these lochs has been estimated at 80 ha (figure taken from the Standard Data Form). The area of each loch should be maintained.

Fundamentally there should be no measurable net reduction the extent of the habitat and, most 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.

This conservation objective is considered to be met if the conditions to ensure the habitat's long-term existence are in place.

2b. Maintain the structure, function and supporting processes of calcium-rich nutrient-poor lakes, lochs and pools

The structure and function of Lochs Borrallie, Croispol, Lanlish and Caladail are strongly influenced by activities within their catchments. Changes in land management or development can affect the integrity of the feature which will manifest itself in changes to the lochs.

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 lochs affects both water level fluctuations and annual and within year 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. Lochs Lanlish, Croispol, Borrallie and Caladail are likely to be hydrologically connected underground as well as being fed with calcium-rich groundwater in addition to rainwater run-off from their catchments.

Loch Borrallie is used as a public water supply but this does not appear to cause significant changes in the natural water level.

-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 and there is increased input of leaf-litter from scrub encroachment.

-Natural sediment load

Accumulation of nutrient-rich sediment may have a strong effect on the water quality and biology of the lochs. Release of nutrients bound to silt can increase enrichment. Increases in sediment loading from both changes in land management practice in the catchment or on the shoreline and short term events such as construction should be avoided

Evidence is growing that an increase in storm events associated with climate change may increase the amount of sediment deposited in lochs. This should be minimised by avoiding having large areas of bare ground close to the 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 animals, including fish, as well as for aquatic plants. 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. Lochs Borrallie, Croispol, Lanlish and Caladail should have pH between 7.0 and 8.5.

-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. Target 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.

-Total Phosphorus

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, very shallow (Mean depth <3m) 20ugP/l.

-Total Nitrogen

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 at Durness is that Annual Mean Total Nitrogen should not exceed 1.5 mg/l with no increase from the baseline level.

2c. Maintain the distribution and viability of typical species of calcium-rich nutrient-poor lakes, lochs and pools

Stoneworts *Chara* should be the dominant vegetation in Lochs Borrallie, Croispol, Lanlish and Caladail. Stoneworts are freshwater green alga which grow in long filaments. Rough stonewort *Chara aspera*; bristly stonewort *C. hispida*; delicate stonewort *C. virgata*, opposite stonewort *C. contraria* and fragile stonewort *C. globularis* should all be found in the calcium-rich nutrient-poor lakes, lochs and pools at Durness. Typical aquatic plants should include shoreweed *Littorella uniflora* and the pondweeds *Potamogeton filiformis*, *P. natans*, *P. perctinatus*, *P. perfoliatus* and *P. prealongus*.

The viability of the characteristic 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.

In addition, brown trout *Salmo trutta*, three-spined stickleback *Gasterosteus aculeatus*, the fresh water snails *Radix peregra*, and *Planorbis* spp. are found here. A refuge population of the UK native white-clawed crayfish *Austropotamobius pallipes* is present in Loch Croispol, having been introduced in the 1950s. This species is not known to be having any detrimental impact on the ecology of the area. Loch Borrallie is the only marl lake in the UK with a population of Arctic charr *Salvelinus alpinus*. Otters *Lutra lutra*, tufted duck *Athya fuligula* and red-throated diver *Gavia stellata* also feed here. Corncrake regularly breed on the island in Loch Borrallie.

Conservation Objectives for wet heathland with cross-leaved heath (northern Atlantic wet heaths with *Erica tetralix*)

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

Maintain the extent of this habitat to approximately 123 ha. The area figure has been taken from the Standard Data Form, and is an estimate. The area and distribution of this habitat should be maintained within Durness SAC.

Wet heath covers a large part of this site to the north-west of Loch Meadaidh and near the head of the Kyle of Durness. It forms complex mosaics, with dry heaths and grassland being found on drier ground and base-rich fens or blanket bog being found in wetter places. Any apparent changes in wet heath distribution and extent on this site identified by future surveys may thus represent greater survey accuracy rather than area change in the area of wet heath.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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 Durness SAC is by sheep and cattle although there are also red deer and rabbits on parts of the site.

