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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

RED MOSS OF NETHERLEY SPECIAL AREA OF CONSERVATION (SAC)

CONSERVATION ADVICE PACKAGE

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Site details

Site name:	Red Moss of Netherley
Map:	https://sitelink.nature.scot/site/8601
Location:	North Eastern Scotland
Site code:	UK0030315
Area (ha):	93.17
Date designated:	17 March 2005

Qualifying features

Qualifying feature	SCM assessed condition	SCM visit date	UK overall Conservation Status
Active raised bog [H7110]*	Unfavourable Recovering	10 August 2015	Unfavourable-Bad
Degraded raised bog [H7120]	Unfavourable Recovering	10 August 2015	Unfavourable-Bad

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.
***** Habitats Directive priority habitat

Overlapping protected areas

Red Moss of Netherley Site of Special Scientific Interest (SSSI)

Key factors affecting the qualifying features

Active raised bogs
Raised bogs are slow-growing, entirely rain-fed, nutrient-poor ecosystems, raised above the surrounding mineral soil, and formed and maintained by waterlogging of an area.

The bogs survive because water losses are matched or exceeded by regular precipitation inputs, and in good conditions they remain waterlogged despite sometimes being several metres above the surrounding land. The bog grows over time as vegetation dies off and the remains accumulate but only partially decompose.

Sphagnum mosses are the main bog-forming plant species on most bogs, and they are unable to survive unless they lie close to the water table. This means the living growing surface of the bog is closely tied to the shape of the water table within the bog, and the low levels of nutrients that exist.

These bogs can be very sensitive to any changes in their hydrological conditions. Such changes can include changes to water levels through alterations to drainage and climatic changes; alterations to the acidic conditions (typically a weakening of the acidity) that the vegetation communities need to persist; and physical damage to their structure, especially to their surface layers.

In common with nearly all remaining raised bogs in Britain, the Red Moss of Netherley has been greatly influenced by peat cutting and drainage. The bog is surrounded by forestry and agricultural land. Some peripheral drains are still actively maintained, while most of the internal drains have been blocked. The area of active raised bog is found in the centre of the site, with the degraded raised bog surrounding it. A combination of factors, including low water levels, has contributed to an increase in heather cover and invasion of scrub and trees on the site. Work to remove scrub and a trial to reduce heather cover has taken place.

A fuller account of the habitat can be found here.

Degraded raised bogs

Degraded raised bogs are also entirely rain-fed, nutrient-poor ecosystems, formed by waterlogging and a build-up of peat to the point where they are raised above the surrounding mineral soil. 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.

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.

The degraded raised bog at Red Moss of Netherley was historically drained and cut-over in the past but much of the site has been the subject of restoration proposals to block active drains and remove scrub. However, one compartment is not under secure management and, on this area, active drains, heather cover and scrub invasion continue to affect the site.

A fuller account of the habitat can be found here.

Conservation priorities

The overall objective for this SAC is to restore the condition of the areas of active raised bog, and to restore the areas of degraded raised bog to become active raised bog.

Conservation Objectives

Active and degraded raised bogs are considered separate habitat types for the purposes of designating SACs. However as the aim is to restore degraded raised bog habitat to active raised bog, and both are hydrologically linked, they have been considered together within the conservation objectives.

Conservation Objectives for active raised bog and degraded raised bog

1. To ensure that the qualifying features of Red Moss of Netherley 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 Red Moss of Netherley SAC is restored by meeting objectives 2a, 2b and 2c
The aim at this SAC is to restore the areas of degraded raised bog habitat to active raised bog, as well as to restore the active raised bog habitat to a favourable condition, as a contribution to wider raised bog 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 the feature to recover and there is certainty that the features will be able to quickly recover.

This objective recognises that the qualifying habitat is exposed to a wide range of drivers of change. Some of these are natural and are not a direct result of human influences. Such changes in the habitat's extent, distribution or condition within the site which are brought about by natural processes, directly or indirectly, are normally considered compatible with the site's conservation objectives. An 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 extent and distribution of the habitat within the site

There should be no reduction in the extent and distribution of raised bog habitat within the site. The extent of active raised bog should be increased where possible through regeneration and through restoration of the degraded raised bog feature. This will mean areas defined as degraded raised bog will decline in extent over time as active raised bog areas increase. The aim is to increase the extent of active raised bog on the site to at least 57ha.

This is based on the most recent monitoring visit that estimated the total area of degraded raised bog at 50ha, and the area of active raised bog at 7ha. Note that these figures do not correspond with those given in the Site Data Form but they are considered to be more accurate.

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

The slow formation of raised bogs, and their typical domed shape, means they rely heavily on specific hydrological conditions. Degraded raised bogs will likely have been subject to some deterioration of these conditions. The natural hydrology of this site should be restored 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).

