

## **MUIR OF DINNET SPECIAL AREA OF CONSERVATION (SAC)**

### **CONSERVATION ADVICE PACKAGE**



## Site Details

Site name:	Muir of Dinnet
Map:	<a href="https://sitelink.nature.scot/site/8334">https://sitelink.nature.scot/site/8334</a>
Location:	North Eastern Scotland
Site code:	UK0019959
Area (ha):	417.76
Date designated:	17 March 2005

## Qualifying features

Qualifying feature	SCM assessed condition	SCM visit date	UK overall Conservation Status
Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels (Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflora</i> and/or of the <i>Isoëto-Nanojuncetea</i> ) [H3130]	Favourable Maintained	25 June 2004	Unfavourable-Bad
Dry heaths (European dry heaths) [H4030]	Unfavourable no change	28 September 2018	Unfavourable-Bad
Degraded raised bog (Degraded raised bogs still capable of natural regeneration) [H7120]	Favourable Maintained <sup>§</sup>	30 June 2000*	Unfavourable-Bad
Very wet mires often identified by an unstable 'quaking' surface (Transition mires and quaking bogs) [H7140]	Favourable Maintained	10 September 2014	Unfavourable-Bad
Otter ( <i>Lutra lutra</i> ) [S1355]	Favourable Maintained	4 October 2012	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.

<sup>§</sup> SCM condition to be re-assessed on a more up to date visit, but likely to be unfavourable.

\*SCM assessment of SSSI equivalent feature carried out more recently. Hydromorphological mire range SSSI feature was monitored in 2014 partially corresponds to the bog SAC feature.

## Overlapping Protected Areas

[Muir of Dinnet Site of Special Scientific Interest \(SSSI\)](#), [Muir of Dinnet Special Protection Area \(SPA\)](#), Muir of Dinnet RAMSAR site, [Muir of Dinnet National Nature Reserve \(NNR\)](#) and [River Dee SAC](#).

## Key factors affecting the qualifying features

### Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

This habitat type comprises both oligotrophic (nutrient-poor) and mesotrophic (moderate nutrient levels) waters, and more rarely may include intergrading types. The dominant substrates of both oligotrophic and mesotrophic waters are silt, sand, gravel, stones and boulders. The clear soft water contains low to moderate levels of plant nutrients and supports characteristic assemblages of plant species. The community is characterised by submerged aquatic and amphibious short perennial vegetation, the marginal components of which can be exposed on the lake shores during summer.

This site, in the Dee valley, includes two lochs, Kinord and Davan, in a complex area of morainic landforms and granite hills that supports a wide variety of habitats. Lochs Kinord and Davan represent high quality oligotrophic to mesotrophic freshwater habitats, with a rich aquatic flora. This includes species such as shoreweed *Littorella uniflora*, quillwort *Isoetes lacustris* and water lobelia *Lobelia dortmanna*, along with the white water-lily *Nymphaea alba*. Various pondweeds *Potamogeton* spp. are also present. In transitions from open water, the lochs also support a wide range of swamp and fen communities, dominated by common club-rush *Scirpus lacustris*, common reed *Phragmites australis* or bottle sedge *Carex rostrata*. Bog myrtle *Myrica gale* is a prominent feature of much of the adjacent fen. Fen carr characterised by willows *Salix* spp. is also present, along with other woodland habitats.

Key management issues generally for this habitat type include changes to hydrology, invasive non-native species, surface water pollution and air pollution.

Historically Loch Kinord has relatively few water quality issues, having a largely 'unmanaged' catchment of 819 ha. The main land cover (around 54%) is moorland with woodland around 30%. There are no settlements and only a few scattered buildings including the visitor centre for the National Nature Reserve. The site is also an SPA for waterfowl. Waterfowl numbers using the loch have decreased but there is now a summer resident population of greylag geese contributing to the biologically available phosphorus load. Forestry operations have the potential to affect the site through release of sediment and nutrients during felling and restocking. These operations need to be planned and carried out with regard to the sensitivity of the feature. The site is currently slightly above the target for [nitrogen critical loads](#); there are no onsite remedies for this issue. Angling permits are sold for the loch. Bio-security is an important issue in tackling the spread of invasive non-native aquatic species which once established are almost impossible to eradicate such as Nuttall's pondweed *Elodea nuttallii*.

Loch Davan has a larger, more intensively managed [catchment](#), roughly 30% farmland 35% woodland and 35% moorland. There are a couple of large steadings and a small settlement, Logie Coldstone, which has a small waste water treatment works. The Logie Burn catchment which passes through farmland has also been canalised in both its inflow (and outflow) to Loch Davan, leading to increased sedimentation. Himalayan balsam is present in the Logie Burn catchment and there is a risk this could become more widespread around the loch.

SNH's programme of SCM has found this feature to be in favourable condition.

Further information about clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels can be found [here](#).

### Dry heaths

Dry heaths occur on freely-draining, acidic to almost neutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation.