Wet heath on Durness 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 livestock, deer and rabbits 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 livestock and red deer 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.
- 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 Durness 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.

Grazing and trampling levels should be reduced at Durness SAC (as described in 2b) to restore the distribution of cross-leaved heath *Erica tetralix* and the species listed below,

<i>Arctostaphylos</i> spp	bearberry/Arctic bearberry
<i>Calluna vulgaris</i>	common heather
<i>Erica cinerea</i>	bell heather
<i>Myrica gale</i>	bog myrtle
Vaccinium species	bilberry/cowberry/cranberry
<i>Eriophorum angustifolium</i>	common cottongrass
Cladonia species	Lichens
<i>Racomitrium lanuginosum</i>	woolly fringe-moss
<i>Sphagnum</i> spp	bog mosses
<i>Trichophorum</i> species	deer grass
<i>Narthecium ossifragum</i>	bog asphodel
Drosera species	Sundews

In addition, red grouse *Lagopus l. scotica*, golden plover *Pluvialis apricaria* and merlin *Falco columbarius* use wet heath habitat.

Conservation Objectives for dry heaths (European dry heaths)

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

Maintain extent of habitat to approximately 110 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 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.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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

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. Sheep, cattle, red deer and rabbits are the main herbivores on Durness SAC. 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. 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 livestock and red deer so that less than 1/3 of the last complete growing season's shoots of dwarf-shrub species show signs of browsing.
- Restore the age structure of the vegetation. 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.
- Restore the ground cover of the heath by reducing trampling by livestock and red deer 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.
- Current levels of disturbed bare ground should not be increased.
- 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 Durness SAC should follow the Muirburn Code to avoid damage to the structure, function and supporting processes of dry heath.

2c. Restore the distribution and viability of typical species of dry heaths

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

The objectives for restoring the distribution and viability of typical dry heath species are to:

- Increase the cover of typical species by reducing levels of grazing and trampling as described in 2b.
- Decrease the cover of bracken as dense stands of bracken tend to out-compete typical dry heath species.

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

This habitat is also important for red deer *Cervus elaphus*. 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 subalpine calcareous grasslands

2a. Maintain the extent and distribution of alpine and subalpine calcareous grasslands within the site

The objective is to maintain the extent of the habitat to approximately 84 ha. The area figure has been taken from the Standard Data Form, and is an estimate based on this habitat

forming a mosaic with limestone pavements.

Alpine and subalpine calcareous grasslands occur on lime-rich soils near limestone outcrops. Most of this habitat is on the Keodale headland and near Loch Borrallie but there are also scattered limestone outcrops alongside and near the head of the Kyle of Durness and embedded within wet and dry heath to the south of Loch Caladail.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

2b. Restore the structure, function and supporting processes of alpine and subalpine calcareous grasslands

These alpine and subalpine grasslands, especially areas rich in mountain avens *Dryas octopetala*, are amongst the most natural habitats remaining in the UK. They are however very sensitive to the level of grazing. The structure of this habitat should be maintained by appropriate grazing levels. Grazing by a combination of livestock and rabbits should be low enough to allow typical plants (listed in 2c) to grow, flower and set seed. Grazing should also be sufficient to prevent a mat of dead vegetation from building up and to prevent encroachment by scrub, trees or bracken.

At Durness bracken has spread into this habitat and should be controlled so that it forms less than 10% of the ground cover.

This habitat should have a high proportion of dwarf forbs to grasses accompanied by a relatively high proportion of mosses in the sward. Less than 10% of ground cover should be disturbed bare ground.

Alpine and subalpine grasslands should not be burnt to avoid damage to the structure, function and supporting processes of this habitat.

