

Lowland raised bogs



Wester Moss © Paul Kirkland / Butterfly Conservation

Introduction

There has been a dramatic decline in the area of lowland raised bog habitat in the past 100 years. The area of lowland raised bog in the UK retaining a largely undisturbed surface is estimated to have diminished by around 94% from an original 95,000 ha to 6,000 ha. In Scotland, it is estimated that the original 28,000 ha of lowland raised bog habitat has now diminished to a current 2,500 ha. Most of the remaining lowland raised bog in Scotland is located in the central and north-east lowlands.

Historically the greatest decline has occurred through agricultural intensification, afforestation and commercial peat extraction. Future decline is likely to be the result of the gradual desiccation of bogs, damaged by a range of drainage activities and/or a general lowering of groundwater tables.

Lowland raised bogs support many rare and localised invertebrates, such as the Large heath butterfly (*Coenonympha tullia*) and the 6 spotted pot beetle (*Cryptocephalus sexpunctatus*). The Bog bush cricket (*Metrioptera brachyptera*) is known from only one sites in Scotland, both of which are raised bogs. One of only two recent

Scottish records of the Bilberry pug moth (*Pasiphila debiliata*) is from Kirkconnell Flow (Dumfries and Galloway) while the Bog sun-jumper spider (*Heliophanus dampfi*) is known only from two sites in the UK – one of which is Flanders Moss (Stirlingshire). In addition, there is a possibility that the Bog chelifer (*Microbisium brevifemoratum*) is likely to occur in Scottish bogs—highlighting that there may yet be unrecorded species in this important habitat (Legg, 2010).

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



Bog bush cricket (*Metrioptera brachyptera*) © Roger Taylor

Threats

Peat extraction

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

Landfill development

Use of cut-over bogs for landfill developments results in habitat loss.

Afforestation

Trees (and associated furrows) dry out the bogs they are planted on and neighbouring areas, while acting as an invasive seed source. The trees will continue to affect the hydrology and species composition of adjacent areas of bog 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.

Timber extraction of afforested bogs can also cause damage to the structure of the bog—care should be taken to avoid the creation of trenches or roads that may alter the hydrology of the bog.

Drainage

Neighbouring agricultural areas lower water levels through marginal ring-ditches and other intrusive drainage measures. Drying out the raised bog through drainage allows invasion by scrub and trees which in turn speed up the drying process and leads to the loss of this special habitat and associated species.

Water abstraction

Abstraction of water within the catchment area will have an adverse effect on the hydrology of a raised bog.

Pollution

Run-off from agricultural land (fertilisers and pesticides) will damage the ecology of the bog. While pesticides have an obviously adverse impact, fertilisers cause nutrient enrichment, resulting in the loss of suitable habitat.

Livestock & game management

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

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 raised bog during construction.

Climate change

Changes in weather patterns (increased winter rainfall and severe summer droughts) may affect the condition of raised bogs.

Habitat Management

Maintain a stable high water table

Maintenance of water levels and prevention of scrub invasion is important in maintaining raised bog habitat. Maintenance of a stable high water table is critical for specialist bogland invertebrates; any management that alters or lowers the water table will probably be detrimental to these species. In order to maintain water levels and prevent peat drying, existing drainage ditches should be blocked wherever possible. The ditches will rapidly fill with vegetation and *Sphagnum* species will colonise.

Raising and stabilising of water levels should be considered on sites that are drying out.

Prevent scrub encroachment

Scrub invasion is likely to occur on sites where the peat is drying out as a result of a lowering of the water table. If scrub is known to be spreading and invading open peatland habitats, clearance may be necessary. Once scrub clearance is undertaken on a site, it is essential that the site is not allowed to scrub over again, as the alternation between open and closed habitats will not provide the stable conditions required by diverse invertebrate communities.

On sites where the water levels are stable, scattered scrub can provide habitat for interesting invertebrate communities. Native peatland scrub species found either across central areas or associated with the natural margins of raised bogs include Bog myrtle (*Myrica gale*), birch (*Betula* spp.), Alder buckthorn (*Rhamnus frangula*) and willow (*Salix* spp.). These natural scrub margins should not be removed, unless they are encroaching on a drying bog.