This site has extensive dry heaths. The heath community is mainly H16 *Calluna vulgaris-Arctostaphylos uva-ursi* heath, which is largely confined to north-east Scotland. The rare, species-rich type, H16a *Pyrola media-Lathyrus montanus* sub-community is well represented, with species such as intermediate wintergreen *Pyrola intermedia*, petty whin *Genista anglica* and bitter vetch *Lathyrus linifolius*. Mountain everlasting *Antennaria dioica* and stone bramble *Rubus saxatilis* also occur. Small areas of wet heath are also present around the margins of kettle holes, which support 7120 Degraded raised bog and fen vegetation.

Nearly all dry heath is semi-natural, originally derived from woodland. On this site, the main areas of dry heaths are currently managed by rotational burning with gorse control through cutting/spraying.

The feature's condition has been assessed through NatureScot's SCM programme as unfavourable due to significant encroachment of some of the areas of dry heath where no rotational burning takes place, by native trees and shrubs mainly Scots pine *Pinus sylvestris*, birch *Betula* species and gorse *Ulex europeae*. NVC surveys carried out by NatureScot in 1995 and 2018 are directly comparable and show a decline in the bearberry heath of 40% in that period.

The key management issue at Muir of Dinnet is lack of burning and subsequent encroachment by native trees and shrubs. Muirburn is recommended as the best way of managing H16 heath to retain its species diversity.

Further information about dry heath can be found [here](#).

### Degraded raised bogs

Degraded raised bogs are entirely rain-fed, nutrient-poor ecosystems, raised above the surrounding mineral soil, and formed by waterlogging of an area. They differ from active raised bogs in that they are not currently forming peat. They will have also been subject to changes that have caused deterioration to their hydrology, structure and/or vegetation, usually through land management, either on the bog or nearby. Degraded raised bogs selected for designation are those that are capable of

regeneration, for example with appropriate rehabilitation management. The aim is to restore the areas of degraded raised bog to become active raised bog.

The main areas of degraded raised bog at Muir of Dinnet are at Black Moss and Parkin's Moss with smaller areas in kettle holes either side of the A93. Historical cutting and drainage at Black Moss and Parkin's Moss lowered the water table and allowed scrub/tree encroachment to take place. Black Moss has two remaining central areas of shallowly raised bog, surrounded by swamp, fen and fen woodland. The bog is dominated by heather and cotton grasses (*Eriophorum* species), with some regeneration of Scots pine *Pinus sylvestris*. Some habitat restoration work has been done here with the removal of 15 ha of trees from the western dome of Black Moss and some ditch damming at the outlet to Black Moss. At Parkin's Moss there has been ditch damming and the bog is now thought to be largely peat-forming again and up-to-date monitoring will establish if this part of the site and parts of Black Moss could now be considered active raised bog.

SNH's programme of SCM found the feature to be in favourable condition at the time of the last monitoring (in 2000). However, an up to date SCM visit is required in order to establish the current feature condition. It is anticipated that parts of the feature might be unfavourable due to high tree cover. Recent felling of most of the trees from the western side of Black moss has reduced overall tree cover to less than 10% across all areas of raised bog but may still be above the 5% taret. Sphagnum cover is variable but now above 20% target threshold.

Degraded raised bogs are important in the SAC series, mainly due to the habitat's potential to be restored to active raised bog, and thus contribute to attaining favourable conservation status for raised bogs as a whole.

Further information about degraded raised bog can be found [here](#).

#### Very wet mires often identified by an unstable 'quaking' surface

This feature is also known as transition mires and quaking bogs. The term 'transition mire' relates to vegetation that in floristic composition and general ecological characteristics is transitional between acid bog and alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich.

Transition mires and quaking bogs can occur in a variety of situations, related to different geomorphological processes: in flood plain mires, valley bogs, basin mires and the lagg zone of raised bogs, and as regeneration surfaces within mires that have been cut-over for peat or areas of mineral soil influence within blanket bogs (e.g. ladder fens).

The swamp areas at Muir of Dinnet are found in a lowland setting as lagg-fen at Black Moss and swamp at Ordie Moss. The Black Moss fen is mainly dominated by bottle sedge *Carex rostrata* and common reed *Phragmites australis*. Ordie Moss is a wet, impenetrable area of swamp dominated by bottle sedge *C. rostrata* and willow carr.

The main factors which have influenced the condition of this habitat type at Muir of Dinnet are historical drainage and scrub encroachment. Diatomite was worked from

the basins of Black and Ordie Moss and Loch Kinord until the turn of the century and this has contributed to the overall habitat diversity of the site. SNH's programme of SCM has found the feature to be in favourable condition.

Further information about Very wet mires often identified by an unstable 'quaking' surface can be found [here](#).

### Otter

The lochs, together with their marshes and ditches, provide ideal feeding, resting and shelter areas for otter and support a good population which is linked to the important River Dee population. There is good prey availability, with populations of Atlantic salmon, pike, perch plus frogs, toads and other prey.

Otter require continued proximity to unpolluted open water. 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 outside 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.