2c. Restore the distribution and viability of typical species of alpine and subalpine calcareous grasslands

The alpine and subalpine calcareous grasslands habitat at Durness is of the following NVC types:

CG12 *Festuca ovina* – *Alchemilla alpina* – *Silene acaulis* dwarf-herb community

CG13 *Dryas octopetala* – *Carex flacca* heath

CG14 *Dryas octopetala* – *Silene acaulis* ledge community

These habitats should have a low proportion of grass and be dominated by variety of the following typical species:

<i>Alchemilla alpina</i>	alpine lady's mantle
<i>Carex capillaris</i>	hair sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex pulicaris</i>	flea sedge
<i>Dryas octopetala</i>	mountain avens
<i>Linum catharticum</i>	fairy/purging flax
<i>Lotus corniculatus</i>	bird's-foot-trefoil
<i>Luzula spicata</i>	spiked wood-rush
<i>Plantago maritima</i>	sea plantain
<i>Persicaria vivipara</i>	alpine bistort
<i>Salix reticulata</i>	net-leaved willow

<i>Saxifraga aizoides</i>	yellow mountain saxifrage
<i>Saxifraga oppositifolia</i>	purple saxifrage
<i>Selaginella selaginoides</i>	lesser clubmoss
<i>Sibbaldia procumbens</i>	least cinquefoil
<i>Silene acaulis</i>	moss campion
<i>Thalictrum alpinum</i>	alpine meadow-rue
<i>Thymus polytrichus</i>	wild thyme

The objective is to restore the opportunity for typical species to grow across the entire mapped area of this habitat by reducing the cover of bracken. Rabbits and red deer sometimes use this habitat for grazing. Intensive grazing should be avoided, but low levels of grazing (by red deer, rabbits and livestock) help to maintain the habitat.

Conservation Objectives for tall herb communities (hydrophilous tall herb fringe communities of plains and of the montane to alpine level)

2a. Maintain the extent and distribution of tall herb communities within the site

Maintain the extent of the habitat to approximately 0.2 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. 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.

This conservation objective is considered to be met if the conditions to ensure the habitats' long-term existence are in place.

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 Durness 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 (The emphasis is on 'disturbed' rather than 'bare').

- 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.

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 at Durness owing to their sensitivity to grazing. Management should be the continuation of low/no grazing by any herbivore.

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 Durness SAC are:

<i>Angelica sylvestris</i>	wild angelica
<i>Crepis paludosa</i>	marsh hawk's-beard
<i>Filipendula ulmaria</i>	meadowsweet
<i>Geum rivale</i>	water avens
<i>Hypericum</i> species	St. John's-worts
<i>Luzula sylvatica</i>	great wood-rush
<i>Primula vulgaris</i>	primrose
<i>Rubus saxatilis</i>	stone bramble
<i>Sedum rosea</i>	roseroot
<i>Valeriana officinalis</i>	common valerian

Conservation Objectives for base-rich fens (Alkaline fens)

2a. Restore the extent and distribution of base-rich fens within the site

Due to the small and fragmentary nature of this habitat baseline estimates of the total area of base-rich fen may not be very precise (0.5 ha was estimated on the Standard Data form but 7.5 ha has been estimated more recently). Any changes in extent estimates as a result of new survey may not represent real change but greater precision.

Base-rich fens are found in small patches, often at some distance from each other, so pressures and management that affect base-rich fens vary across the site.

The extent of base-rich fen extent only needs to be restored in patches where it was found previously, but has been damaged near the south end of Loch Caladail and near Grudie at the head of the Kyle of Durness. The extent of the majority of base rich fens should be maintained where it is found east of the Keodale road end, between Loch Borrallie and the Kyle of Durness and to the east of Loch Caladail.

2b. Restore the structure, function and supporting processes of base-rich fens

Hydrology is a key supporting process for base-rich fens. Base-rich fens are created where there are springs or seepages, fed by calcium-enriched water from the limestone bedrock on

both peat and mineral soils. Tufa deposition (formed when mineral-rich water evaporates, leaving the minerals behind) occurs in some of the base-rich fens. Base-rich fen habitat should always be damp or wet. This makes it more vulnerable to damage from trampling than the surrounding drier habitats as well as being attractive to red deer for wallowing.