Active raised bogs typically display a distinctive micro-topography, with patterns of hummocks and hollows rich in Sphagnum mosses and other peat forming species. This habitat structure should also be maintained and where necessary 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 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 supress 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 supress tree establishment. The site has been considered too dangerous for domestic livestock and other than a small number of ponies which grazed a small area towards the southern boundary of the site in the past and wild herbivores, we have no evidence that the site has been grazed. There is also no evidence that grazing by wild herbivores is negatively impacting the site.

Trees and scrub can cause the habitat to dry out through transpiration and should be no more than occasional 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 tree cover should not be increasing on site. Extensive scrub and tree clearance has taken place on this site with the exception of one ownership area. Ongoing maintenance will be required to maintain a low tree cover.

The remaining lagg fen is a component of the active raised bog. It supports the raised bog, and acts in part as a buffer, and therefore the maintenance of the lagg fen is important in maintaining the structure and function of the raised bog.

The likelihood of the establishment of scrub or non-native invasive species on the bog surface is increased because the hydrology has already been compromised by drainage. Extensive ditch blocking has taken place across the majority of the site with the exception of one ownership area where work is still required. This work has raised the water table across the majority of the site thereby creating the right conditions for peat forming mosses to return in the longer term.

Burning can destroy areas of habitat leading to drying out, a loss of Sphagnum, a loss of diversity of dwarf-shrubs with increasing dominance by *Calluna vulgaris* (heather), exposed peat, possibly encouraging grass species not typical of this habitat, and altering the chemistry in its vicinity. Burning should therefore be avoided.

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/srcl) identified a three year average Nitrogen deposition rate for Red Moss of Netherley SAC of 13.7kg 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.

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

The typical species, and those which are key for the active raised bog, are those that have a role as the main bog-builders. These are mainly Sphagnum species, and especially include:

Sphagnum capillifolium	red bog-moss
S.papillosum	papillose bog-moss
S.magellanicum	magellanic bog-moss
S. cuspidatum	feathery bog-moss (in pools)

Other characteristic bog species such as cotton grasses (*Eriophorum sp*ecies), heather (*Calluna vulgaris*) and other ericaceous plants, and the carnivorous sundews (*Drosera sp*ecies) should also be considered typical species.

The floral distribution within the active raised bog habitat, and its continued viability, relies heavily on the presence of small variations in height above the water table across the hummocks and hollows of the bog. Therefore the hydrology of the site (including water levels and drainage) is crucial to sustain this mosaic and floral distribution.

Excessive trampling, and inappropriate grazing regimes can contribute to deterioration in the habitat structure, having harmful effects on the typical species, and grazing should only be done in a controlled, appropriate manner that does not prevent restoration of the habitat or its continued maintenance. This site is currently only grazed by wild herbivores at levels which are not negatively affecting the site. Some grazing can have a positive impact, particularly in areas that have previously been drained and where Calluna has become dominant. Grazing can help to reduce the height and cover of Calluna, and help create

more suitable conditions for Sphagnum species. Heather cutting can also have the same effect. Heather cutting has been trialled at this site. Follow-up monitoring is required to determine how successful this has been and to determine whether the trial should be extended.

Alterations to the acidic conditions through nutrient enrichment should also be avoided in order to protect the typical species of the site.

The work to block drains and clear scrub across the site appears to have had a positive effect on the water levels, creating the right conditions for peat forming sphagnum species to return. Although the wetness across the site appears to have improved it may take more time for the sphagnum cover to increase. Work to maintain dams and the previously cut areas of scrub should be continued, and efforts to extend positive conservation management into the one remaining ownership area that would benefit from this should continue.

Conservation measures

Red Moss of Netherley is notified as a SSSI and management changes described on the list of Operations Requiring Consent must have prior consent from SNH (NatureScot).

Current and recommended management

Issue	Measure	Responsible party
Excessive water loss caused by drainage and scrub/tree encroachment	Identify and dam any remaining active drains, including the ownership compartment where this has not been carried out to date. Identify and remove any remaining scrub and trees, including that which exists in the ownership area where this work has not been carried out to date. Maintain existing dams and carry out follow up scrub control as required.	Land managers
Heather cover	Monitor trial heather cutting areas and continue work, or expand to other parts of the site if it is considered successful in restoring sphagnum cover.	Land manager, NatureScot
Research and monitoring	To identify emerging impacts on the habitat and their causes, in order to understand the long term issues, and to inform future management of the habitat across Scotland. Monitor the success of previous restoration work.	NatureScot, Universities, land managers
Peatland management through	The primary means of supporting peatland restoration is through agri-	Land managers

'Peatland Action' funding, or through its successor funding mechanisms	environment funding if this is available. Alternatively, Peatland Action funding may be available in the absence of any current agri-environment schemes at the time an application is being considered.	
Nutrient enrichment from aerial deposition of Nitrogen	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. Increases in Nitrogen inputs to the site should be avoided.	NatureScot, land managers, SEPA

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