Previous national population declines in otters were primarily attributed to pollution and persecution. Otters may be killed on local roads but there is no evidence that this is a frequent occurrence or adversely affecting the local population.

SNHs programme of SCM has found otter to be in favourable condition. However, otter are believed to be found at lower densities than were previously recorded here, possibly due to the decline in European eel. The importance of this oily fish to lactating females is such that the population was believed to have declined, then stabilized at a lower level. Both males and breeding females with cubs are recorded annually from the site.

Further information about otters can be found [here](#).

### **Conservation Priorities**

There are no priority qualifying features within the site and no apparent management conflicts between the qualifying features. If any conservation management conflicts between the qualifying features were to arise, then consideration should first be given to the i) dry heaths (currently in unfavourable condition) and ii) clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels, the primary reasons for site selection.

This site has other overlapping designations and the impact of any proposed management measure for Muir of Dinnet SAC or assessment of plans or projects subject to a Habitats Regulations Appraisal (HRA), will also need to take account of these features.

Overlapping SPA features are greylag goose and a non-breeding waterfowl assemblage (including whooper swan, pink-footed goose, wigeon, tufted duck, goldeneye and goosander).

The River Dee SAC features are Atlantic salmon, otter and freshwater pearl mussel.

None of these other features are prioritised over any of the Muir of Dinnet SAC features, nor vice versa. Management for these features is largely compatible.

## **Conservation Objectives for habitats**

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

The aim at this SAC is to maintain, or where appropriate 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 and ensuring that they do not prevent restoration of the raised bog habitat, 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 clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels**

### **2a. Maintain the extent and distribution of the clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat within the site**

The extent of clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat feature has been estimated at 100ha. The area figure has been taken from the Standard Data Form.

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 habitats' long-term existence are in place.

### **2b. Maintain the structure, function and supporting processes of the clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels habitat**

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 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. Summary information the loch's physical characteristics can be found on the [UK Lake Database](#) in particular there is a link to the [Bathymetrical survey of Freshwater Lochs in Scotland](#) carried out in 1905 under the direction of Murray and Puller

##### **-Hydrological regime**

The hydrology of the lochs should be maintained as this 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. Loch Kinord is monitored by SEPA and is classified as "High" for water flows and levels.

##### **-Loch substrate character**

The type and distribution of sediment particles within the lochs should be maintained as this will affect the biology of the lochs 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. Loch Kinord is considered to be "High" for physical condition under WFD monitoring by SEPA

#### -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 could be minimised by avoiding having large areas of bare ground close to the lochs. The loch catchments include land used for forestry and agriculture and so these areas are potential sources of sediment input and land use guidelines should be enforced

#### -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. Loch Kinord is generally considered either high or good for most WFD parameters overall it is classified as poor because of a barrier to fish migration downstream outwith the site. This is a legacy structure and is considered technically unfeasible for change.

### **Water Quality**

Loch Kinord is monitored by SEPA for [WFD](#) and is classified as “Good” for Water quality. These are the standards which should be maintained at Muir of Dinnet to ensure that the current level of water quality is maintained:

#### -Dissolved Oxygen

Dissolved oxygen in loch water is vital for respiration of all aquatic life, including fish, and 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 for dissolved oxygen is >7.0mg/l for lochs classified as at Good Ecological Status (GES) under the Water framework Directive (WFD) during July and August. This is the target adopted under common standards monitoring.

#### -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 should have pH of 5.5 to 7 and Mesotrophic 6.5 to 8

#### -Nutrients

Increased nutrient levels can result in undesirable changes to loch vegetation and have impacts on the wider ecosystem. Below are the commonly used parameters used to assess nutrient levels and to identify when levels might become too high at the Muir of Dinnet lochs.

- Phosphorus is one of the main nutrients required for plant growth and there is strong correlation between Total Phosphorus (TP) concentration and phytoplankton biomass. The target for TP is based on an annual mean. For shallow lochs (Mean depth <3m), like those at Muir of Dinnet, this should be around 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 is that Annual Mean Total Nitrogen for all

lake types should not exceed 1.5mg/l or deteriorate from baseline. More stringent targets may be needed to control algal growth. More detailed targets for lakes are being developed for WFD.

- Measurements of Chlorophyll a provide an indicator of the levels of phytoplankton present. Phytoplankton is an important part of the processes of a loch ecosystem affecting light penetration and oxygen demand. However, if chlorophyll a levels are too high this can indicate nutrient enrichment.
- If dense floating rafts of filamentous algae (or thick algal coatings on aquatic plants) are present, this is another indicator of nutrient enrichment. Filamentous algae can have a detrimental impact on plant communities and the wider loch ecosystem.