The structure of the base-rich fen should be restored in places where excessive poaching or red deer wallowing has led to extensive areas of disturbed bare ground. The emphasis should be on avoiding 'disturbed bare' rather than 'bare' ground, since some of the mineral deposits in base-rich fens have naturally low vegetation cover. The type of 'disturbed bare' ground that should be avoided in all base-rich fens is where the substrate is bare soil, peat or gravel, or soil covered only by an algal mat, that has its surface broken and imprinted by hoof marks, red deer wallows, human foot prints, or vehicle and machinery tracks.

Base-rich fens should have light grazing to maintain the open structure of the habitat and prevent dense mats of dead vegetation from building up. Over-grazing (and the associated poaching) should be avoided as this can damage fragile tufa formations and/or result in disturbed bare ground.

Heavy trampling and/or tracking by deer/livestock or use of ATVs, quad bikes or other vehicles should be avoided as these can damage the structure of the habitat by compacting the ground and/or alter drainage patterns in a way that has alters the suitability of the habitat for typical plants listed in 2c.

Colonisation of this habitat by vigorous native species such as soft rush *Juncus effuses* should be avoided as tall, vigorous plants such as this tend to out-compete the typical plants listed in 2c.

Base-rich fens should not be burnt as this would damage the structure and function of the habitat.

2c. Restore the distribution and viability of typical species of base-rich fens

Most of the base-rich fen on this site is NVC type M10 which is mire with low-growing sedge vegetation. The most common typical species in this type of base-rich fen are carnation sedge *Carex panacea*, yellow sedge *Carex viridula* and the brown mosses *Bryum pseudotriquetrum* and *Campylium stellatum*. Other typical species in M10 vegetation include dioecious sedge *Carex dioica*; glaucous sedge *Carex flacca*; carnation sedge *Carex panacea*; flea sedge *Carex pulicaris*; jointed rush *Juncus articulatus*; white flax *Linum catharticum*; common butterwort *Pinguicula vulgaris*; lesser clubmoss *Selaginella selaginoides*; marsh arrow-grass *Triglochin palustris*

There are also several areas of NVC type M11 base-rich fen which should have yellow mountain saxifrage *Saxifraga aizoides*. Brown mosses, yellow sedge *Carex viridula* and common butterwort *Pinguicula vulgaris* are also typical species.

Each patch of base-rich fen should hold the majority of the typical species of that NVC type. Species distribution should be restored where excessive trampling by cattle or wallowing by red deer has led to replacement of typical species by disturbed bare ground. This should be achieved by reducing trampling/wallowing in the fens that have been affected by this to allow re-colonisation by typical species.

The base-rich fens also support snipe.

Conservation Objectives for limestone pavements

2a. Maintain the extent and distribution of limestone pavements within the site

The extent of the limestone pavements feature has been estimated at 5 ha (figure taken from the Standard Data Form). This should be maintained.

Within this site, limestone pavements are mainly found on the low hills to the east of Loch Borrallie. There are also smaller areas of limestone pavement near the head of the Kyle of Durness

The current baseline estimates for this habitat 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 as this habitat forms a complex mosaic with alpine and subalpine calcareous grassland.

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

This habitat lies on the wholly or partly exposed surface of limestone outcrops that have been fissured by natural erosion. The surface of the pavement has been dissolved by water over thousands of years into 'paving blocks', known as clints, with a complex pattern of crevices, known as grikes (or grykes), between them. Natural processes of erosion should be allowed to continue to maintain the physical structure of the limestone pavement.

Grazing pressure is the most important factor in determining the structure of limestone pavement vegetation at Durness because the limestone pavement here has relatively few deep crevices to provide physical protection from grazing animals.

Durness is so exposed that woodland is unlikely to form here in the absence of grazing, but there should be a low level of grazing by livestock and/or rabbits to prevent scrub vegetation from dominating the limestone surface. Equally, grazing levels should be low enough that typical plants species (listed in 2c) are able to grow, flower and set seed.

Bracken has been spreading in other parts of this site and it is important that bracken cover should be maintained at less than 10% throughout this feature.

