

## **THREEPWOOD MOSS SPECIAL AREA OF CONSERVATION (SAC)**

### **CONSERVATION ADVICE PACKAGE**



## Site Details

Site name:	Threepwood Moss
Map:	<a href="https://sitelink.nature.scot/site/8394">https://sitelink.nature.scot/site/8394</a>
Location:	South Eastern Scotland
Site code:	UK0030288
Area (ha):	53.18
Date designated:	17 March 2005

## Qualifying features

Qualifying feature	SCM assessed condition	SCM visit date	UK overall Conservation Status
Active raised bog [H7110]*	Unfavourable No change	11 September 2013	Unfavourable-Bad
Degraded raised bog [H7120]	Unfavourable No change	11 September 2013	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

### [Threepwood Moss 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. They are formed and maintained by waterlogging of an area.

The bogs survive because water losses are matched or exceeded by regular precipitation inputs. 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 partially decompose and accumulate.

Sphagnum mosses are the main bog-forming plant species on most bogs. 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.

The active raised bog feature at this SAC has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition due to issues with species composition. There is insufficient cover of positive indicator species (typical bog plant species and *Sphagnum* species), too much heather *Calluna vulgaris* cover, and too much cover of the negative indicator moss species rough-stalked feather-moss *Brachythecium rutabulum*. The habitat condition is good in some areas and overall it is improving due to past and ongoing management work.

#### 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.

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 feature at this SAC has been assessed through NatureScot's site condition monitoring programme as being in unfavourable condition due to issues with species composition - insufficient cover of positive indicator species (typical bog plant species and *Sphagnum* species) and too much heather *Calluna vulgaris* cover. The habitat condition is good in some areas, and overall is improving due to past and ongoing management work.

Areas of degraded raised bog at Threepwood Moss SAC are generally located to the east of the march fence that runs north-south. As management activities improve the hydrological function of the raised bog habitat across the site the distinction between active and degraded raised bog will become less clear. Management includes tree and scrub removal, heather cutting, ditch blocking and grazing management.

Further information on these habitats can be found on the [JNCC website](#).

## Conservation Priorities

The overall objective for this SAC is to restore the healthy condition of the areas of active raised bog, and to restore the areas of degraded raised bog to become active raised bog. Active raised bog would generally be a conservation priority over degraded habitats. In reality, however, it is impractical to differentiate between work associated with active and degraded bog habitats. Much of the work to enhance one habitat will also benefit the other.

## 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.

### Overarching Conservation Objectives for active raised bogs and degraded raised bogs

<b>1. To ensure that the qualifying features of Threepwood Moss SAC are in favourable condition and make an appropriate contribution to achieving favourable conservation status</b>
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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.

<b>2. To ensure that the integrity of Threepwood Moss SAC is restored by meeting objectives 2a, 2b and 2c</b>
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The aim at this SAC is to restore the areas of degraded raised bog habitat to active raised bog, and 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 and 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 the objectives outlined in

2a, 2b and 2c are met then site integrity will be restored. Note that not all of these objectives 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 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 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 aim is to increase the extent and distribution of active raised bog over time through positive active management of the degraded raised bog. 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 29.61ha. This will be achieved through restoration of the entire hydrological unit at Threeewood Moss, whilst also maintaining the close ecological relationship between the raised bog and its associated habitats including the rand, lagg fen and fen meadow.

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

The slow formation of raised bogs, and their structure and function, rely on specific hydrological conditions. Degraded raised bogs will likely have been subject to some deterioration of the required hydrological conditions, and active raised bog requires these to be maintained for active peat formation.

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 be maintained. Any increases in drainage can cause deterioration in the bog's mosaic of habitats through drying out and shrinkage of the peat. Species composition at the site needs to be restored. There is insufficient cover of typical bog plant species and *Sphagnum* species, too much heather *Calluna vulgaris* cover, and too much cover of the negative indicator moss species rough-stalked feather-moss *Brachythecium rutabulum*.

Burning and compaction by vehicles can also impair the topography, natural functions and processes of the raised bog habitat. Excessive trampling from inappropriate grazing regimes can also contribute to deterioration in the habitat structure.

The site is currently lightly grazed with sheep. 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. Grazing levels should be set with reference to the condition at this site and

other land management measures, to ensure the maintenance of the vegetation communities and bog structure and function across the whole of the site. Where possible it is preferable to graze the bog in association with adjacent drier land and, where this is the case, stocking rates should be set to reflect the areas and types of habitats being grazed (bog, lagg fen and adjacent land). Grazing regimes should be sufficiently flexible to take into account variations in water levels and ground conditions within and between years.