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

Specific species for this site are listed in the SAC reasons for [Site Selection](#)

These are *Littorella uniflora*, *Isoetes lacustris* *Lobelia dortmanna* *Nymphaea alba* *Potamogeton* spp. *Scirpus lacustris* *Phragmites australis* *Carex rostrata* *Myrica gale* and *Salix* spp

Baseline information for [Loch Davan](#) and [Loch Kinord](#) is available from the Scottish Loch Survey

Typical species of this habitat are listed in table 6 of the Common Standards Monitoring Guidance. The following have been recorded from the two lochs:

<i>Isoetes lacustris</i>	lake quillwort
<i>Littorella uniflora</i>	shoreweed
<i>Lobelia dortmanna</i>	water lobelia
<i>Nitella</i> sp (each species)	
<i>Potamogeton alpinus</i>	red pondweed
<i>Potamogeton gramineus</i>	various-leaved pondweed
<i>Potamogeton perfoliatus</i>	perfoliate pondweed
<i>Sparganium angustifolium</i>	floating bur-reed
<i>Utricularia</i> sp (each species)	bladderworts

Other notable species are:

*Nuphar pumila* Nationally Scarce, [IUCN Red List – Least concern](#)

*Nitella flexilis* [IUCN Red list – least concern](#)

The site also hosts a relatively rich *Potamogeton* flora (K- Loch Kinord, D- Loch Davan):

*P. alpinus* D  
*P. berchtoldii* K,D  
*P. crispus* K,D  
*P. gramineus* K,D  
*P. natans* K  
*P. x. nitens* D  
*P. obtusifolius* K D  
*P. perfoliatus* K, D

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 the population 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. *Canadian pondweed* is present on the site in both lochs. While an invasive non-native species this is currently not on the list of high impact species and will only be considered unfavourable where it is causing other issues. Himalayan balsam is present in the Logie Burn catchment and there is a risk this could enter Loch Davan.

Elevated nutrient levels can have a detrimental impact on the lochs ecosystem. Dense floating rafts of filamentous algae and phytoplankton blooms can be caused by high nutrient levels, and these can have a negative impact on typical species through competition for resources such as light. The water quality parameters listed in section 2b should be met, in order to avoid phytoplankton blooms, and increases in filamentous algae.

The habitat is also used by Atlantic salmon and supports breeding and non-breeding greylag goose. The lochs provide important foraging habitat for osprey during the breeding season. In addition, the lochs support a variety of breeding waterbirds, including: oystercatcher, lapwing, curlew, redshank and common sandpiper. These and other birds may have an impact on the nutrient balance in the lochs.

## Conservation Objectives for dry heaths

### 2a. Restore the extent and distribution of the dry heaths habitat within the site

The extent of dry heaths habitat is approximately 79 ha. The area figure has been taken from the Standard Data Form. At designation some areas of bearberry heath already had an open cover of pine and birch.

There should be no measurable net reduction in the extent of the habitat. There has been a recorded significant reduction over 20+ years and the habitat's extent and distribution throughout the site should therefore be restored.

The habitat is found on freely-drained, nutrient-poor, acidic to neutral soils. This can determine the extent and distribution of the habitat throughout Muir of Dinnet SAC, although management is also required to restore and maintain extent. This can include the following:

- muirburn carried out in accordance with the Muirburn Code
- an appropriate (low) level of grazing
- avoidance of any loss of habitat through increased extent of successional or adjacent natural habitats. The extent of dry heath at Muir of Dinnet is currently affected by encroaching gorse, birch and Scots pine.
- avoidance of negative effects of access and recreation

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

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

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.

Areas of dry heath within the wider SSSI used to be managed by grazing of livestock but none currently remain in the SAC. Low numbers of roe deer are present. In parts of the site a lack of management has led to extensive encroachment of tree and shrubs (Scots pine birch and gorse), as well as large patches of long heather. Some areas of dry heath at Muir of Dinnet are currently managed by muirburn to maintain the bearberry heath. Gorse is controlled through spraying and cutting.

The two primary objectives for restoring dry heath at this site are currently:

- to restore recently lost areas of bearberry heath back to heath
- to restore the height structure of the vegetation of recently lost areas of bearberry heath. This can be done by burning or grazing but burning is preferred for bearberry heath
- to reduce the cover of non-typical species to an acceptable level. At Muir of Dinnet, the main issue is extensive Scots pine, birch and gorse encroachment on the heath.

Additional objectives for restoring the structure of the habitat include:

- 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.
- Levels of disturbed bare ground should be low. Activities that might cause an increase include excessive use of vehicles or increasing use of the habitat by deer.

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

The indicator species for dry heath include:

Common bearberry	<i>Arctostaphylos uva-ursi</i> .
Ling	<i>Calluna vulgaris</i>
Bell heather	<i>Erica cinerea</i>
Crowberry	<i>Empetrum nigrum</i>
Cowberry	<i>Vaccinium vitis-idaea</i>
Petty whin	<i>Genista anglica</i>

Of the three types, or sub-communities, of bearberry heath, the rarer, more herb-rich sub-community, H16a, *Pyrola media-Lathyrus linifolius*, is predominant at lower altitudes on the Muir of Dinnet, especially in the heath areas at both sides of the A93. Chickweed-wintergreen *Trientalis europeaea* and intermediate wintergreen *Pyrola media* occur more frequently in this type and bitter vetch *Lathyrus linifolius*, slender St John's Wort *Hypericum pulchrum*, common dog's violet *Viola riviniana* and *Anemone nemorosa* occur in this type but not the others. Pasture herbs and grasses are also more common here than in the other two types of H16 heath. Many of the herbs are adapted to survive the effects of burning so there can be fairly abundant new growth of these species in newly burned areas.