To the east of Loch Borrallie, where the much of the limestone pavement is found at Durness, a good indicator of whether grazing levels are low enough in summer is to ensure that only a few flowering stalks are bitten off the dark-red helleborine orchid *Epipactis atrorubens*. This species is particularly attractive to grazing animals, so if grazing levels are low enough for dark-red helleborine to flower, they should be appropriate for other limestone pavement species too.

2c. Maintain the distribution and viability of typical species of limestone pavements

The vegetation of limestone pavements is unusual because northern and arctic-alpine species that are tolerant of full sunshine and drought grow in small crevices in exposed parts of outcrops next to taller species that have their roots in the base of large crevices and which would normally require the sort of shady, humid environment found in woodlands or north-facing cliffs.

There should be a wide variety of typical species throughout this habitat including: ramsons *Allium ursinum*; hairy rock-cress *Arabis hirsuta*; wall rue *Asplenium ruta-murua*; the sedges *Carex capillaris*, *C. flacca* and *C. pulicaris*; brittle bladder-fern *Cystopteris fragilis*; mountain avens *Dryas octopetala*; dark-red helleborine *Epipactis atrorubens*; limestone bedstraw *Galium sternerii*; white flax *Linum catharticum*; bird's-foot trefoil *Lotus corniculatus*;

burnet rose *Rosa pimpinellifolia*; stone bramble *Rubus saxatilis*; hart's tongue fern *Phyllitis scolopendrium*; meadow-rue *Thalictrum minus* or *alpinum*, sanicle *Sanicula europaea* and thyme *Thymus polytrichus*.

Appropriate grazing levels (as described in 2b for limestone pavements) should be maintained to keep a wide variety of these typical species growing throughout the limestone pavement.

Colonisation of this habitat by vigorous native species, such as bracken should be avoided as this could lead to irreversible losses of typical species.

This habitat is very sensitive to fire, which should be avoided on limestone pavement.

This habitat also supports skylark and wheatear.

Conservation Objectives for otter (*Lutra lutra*)

1. To ensure that the qualifying feature of Durness SAC is in favourable condition and makes 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 Durness SAC is restored by meeting objectives 2a, 2b and 2c for otter

The aim at this SAC is to maintain otter in a favourable condition as a contribution to its wider conservation status. Therefore any impacts to the objectives shown in 2a, 2b or 2c below must not persist so that they prevent the achievement of this overall aim. When carrying out appraisals of plans or projects the focus should be on 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 they do not prevent the ability of a feature to recover and there is certainty that the features will be able to quickly recover.

This objective recognises that the qualifying species is 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.

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

The conditions for the long-term existence of otter at Durness SAC should be maintained. 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 Durness is reliant on suitable habitat in the surrounding wider terrestrial and marine environments including the nearby Foinaven SAC and Caithness and Sutherland Peatlands SAC. It 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 otter will predominantly feed in coastal waters that lie outwith the boundary of the site (for example Kyle of Durness and Loch Eriboll). 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 around 40 km and females living in the same habitat can have a linear home range of 20 km. Ranges are thought to have some degree of overlap and 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, bearing in mind that localised plans or projects more than 5 km from the site boundary would be unlikely to have a significant effect on otter.

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.

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

The spatial extent of otter within Durness SAC should be maintained.

The ability for otter to use and access all areas of importance within the SAC should be maintained.

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

The distribution and extent of otter habitat within Durness SAC should be maintained, together with the structure, function and supporting processes of the habitat.

Sufficiently high water quality and natural flow conditions should be maintained to provide the necessary conditions for otter and their prey.

Otters require suitable habitat for foraging, breeding and resting. Otters forage on fish and crabs close to the rocky shore in the sea adjacent to Durness SAC and on fish and amphibians in the lochs and streams within the site. Streams or lochs within the site that support a healthy fish population should be maintained within each otter’s home range, to enable foraging for key prey species such as salmonids, crabs and eels. Access to ponds, ditches, reedbeds and wetlands where amphibians may breed is also important. Ample sources of freshwater are essential to enable animals that feed in the sea to remove salt from their fur. They also need areas with abundant boulders, crevices and/or peat to provide secure holt sites. Dense patches of gorse along the side of the Kyle of Durness are also valuable for providing lie-ups and couches.

