

Blanket bogs



Claish Moss © Scottish Natural Heritage

Introduction

Britain has about 10-15% of the total global area of blanket bog, making it one of the most important international locations for this habitat. 80-85% of Britain's blanket bog habitat is found in Scotland, covering 1.8 million hectares, and representing 23% of the country's land area. This makes Scotland an internationally important country for blanket bog.

Blanket bog is found in cool, wet, typically oceanic climates, where it can cover whole landscapes, such as in the North-West of Scotland. Peat accumulates slowly over many years and can reach depths exceeding 5m, although 0.5-3m is more typical. Blanket bog is "ombrotrophic", that is, the water and mineral supply comes entirely from atmospheric sources (rainwater, mist, cloud-cover). The water chemistry is nutrient-poor and acidic and the habitat is dominated by acid-loving plant communities, especially *Sphagnum* mosses. A blanket mire landscape may also contain minerotrophic systems (those that are affected by ground-water and the nutrients in it), such as springs, flushes, stream margins and valley mires. These support different vegetation types

that may also provide important sub-habitats.

Invertebrates in upland moorland or bog habitats are an essential component of the diet of many bird species; crane-fly larvae and adults have been shown to be important food for grouse chicks and breeding waders, such as Golden plover. Adult grouse may also eat crane-flies to supplement their diet of heather shoots. Managing habitats to benefit these invertebrates is thus likely to have a significant impact on the survival of upland birds.

In addition, the *Scottish Invertebrate Species Knowledge Dossiers: Pseudoscorpiones* indicated the possibility that the Bog chelifer (*Microbisium brevifemuratum*) is likely to occur in Scottish bogs—highlighting that there may yet be unrecorded species in this important Scottish habitat (Legg, 2010).

Support for management described in this document is available through Scotland Rural Development Programme (SRDP) Rural Development Contracts (RDC). A summary of this support (at time of publication) can be found in this document.

Threats

Peat extraction

Peat extraction may be either domestic or commercial, and results in habitat loss.

Drainage

Drainage ditches, both new and old will lower the water table and may initiate erosion and oxidation of the peat. Even unmaintained old drains will continue to affect the hydrology of a site. Lowered water tables will alter the species composition of the surface vegetation and have a detrimental affect on specialist invertebrates. Drainage at the margins of bogs will lower the water table and may modify the surface patterning, such as loss of *Sphagnum* hollows.

Afforestation by exotic conifers

Coniferous trees have been planted on extensive areas of blanket bog in the past. The trees will continue to affect the hydrology and species composition of adjacent areas of blanket mire as they mature and require more water. Afforestation has generally been accompanied by furrowing of the ground, and these highly destructive drainage channels become a long-lasting scar.

Development

The construction of wind farms and communication masts, together with associated infrastructure such as access and maintenance roads can cause significant hydrological disruption. Links to the national grid via landlines or more usually pylons also have an impact on very fragile blanket bog during construction.

Livestock & game management

Heavy grazing (by Sheep, Red deer, Cattle and Horses) will have a significant impact on mire vegetation, especially if there is supplementary feeding (which will increase the nutrient input) and other management measures such as drainage, burning or fencing.

Burning

Serious fires can result in the loss of surface vegetation and the death of peat-forming species. These can slowly recover over time (>20 years), but invertebrate communities and populations will be seriously affected.

Erosion

Erosion on blanket bog exposes more of the peat to the atmosphere, increasing drying and oxidation of the peat. Hag erosion may be instigated, resulting in extensive patches of bare

eroding peat both in gullies and flatter areas.

Eutrophication of water supply

Examples of potential causes of eutrophication (nutrient enrichment) include run-off from road drainage, agricultural pollution, and nutrient enrichment from sewage.

Water-course liming

Blanket bog habitats are naturally acidic. If lime is added to lochs, lakes and rivers as a treatment for acidification, this may have a detrimental effect on adjacent areas of blanket bog.

Fertilisers

The application of fertilisers and lime to increase stock grazing productivity will inevitably modify the ecology to the detriment of the blanket bog invertebrate fauna.

Atmospheric pollution

Many bogs, especially those in the North of England, have been affected by atmospheric pollution. This alters nutrient availability, and hence the plant community composition.

Habitat management

Maintain the hydrology

As a peat bog consists of 95-98% water held by *Sphagnum* peat, the water level is the most crucial aspect to consider when managing this Priority habitat type. Operations some distance away from the ombrotrophic *Sphagnum* communities can therefore have a devastating effect if they are on sites within the same hydrological unit. In order to conserve the characteristic bog communities, it is necessary to look at the whole system, which may extend beyond the boundaries of a particular site. Drainage ditches and forestry plantations will remove water from surface layers of the bog and ultimately lower the bog surface, favouring plants which grow in drier conditions, thus adversely affecting any specialist invertebrate species. Wet blanket bog is of great importance to many invertebrates such as spiders and leaf-hopper bugs. Drying peat will shrink and oxidise, creating erosion problems and increasing vulnerability to fire damage, so it is essential to maintain water levels. On sites that are drying, raising the water levels should be considered.