Trees and scrub can dry the habitat 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.

Burning does not take place on this site and should be avoided. It 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 the habitat, and altering the chemistry in its vicinity.

The rand and lagg are components of the raised bog. They should be maintained to support the structure and function of the raised bog.

Nutrient enrichment via aerial deposition of nitrogen may negatively affect the condition of 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/src/](http://www.apis.ac.uk/src/)) identified a three year average Nitrogen deposition rate for Threepwood Moss SAC of 14.8kg 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 distribution and viability of typical bog plant species rely on the hydrological function of the habitat and its topography. In particular, the presence of small variations in height of the water table across the hummocks and hollows of the bog create the conditions for different Sphagnum species to thrive. The hydrology of the site (including water levels and drainage) is crucial to sustain this mosaic and floral distribution, so where this is compromised, the distribution and viability of species present can change.

Typical species 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 red bog-moss *Sphagnum capillifolium*, papillose bog-moss *S. papillosum*, magellanic bog-moss *S. magellanicum*, soft bog-moss *S. tenellum* and fringed bog-moss *S. fimbriatum*.

Red bog-moss *S. capillifolium* is the principal species in the areas of degraded raised bog at Threepwood Moss. Other Sphagnum species found in the active raised bog are less abundant or absent in the degraded raised bog, but could colonise with appropriate management.

Other characteristic bog species such as cotton grasses *Eriophorum* species, heather

*Calluna vulgaris* and other ericaceous plants, and the carnivorous sundews *Drosera* species should also be considered typical species. The site supports cranberry *Vaccinium oxycoccus*, bog asphodel *Narthecium ossifragum* and tea-leaved willow *Salix phylicifolia* as well as local and national rarities such as early marsh orchid *Dactylorhiza incarnata* and globeflower *Trollius europaeus*. Large heath butterfly and small pearl bordered fritillary have also been recorded on site.

Characteristic bog species of active raised bog will be locally present in the degraded raised bog and considered as typical species. Heather *Calluna vulgaris*, however, is dominant and suppresses the growth of smaller species. There is insufficient cover of typical bog plant species and *Sphagnum* species in areas of the active raised bog and this should be restored. The degraded raised bog is botanically impoverished compared with the active raised bog and this should also be restored.

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.

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

Lagg fen occurs around much of the site, although this is truncated on the southern boundary along the Moss Burn. Much of the lagg is willow or alder carr, with downy birch and some Scots pine. Elsewhere, marshy grassland and rushes can be found.

## Conservation Measures

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

Since 1998 a series of conservation measures have been applied to Threepwood Moss, including drain blocking, tree and scrub clearance, localised heather mowing and low intensity grazing. This has been beneficial to the raised bog habitats across the site. Although the improvements to vegetation composition are yet to be fully realised and the overall condition of site features was assessed as unfavourable when monitored in 2013, the raised bog habitats are improving slowly.

## Current and recommended management for both active raised bogs and degraded raised bogs

Issue	Measure	Responsible party
Habitat Management	Identify where additional work is required to reduce direct water loss from the raised bog and install appropriate structures – dams, marginal bunds, cell bunds.	Land owners, Land managers, NatureScot
Habitat management	Reduce water loss from the SAC where drainage is found to have a negative impact on the habitat e.g. on the Moss Burn in the south	Land owners, Land managers,

	or the un-named water outflow in the north.	NatureScot
Habitat Management	Monitor regeneration and wider growth of trees and scrub, noting that these are a desirable component of the lagg fen. Regularly remove trees and scrub from the raised bog to reduce water loss by transpiration and promote growth of typical bog plant species.	Land owners, Land managers, NatureScot
Habitat Management	Monitor the impacts of heather mowing and extend the practice to other areas of the moss as needed.	Land owners, Land managers, NatureScot
Grazing management	Maintain seasonal sheep grazing across the bog and encourage them to range widely. Grazing should be low enough to avoid damage through trampling and overgrazing, but sufficient to maintain an open vegetation structure and prevent encroachment of trees and scrub.	Land owners, Land managers, NatureScot
Habitat Management	Avoid deterioration of the raised bog and its associated habitats from burning and damage from inappropriate vehicular use.	Land owners, Land managers, NatureScot
Peatland Management Funding	Support positive practical management through 'Peatland Action' funding, or successor funding mechanisms, or agri-environment measures in surrounding land.	Land owners, Land managers
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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