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

Durness SAC is notified as a Site of Special Scientific Interest and management changes described on the SSSI list of Operations Requiring Consent must have prior consent from (SNH) NatureScot.

Current and recommended management for

- **Shifting dunes with marram**

Issue	Measure	Responsible party
Tracking/ trampling/ crushing by visitors, cattle or vehicles	Ensure trampling/crushing by visitors, cattle and vehicles is minimal to prevent erosion of the shifting dunes and loss of typical species.	Land managers/owners/visitors (SOAC) The Highland Council, Police Scotland
Artificial movement of sand & sand clearance	Sand clearing from the road that runs through the dunes to Faraid Head should be kept to the minimum required to keep the track passable and sand should be cleared from	Land managers, MOD, Highland Council, NatureScot

	west to east to maintain the sand transfer system.	
Coastal defences	Ensure that any coastal defences or other coastal developments that may be proposed do not disrupt the natural mobility and supply of new sand or continuity with adjacent associated habitats.	Land managers/owners, NatureScot

Current and recommended management for coastal habitats

- Dune grassland
- Humid dune slacks

Issue	Measure	Responsible party
Grazing	<p>Low/medium levels and timing of grazing should be ensured so that combined grazing levels by cattle, sheep and rabbits are low enough to allow flowering and fruiting of typical vegetation whilst not being so low that the vegetation becomes rank enough to cause loss of typical species.</p> <p>Monitor rabbit population and re-introduce control measures if necessary.</p> <p>Avoid feeding cattle in the dune slacks.</p>	Land managers, NatureScot, SGRPID (GEAC)
Habitat continuity	Ensure localised destabilisation through loss of surface vegetation (for example, as a result of excessive rabbit activity) does not lead to large-scale destabilisation via blowouts in order to prevent loss of structure and extent within the system and any fragmentation of the habitat and loss of continuity with adjacent associated habitats.	Land managers/owners
Adjacent land uses and Development	Ensure that adjacent land uses and/or development do not limit the inland extent of the dune grassland.	The Highland Council, Land manager, NatureScot,
Trampling/crushing by people and vehicles	<p>Ensure trampling/crushing by cattle, people and vehicles is minimal to prevent compaction of the soil, erosion and/or reduction/loss of the typical species. Everyone should follow the Scottish Outdoor Access Code.</p> <p>During wet weather prevent</p>	Land managers/owners/visitors, The Highland Council, Police Scotland

	excessive trampling by cattle in the dune slacks.	
Colonisation by vigorous native species	Ensure colonisation by vigorous native species, such as nettles, ragwort, creeping thistle and bracken is minimal to prevent loss of indicator species and conversion to other habitats.	Land managers
Colonisation by invasive non-native species	Invasive non-native species should not be introduced to the site. The invasive, non-native monkey flower should not be controlled in dune slacks where it is present nor spread to other parts of the site, to prevent loss of indicator species and conversion to other habitats.	Land managers

Current and recommended management for upland habitats

- **Base-rich fen**
- **Wet heathland with cross-leaved heath**
- **Dry heaths**
- **Alpine and subalpine calcareous grasslands**
- **Tall herb communities**
- **Limestone pavements**

Issue	Measure	Responsible party
Grazing/browsing	Ensure low/medium grazing levels and timing to ensure that combined grazing levels by sheep, cattle, horses/ponies and red deer are low enough to allow growth, flowering and fruiting of typical plants whilst not being so low that juniper or other more vigorous plants dominate the vegetation so much that they cause loss of typical species. Grazing/browsing pressure should continue to be low/absent on the tall herb communities.	Land manager, NatureScot, SGRPID (GEAC), Deer Management Group
Trampling/wallowing	Levels of trampling/wallowing by cattle and red deer, should be low enough not to damage habitats by causing extensive disturbed, bare ground particularly on the base-rich fens, whilst also high enough to prevent bracken and scrub including juniper, from dominating the vegetation so much that it causes loss of typical species.	Land manager, NatureScot, SGRPID (GEAC), Deer Management Group
Vehicle tracks	These habitats are very sensitive to	Land Manager