The Muir of Dinnet's bearberry heath hosts a variety of rare plants and invertebrates. As

well as *Genista anglica* (Near Threatened), and intermediate wintergreen *Pyrola media* (Vulnerable), rare and threatened plants include heath violet *Viola canina* (Near Threatened), and rusty fork-moss *Dicranum spurium* (Vulnerable).

Rare moths found on the heath include the netted mountain moth *Macaria carbonaria* (Rare, see Butterfly Conservation's [factsheet](#)), the bearberry case-bearer *Coleophora arctostaphyli* and formerly the small dark yellow underwing *Coranarta cordigera* (Rare). Areas of young birch on the heath also support the Kentish glory moth *Endromis versicolora* (Nationally Scarce).

A lack of management of dry heath (by grazing and/or burning) can result in a reduction in species richness through an over dominance of tall heather. This will also lead to an encroachment of scrub and trees, and the eventual succession to woodland. At Muir of Dinnet, the dominant, taller heather is outcompeting the shorter bearberry. SNH currently manage parts of the site by muirburning, which is the preferred management for restoring and then maintaining the right conditions for bearberry heath. Tree and scrub encroachment is also affecting the heath at Muir of Dinnet. Some scrub and tree removal has been done in the past, but additional clearance is required as this is affecting the typical species, as well as the overall extent of habitat.

This habitat also supports skylark, meadow pipit and stonechat, and formerly red grouse.

## Conservation Objectives for degraded raised bogs

### 2a. Restore the extent and distribution of the raised bog habitat within the site

The extent of the degraded raised bog feature has been estimated at 25 ha. The area figure has been taken from the Standard Data Form.

There should be no reduction in the extent and distribution of raised bog habitat within the site.

This habitat should be restored to active raised bog wherever possible through regeneration and restoration. This will mean areas defined as degraded raised bog will decline in extent over time as active raised bog areas increase.

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 the raised bog habitat

The slow formation of raised bogs, and their typical domed shape, means they rely heavily on specific hydrological conditions. Degraded raised bogs are likely to have been subject to some deterioration of these conditions. The natural hydrology of this site should be maintained with no modifications, both within and outwith the site, that may negatively change the hydrology of the site (e.g. by the digging or deepening of ditches, or by excessive vehicle usage, or by the planting or encroachment of trees on the peat body).

Artificial drains should be blocked, or natural vegetation growth be allowed to block the drains. No new drains should be installed. This will help the bog to function naturally and actively grow. Drain blocking has been carried out at Muir of Dinnet. There are some remaining drains which could usefully be blocked but the impacts to adjacent land, and to downstream water courses will need to be investigated before any work can be carried out.

The habitat structure (e.g. vegetation cover and surface patterning / micro-topography of the

bog) should also be improved. Any increases in drainage can cause deterioration in the bog's mosaic of habitats through drying out and shrinkage of the peat. Burning and compaction by vehicles can also impair the topography, natural functions and processes of the raised bog habitat. Excessive trampling, and inappropriate grazing regimes can also contribute to a deterioration in the habitat structure.

Overgrazing can cause poaching, damaging and dislodging the surface vegetation of Sphagnum mosses and other bog species, resulting in areas of bare peat and erosion. Light grazing with appropriate numbers and types of stock can help to suppress the encroachment of young trees and scrub, and can help to lessen the dominance of *Calluna vulgaris*. This is particularly the case on sites where the hydrology has been modified and water levels are not sufficiently high to suppress tree establishment. There is no grazing of livestock at Muir of Dinnet, and deer numbers are low.

Trees and scrub can cause the habitat to dry out. Where they are more than 'occasional' they should be considered for removal where they are negatively impacting on the bog, although they can be slightly more frequent on the rand (the sloping bog margin) and lagg (an area of wetland at the edge of the bog). Generally there shouldn't be a trend of increased tree cover on the site. The likelihood of the establishment of scrub or non-native invasive species on the bog surface is increased where the hydrology has already been compromised by drainage, planting or peat cutting. Scrub and tree encroachment has been an issue for the bogs at Muir of Dinnet. Extensive tree clearance has already been carried out at Black Moss and further work might be required.