Scrub margins can be important habitat for invertebrate species. For example, the 10 spotted pot beetle (*Cryptocephalus decemmaculatus*) has only been recorded from small specimens of birch (*Betula* spp.) and willow (*Salix* spp.), while these margins can also support *Procas granulicollis*, a rare weevil. Therefore, scrub

removal and scrub maturation may both be threats to these species, while drainage may be an indirect threat through increased scrub growth. However, invasive species such as Rhododendron (*Rhododendron ponticum*) and, in the south outside its native range, Scots pine (*Pinus sylvestris*) should be removed from both the bog and the scrub fringe, as unchecked they will act as a seed source and threaten the bog habitat in the long term.

Ensure a diverse vegetational structure

Relatively undisturbed lowland raised bog surfaces are not uniform; they are made up of an almost continuous carpet of *Sphagnum* with hummocks and hollows providing a range of conditions that support different invertebrate communities. It is important to minimise human activity on undisturbed raised bogs; wet *Sphagnum* communities are fragile and easily damaged by trampling.

Bog pools

Shallow bog pools should never be deepened or cleared, as their invertebrate interest is likely to be far greater than any larger pool that is created.

Small-scale peat cuttings

Existing small-scale peat cuttings are very effective in providing and maintaining early successional stages, small pools, bare peat and low vegetation, thus diversifying vegetation composition and structure. The typical mosaic created by domestic hand-cutting of peat provides a range of small-scale structures across a site, and this is good for invertebrates. Large-scale peat extraction is extremely damaging. Peat cutting methods involving drainage of the peat are also extremely harmful.

On a site with a falling water table, domestic peat cuttings can provide areas of wet bog which may act as valuable refugia. However, lowering the surface of the bog by removal of peat is an unsatisfactory way of maintaining such conditions in the long term.

For invertebrate conservation it is best if cuttings are small and much shallower than traditional extraction. The best form of cutting tends only to be deep enough to form a shallow pool, with turves replaced at the bottom of the cutting. The uncommon dytiscid beetle *Acilius canaliculatus* also appears to favour acid pools created as a result of past domestic peat-cutting.

Where peat-cutting does take place, management should take into account the fauna of these sites and of fringing wetland habitats, as well as the core habitats of the bog.

However, peat digging, even domestic cutting, is always damaging to the habitat when carried out on a part of the bog surface which has not previously been cut for peat. Nor should it be done in areas where past peat cutting has been so extensive as to leave only a thin covering of peat over the mineral soil, as any nutrients from the mineral soil will encourage the development of fen rather than bog communities.

Avoid grazing

Grazing on *Sphagnum*-dominated bogs can cause extensive damage by trampling and nutrient enrichment of the water supply through dung and urine.

Avoid burning

Burning is a highly damaging practice for invertebrates, as it will destroy large numbers or even entire populations. On acid sites, burning can alter the plant species composition, encouraging the growth of Purple moor grass (*Molinia caerulea*). The heat can kill *Sphagnum* and burn into the peat, damaging invertebrate habitats both above and below ground.

Agricultural scheme grants and subsidies

The Scotland Rural Development Programme (SRDP) offers support for management described in this document through Rural Development Contracts (RDC). At the time of publication, Options include the following:

- SRDP RDC Rural Priorities (RP) Axis 2 Option 13: Control of Invasive Non-native Species.
- SRDP RDC-RP Axis 2 Option 20: Management / Restoration of Lowland Raised Bogs.
- SRDP RDC-RP Axis 2 Option 23: Buffer Areas for Fens and Lowland Raised Bogs.
- SRDP RDC-RP Axis 2 Option 26: Wildlife Management on Upland and Peatland Sites.
- SRDP RDC-RP Axis 2 Option 28: Moorland Grazings on Uplands and Peatlands.
- SRDP RDC Package 7: Supporting Biodiversity offers support for specific species or more general biodiversity management.
- SRDP RDC Package 12: Wetland—Lowland Raised Bogs.

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 overleaf).

Further Information

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

Chapman, P. 2007. *TN586: Conservation Grazing*. Scottish Agricultural College (SAC), Inverurie.

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

Tharme, A. 2008. *Scottish Borders Lowland Raised Bog Habitat Action Plan*. Scottish Borders Council.

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