	vehicle use so any use of vehicles needs to avoid creating bare ground.	
Colonisation by invasive native species	<p>Ensure colonisation of these habitats by vigorous native species, such as bracken, is minimal to prevent loss of indicator species.</p> <p>Bracken should be controlled on all habitats, but particularly where there are dense patches on the dry heaths and the alpine and subalpine calcareous grasslands.</p>	Land managers, NatureScot
Muirburn	If any burning were to be planned, it should be carried out only with consent from NatureScot and in accordance with the Muirburn Code, avoiding burning in sensitive areas including the base-rich fen and alpine and subalpine grasslands.	Land manager, NatureScot

Current and recommended management for

- Calcium-rich nutrient-poor lakes, lochs and pools

Issue	Measure	Responsible party
Management/maintenance of dams and sluices	<p>Any management or maintenance of dams and sluices should minimise effects of any changes in the water level on loch ecology.</p> <p>This measure is relevant at Loch Caladail (which has a dam which probably impounds most of the water currently in this loch), Loch Criospol (which has a small sluice) and Loch Borrallie (which has a managed outflow). Only Loch Lanlish has a natural water level.</p>	Land manager, SEPA, NatureScot
Water abstraction	Ensure timing and volume of abstraction that may be proposed in future is not damaging through discussions with SEPA. Drought plans should adequately address the interests of the site.	SEPA
Water quality – enrichment	Implement and maintain monitoring of key water quality parameters.	NatureScot/SEPA

	<p>Ensure no adverse impacts from diffuse or point sources.</p> <p>The width of buffer zones of vegetation between agricultural land and the loch should be increased to reduce man-made nitrogen and phosphorous run-off into the loch from surrounding land.</p> <p>Any septic tanks in the catchment should avoid adding nutrients to the loch.</p>	Land Managers, SEPA
Sediment load	Avoid land management activities, such as ploughing large areas of ground or use of vehicles which cause bare ground, that can lead to bare soils in the catchment from which there could be excess sediment run-off into the site	Land Managers, SEPA, The Highland Council
Grazing	Soil erosion should be prevented by ensuring grazing avoids poaching of edges of streams that flow into the lochs and of the lochs themselves. Avoid supplementary feeding of livestock close to the lochs as this could concentrate livestock close to the water leading to excess nutrient or sediment entering the lochs from poaching, heavy dunging or uneaten fodder.	Land Managers
Development	Ensure any development proposals do not adversely affect the site and include appropriate measures to minimise sediment run-off and prevent pollutants from entering the lochs.	Land Managers The Highland Council NatureScot
Invasive species	<p>Maintain surveillance for potentially damaging invasive species and agree action with NatureScot or SEPA if they are found in any of the lochs within Durness SAC.</p> <p>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</p>	SEPA NatureScot Land managers Members of the public West Sutherland Fisheries Trust
Fishing	Stocking and feeding should be avoided as this can cause enrichment. Introduction of some fish species could also affect the food web in the loch.	Marine Scotland West Sutherland Fisheries Trust

Current and recommended management for

- Otter

Issue	Measure	Responsible party
Ongoing species protection	Otter are a European Protected Species and therefore the species protection provisions of the Habitats Regulations apply.	All
Road mortality-otter	Any upgrading or bridges or culverts, or widening of roads such as the A838, or other work on roads, should be assessed and adequate allowance made for otters to safely use underpasses or culverts, so they are not forced to cross the road.	Transport Scotland, Highland Council, NatureScot
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

Current and recommended management for all features

Issue	Measure	Responsible party
Research and monitoring	<p>To identify emerging impacts on the habitats and their causes, in order to understand the long term issues, and to inform future management of the habitats across Scotland.</p> <p>Research bodies should have a local contact they can call upon if undertaking field data collection remotely.</p>	NatureScot, University researchers

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