Blocking any existing drains to retain rainwater will allow the water table to re-stabilise and peat-forming *Sphagnum* species to colonise areas that have dried or been affected by peat cutting or milling. Unless the peat has been removed down

to the level of the mineral substrate, secondary bog vegetation will return over time. Water flow is essential for some species, such as the caddisfly *Oxyethira mirabilis*, so care should be taken that any work does not compromise the survival of these invertebrates.

Maintain habitat diversity

It is important to maintain a habitat mosaic both within and beyond the bog. The natural structure of the surface of an undamaged blanket bog provides a variety of aquatic and semi-aquatic habitats each supporting different invertebrates. Management should aim to recognise and monitor these valuable microhabitats: boggy pools, flushes, wet peat, sedge (*Carex* spp.) and rush (*Juncus* spp.) stands and localised poor fen. Retaining extensive areas of inundated *Sphagnum* is particularly important for invertebrate species with a high nature conservation status.

It is also important to consider the fringes of bogs and ensure that they support a rich marginal vegetation. Tussocky vegetation of taller *Molinia* spp., *Carex* spp. or *Juncus* spp. and the associated litter build-up provides cooler, more sheltered microhabitats for adult craneflies and drier sites for over-wintering invertebrates such as spiders. Ericaceous dwarf shrubs also support many heather-feeding moths and other insects, as well as providing a well-developed vegetation structure for spiders. Scrub on the fringes of blanket bog in habitats such as stream-sides supports its own fauna and provides shelter; willow catkins may be the best spring nectar source for many adult insects.

Avoid burning

Burning destroys large numbers of invertebrates, potentially entire populations of species living wholly in the above-ground parts of plants. In acid sites it can also encourage Purple moor-grass (*Molinia caerulea*) at the expense of other vegetation. Too hot a burn can kill bog-moss and burn into the peat, altering plant communities and damaging invertebrate interest.

Heather management through burning appears to be especially damaging to plant-hopper bugs, sensitive species taking a long time to return. Burning should be therefore replaced with a more sympathetic form of management such as cutting or low-level grazing.

Prevent nutrient enrichment and pollution of the water table

Pollution incidents and nutrient enrichment lead to the loss of *Sphagnum* bog vegetation reducing its ability to support species.

The use of pesticides should also be avoided.

Prevent invasion of scrub and trees

If water table levels are maintained then significant scrub invasion should not present a major problem as the very wet, infertile ground conditions, altitude and exposure of the blanket bogs often makes tree or shrub growth difficult. However, in areas of bog that have already begun to dry as a result of drainage or agricultural operations, scrub invasion can be prevented by cutting or light grazing, but it is important not to overgraze. Grazing can cause problems to blanket bog habitats, causing damage to the vegetation by trampling and affecting the species composition if nutrient enrichment occurs by the deposition of dung.

Afforestation is a major threat to this habitat and should be discouraged.

Minimise disturbance

Excessive trampling through over-grazing or large numbers of ramblers is a problem, as it affects the growth of fragile *Sphagnum* mosses and can ultimately alter the species composition or lead to erosion of the peat.

Natural pools within the *Sphagnum* lawns should be left unmanaged and not cleared or deepened.

Exceptions to general habitat management

Ampedus pomorum is a nationally scarce click beetle associated with the dead heartwood of mature birch trees and is characteristic of the fringes of peatlands where ancient broadleaved woodland and birch woodland has developed on bogs. Another nationally scarce click beetle *Ampedus nigrinus*, primarily a woodland species, has also been found in rotten heartwood of birch and Scots pine around the margins of blanket bogs. In these cases, clearance of woody growth and scrub prevention is detrimental.

Some invertebrates like small patches of bare wet peat so trampling in confined rare strips may actually be beneficial.

Agricultural scheme grants and subsidies

Support for management is available through Scotland Rural Development Programme (SRDP) Rural Development Contracts (RDC):

- SRDP RDC Rural Priorities (RP) Axis 2 Option 13: Control of Invasive Non-native Species.
- SRDP RDC-RP Axis 2 Option 26: Wildlife Management on Upland and Peatland Sites.
- SRDP RDC-RP Axis 2 Option 27: Management of Moorland Grazing.
- SRDP RDC-RP Axis 2 Option 28: Moorland Grazings on Uplands and Peatlands.
- SRDP RDC-RP Axis 2 Option 29: Moorland Stock Disposal.
- SRDP RDC-RP Axis 2 Option 30: Away-wintering of Sheep.

- SRDP RDC-RP Axis 2 Option 31: Off-wintering of Sheep.
- SRDP RDC-RP Axis 2 Option 32: Muirburn and heather swiping.
- SRDP RDC-RP Axis 2 Option 41: Habitat Grazing Management.
- SRDP RDC Package 7: Supporting Biodiversity offers support for specific species or more general biodiversity management.
- SRDP RDC Package 14: Upland and Peatland.

Applicants for Rural Priorities Options must demonstrate how the option will contribute towards the priorities for the particular region. Not all Options are compatible with each other and eligibility criteria may apply. Further information is available on the SRDP website (details below).

Further information

Scotland Rural Development Programme: <http://www.scotland.gov.uk/Topics/farmingrural/SRDP>

Legg, G. 2010. *Scottish Invertebrate Species Knowledge Dossier: Pseudoscorpiones*. Buglife – The Invertebrate Conservation Trust.

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