Nutrient enrichment via aerial deposition of nitrogen may negatively affect the growth and condition of the typical bog species. The critical load for nitrogen for this habitat is 5kg/ha/yr. The characteristic bog species, such as sphagnum, are dependent on low nutrient conditions and, in the long term, nutrient enrichment would favour the growth of dwarf shrub species and grasses over the bog-building sphagnum mosses. There should therefore be no alteration to the acidic conditions needed for the bog species to be maintained, or where necessary restored. The Air Pollution Information System ([www.apis.ac.uk/src1](http://www.apis.ac.uk/src1)) identified a three year average Nitrogen deposition rate for Muir of Dinnet SAC of 9.3 kg N/ha/yr between 2015-17. The SAC is likely, therefore, to experience some level of eutrophication. Increases in nitrogen inputs to the site should therefore be avoided. Bogs that have been hydrologically compromised are more sensitive to the effects of Nitrogen deposition and therefore the natural hydrology of this site should be maintained or where appropriate restored.

It is important to maintain low nutrient, low pH conditions on the site. For this reason the potential impacts of proposals, e.g. the establishment or expansion of pig or poultry units in the surrounding area, should be fully assessed and where appropriate mitigation measures would be required.

Lagg fen is a natural component of active raised bogs but in many cases it has been removed or degraded by agricultural improvement. It supports the raised bog, and acts in part as a buffer, and therefore the maintenance of any remaining lagg fen is important in maintaining the structure and function of the raised bog. Much of the lagg fen at Muir of Dinnet is part of the Very wet mires feature (see details below).

## **2c. Restore the distribution and viability of typical species of the raised bog habitat**

The typical distribution of bog flora within a raised bog relies on the presence of small variations in height across the hummocks and hollows of the remaining bog, and the maintenance or raising of the water table close to the bog surface. In degraded bogs this is likely to involve restoring the hydrology by blocking any active drains that are the result of

anthropogenic activities. Therefore, the hydrology of the site (including water levels and drainage), is crucial to sustain this mosaic and floral distribution.

The typical species, and those which are key for restoring the degraded raised bog to active raised bog, are those that have the role as the main bog-builders. These are mainly:

*Sphagnum* species, and especially include:

*S. capillifolium*

*S. papillosum*

*S. magellanicum*

*S. cuspidatum*

A healthy raised bog is characterised by a near dominance of peat forming sphagnum and cotton grasses (*Eriophorum* species). Other characteristic bog species include cross leaved heath (*Erica tetralix*) and other ericaceous plants, and the carnivorous sundews (*Drosera* species). Ling heather (*Calluna vulgaris*) is also a typical species and may be extensive on degraded raised bogs but should not be dominant in a healthy active raised bog.

The main areas of degraded raised bog at Muir of Dinnet are at Black Moss and Parkin's Moss. Black Moss has a central area of shallowly raised bog, surrounded by swamp fen and fen woodland. The bog is dominated by heather and cotton grasses (*Eriophorum* species), with some regeneration of Scots pine *Pinus sylvestris*.

As well as *Calluna* and *E. tetralix*, the heather-dominated bog is characterised by a constant *Eriophorum vaginatum* and *E. angustifolium* cover, together with a little deer grass *Trichophorum cespitosum*, though this is rather local. *Myrica gale* is locally abundant in the eastern section of Black moss, where *Vaccinium oxycoccus* occurs very occasionally. Sphagnum covers on the bog are low; mainly *S. capillifolium*, with locally occasional *S. papillosum*, and with locally abundant *S. cuspidatum*, mainly in peat pits (M2) and in wetter areas approaching sphagnum bog (M18). *S. magellanicum* has been noted in the eastern section of the bog and *S. fuscum* in the southern section. The rare waved fork-moss *Dicranum bergeri* also occurs in the eastern section of Black Moss. Peat pools present on the bog and locally in the wet woodland also support *Carex rostrata*.

At Parkin's Moss, the bog has been extensively cut-over in the past. However, due to habitat restoration works, the bog is now thought to be largely peat-forming again. This is to be confirmed by an up to date SCM visit which will establish the current overall condition. Here, the bog is dominated by *Calluna vulgaris*, *Eriophorum* species and *Sphagnum* species. *Myrica gale* is found along the ditches.

The main problems with the bog areas at Muir of Dinnet are alterations to hydrology caused by historical peat cutting and drainage. This has allowed scrub/ tree encroachment to take place, further drying the bogs. Drain blocking and scrub clearance has taken place but further tree clearance work might be required, particularly on Black Moss. There is also an active drain to the SW of Black Moss which is taking water off the site.

Excessive trampling and inappropriate grazing regimes can contribute to deterioration in the habitat structure, having consequential harmful effects on the typical species. Appropriate (not too high or too low) grazing can be beneficial in helping to suppress encroachment by scrub and *Molinia* on bog which has been damaged. The bog habitat at Muir of Dinnet is grazed at a low level by red and roe deer.

## Conservation Objectives for Very wet mires often identified by an unstable 'quaking' surface

### 2a. Maintain the extent and distribution of the Very wet mires often identified by an unstable 'quaking' surface habitat within the site

The extent of Very wet mires often identified by an unstable 'quaking' surface at Muir of Dinnet has been estimated as 25ha (taken from the Standard Data Form). This should be maintained.

Accurate measurement of the extent of Very wet mires often identified by an unstable 'quaking' surface habitat is hard to achieve due to gradual transitions in vegetation to adjacent habitats.

There should be no measurable net reduction in the extent of the habitat and its distribution throughout the site should be maintained.

This habitat is transitional with other adjacent wetland habitats so 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.

The swamp areas at Muir of Dinnet are found in a lowland setting as lagg-fen at Black Moss and swamp at Ordie Moss.

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 the Very wet mires often identified by an unstable 'quaking' surface habitat

This habitat is usually present as a mosaic with other wetland habitats. The term "transition mire" relates to vegetation that, in floristic composition and general ecological characteristic, is transitional between acid bog and alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich.

The maintenance of appropriate hydrology for this habitat is important to retain the structure and function. This habitat has developed here due to the ground being close to the water table. Management to prevent or reduce detrimental effects of drainage, including in the wider surrounding area, is key to retain an appropriate water table and to avoid the habitat drying out or suffering from cycles of extreme high and low water levels. Management to prevent or reduce detrimental effects of drainage, including in the wider surrounding area, is also key. There is an active drain at the SW corner of Black Moss which is reducing the water table. Ideally, this drain would be blocked in order to increase the height of the water table.

Colonisation of this habitat by vigorous native species, tree or scrub growth or invasive non-native species could led to irreversible habitat loss in the longer term, through shading, drying out of the habitat and possible conversion to other open-ground habitats or woodland. Trees/scrub should be no more than scattered, cover should be <10% on open fen and saplings/ seedlings should be no more than rare. The site should be too wet for tree regeneration over most of the extent. Due to a lack of historical management trees and scrub have colonised this habitat at Muir of Dinnet, but there has been no increase in the last 20 years and the average tree cover on the site is below the 10% target. Further removal of trees and scrub may be considered if there is evidence of additional colonisation, however, this is challenging as the extreme wet conditions make access challenging, and potentially hazardous.

No livestock are grazed on Muir of Dinnet. The site is grazed by only red and roe deer, with resulting tree/scrub encroachment. The introduction of grazing by domestic stock at this site is may never be possible due to the extremely wet conditions.

Non-native invasive species should not be present on this habitat. Currently none have been recorded on this site.

### **2c. Maintain the distribution and viability of typical species of the Very wet mires often identified by an unstable 'quaking' surface habitat**

This habitat is found in transition with other habitats and the typical species are dependent on the site and location of the habitat.

On Muir of Dinnet the following NVC types are found;

M9 *Carex rostrata* – *Calliergon cuspidatum/giganteum*

M4 *Carex rostrata* – *Sphagnum recurvum*

M18 *Erica tetralix* – *Sphagnum papillosum*

M27 *Filipendula ulmaria* – *Angelica sylvestris* mire

S27 *Carex rostrata* – *Potentilla palustris*

S10 *Equisetum fluviatile* swamp

S9 *Carex rostrata* swamp

The swamp areas at Muir of Dinnet are found as lagg-fen at Black Moss and swamp at Ordie Moss. The Black Moss fen, is mainly dominated by bottle sedge *Carex rostrata* and common reed *Phragmites australis*. Lesser tussock sedge *C. diandra* and slender sedge *Carex lasiocarpa* also occur. Ordie Moss is a wet, impenetrable area of swamp dominated by bottle sedge *C. rostrata* and willow carr.

The wet and condition of this habitat make access challenging, and potentially hazardous, for scrub and tree management. Drainage management, as mentioned in Conservation Objective 2b, is likely to be the most practical way to control succession on the site.

## **Conservation Objectives for otter**

### **1. To ensure that the qualifying feature at Muir of Dinnet 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 Muir of Dinnet SAC is restored by meeting objectives 2a, 2b and 2c for the qualifying feature.**

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 the otter at Muir of Dinnet 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 Muir of Dinnet is reliant on suitable habitat in the surrounding wider countryside, including the adjoining River Dee SAC and nearby Glen Tanar SAC, and it is unlikely to be viable (capable of being self-sustaining) in isolation. The home range of an otter will vary depending on their sex, habitat quality and food availability, but is likely to be much larger than this site. Males living in rivers and streams can have a mean linear range size of around 40km and females living in the same habitat can have a linear home range of 20km. Males have been known to range as far as 80km.

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.

Otter is 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 ability for otter to use and access all areas of importance within Muir of Dinnet SAC should be maintained.

Distribution of otters within a 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 Muir of Dinnet SAC should be maintained, together with the structure, function and supporting processes of the habitat.

Otters require suitable habitat for foraging, breeding and resting. In freshwater environments 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, reedbeds and wetlands where amphibians may breed is also important.

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 for Good Ecological Status (GES) under the Water Framework Directive should be met. These targets are intended to support a healthy, naturally functioning riverine ecosystem which protects the whole biological community and individual species to a degree characteristic of the lochs.

## Conservation Measures

Muir of Dinnet is notified as a SSSI and management changes described on the SSSI list of Operations Requiring Consent must have prior consent from SNH (NatureScot). The site is also a National Nature Reserve and the Management Plan ensures that management for nature conservation is the primary objective.

## Current and recommended management

Issue	Measure	Responsible party
Water management	<p>The hydrological regime is currently healthy therefore maintain current hydrological/ flushing regime.</p> <p>Any adverse effects on site integrity should be avoided through the consenting regimes. The main regulatory mechanism is the Controlled Activities Regulations, CAR.</p>	SEPA, Aberdeenshire Council, NatureScot,
Water Quality	<p>Loch Kinord and Davan form part of SEPA's ECN monitoring programme. This would highlight any significant deterioration in water quality.</p>	SEPA, NatureScot, Land Managers
	<p>Most water quality issues stem from run-off outside the SAC. The most effective means of addressing this is through the River basin management plan priority catchment program.</p> <p>Ensure adverse effects from diffuse or point source pollution are minimised or removed.</p> <p>Any new sewage treatment systems in the catchment must not add nutrients to the lochs.</p>	SEPA, NatureScot, Land Managers
	<p>Any development proposals in the catchment should include appropriate measures to minimise sediment run-off and prevent pollutants from entering the site e.g. renewable energy proposals.</p> <p>Any adverse impacts on site integrity through land management/change should be avoided through the consenting regimes, where activities are covered by these.</p>	Aberdeenshire Council, NatureScot , SEPA, Land Manager
Grazing/trampling	<p>Red and roe deer are likely to continue to be the only grazers within the SAC.</p> <p>Trampling by deer should remain low.</p>	Land manager, NatureScot,

Woodland encroachment onto open habitat	<p>Targeted tree/scrub removal to maintain and restore the extent of bearberry heath.</p> <p>Continue tree and scrub clearance from areas of raised bog and wet mire.</p>	NatureScot, Scottish Forestry, Forestry & Land Scotland
Muirburn	<p>It is important to continue a targeted programme of muirburning to maintain and restore the dry heaths feature (H16 bearberry heath). The burning programme could be expanded to included areas of heath which have been lost, following removal of scrub woodland.</p> <p>Burning to be carried out in accordance with the Muirburn Code in targeted areas.</p> <p>No burning is carried out in close proximity to the bogs at Muir of Dinnet SAC.</p>	NatureScot , Land manager
Forestry	<p>Ensure adherence to the Forest and Water Guidelines, and published best practice, during any forestry operations and highlight the need to strictly control fine sediment and other diffuse pollution release into the lochs.</p>	Scottish Forestry, Forestry & Land Scotland, Forestry owners and managers
Agriculture	<p>Agricultural land in the catchments of the lochs should be managed according to best practise set out in the Good Agricultural and Environmental Conditions (GAEC).</p>	Land managers, NatureScot, SGRPID
Habitat management	<p>Most of the SAC is within the Muir of Dinnet National Nature Reserve (NNR).</p> <p>The areas within the NNR are managed in accordance with an approved NNR management plan which aims to improve the condition of the SAC. The plan sets out conservation measures to be carried out on the NNR, including dealing with visitor management concerns e.g. disturbance or wildfire risk.</p> <p>Any new proposals regarding visitor management that could affect SAC features will be subject to HRA.</p> <p>There is a Fire Plan for the reserve which deals with emergency action in case of wildfire.</p>	NatureScot, Land managers.

Peatland management –raised bog/wet mire	Restoration of the degraded raised bog will continue through the maintenance of ditch blocking and tree/scrub removal.	NatureScot
	Investigate the feasibility of damming the drain in the SW of Black Moss as this could provide some benefits to the raised bog and wet mire features.	NatureScot, Landowners,
Nutrient enrichment from aerial deposition of nitrogen – raised bog	<p>Raised bogs that have been hydrologically compromised are more sensitive to the effects of nitrogen deposition and therefore the natural hydrology of this site should be maintained or where appropriate restored.</p> <p>Increases in Nitrogen inputs to the site should be avoided.</p>	SEPA, UK Government, NatureScot, Land managers
Monitoring – Degraded raised bog	An up to date SCM visit is required for this feature to ascertain the current overall condition, and which parts of the feature could be considered 'active raised bog'.	NatureScot
Ongoing species protection - otter	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 A97 and A93, 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, Aberdeenshire Council, NatureScot
Invasive species	All anglers and other water users (such as canoeists or researchers) should follow the Check, Clean, Dry biosecurity procedures to help prevent the spread of problem non-native species.	Land Manager, SEPA, River Dee Board, Scottish Government, NatureScot
	Canadian pondweed is present on the site in both lochs. Monitor to track long term effects. There is no reasonable measure that can remove Canadian pondweed from Muir of Dinnet.	SEPA

	<p>Himalayan balsam occurs on the Logie Burn. This is removed within the NNR but would need a wider initiative to remove from the catchment of the burn, outwith the SAC to have long-term success.</p> <p>Monkey flower is also found on the Logie Burn (since the flood event of 2015) but it is not known if this poses a significant threat.</p>	<p>NatureScot, Land manager, SISI</p>
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