US 8

MOSSES SPECIES ACTION PLAN

SPECIES PROFILE

Common Names: Scottish Beard Moss, Perthshire Beard moss and Lead moss.
Scientific Names: *Bryoerythrophyllum caledonicum, Didymodon mamillosus* and *Ditrichum plumbicola*.
UK Biodiversity Status: Priority.
Relevant Priority Habitats: Montane and inland rock, upland oakwoods and upland ashwoods.
Statutory Protection: These species are protected in a general sense (see Section 13) by the Wildlife and Countryside Act (1981).

BIODIVERSITY CONTEXT

Scottish Beard Moss *Bryoerythrophyllum caledonicum***.**
This species is endemic to Scotland. It is classified as Low Risk (Near Threatened).

This species has a National SAP, its main objective is:

- Maintain the populations at existing sites at current levels.

Perthshire Beard moss *Didymodon mamillosus***.**
This species is a European endemic, with four known localities outside Scotland, Iceland, Germany, The Czech Republic and north-east Spain. It is only found on two sites in Scotland. It is classified as Vulnerable in the 1995 RBD of European Bryophytes. It is classified as Critically Endangered in the British RDB 2001.

This species has a National SAP, its main objectives are:

- Maintain populations at the existing known site and any newly discovered sites.
- By 2005, establish ex-situ stocks of this species to safeguard extant populations.

Lead moss *Ditrichum plumbicola***.**
This species is endemic to Europe where it is found only in Germany and Britain. It has been recorded in north and mid-Wales, the Isle of Man, western Scotland, northern and south-west England. It is classified as Vulnerable in the 1995 RBD of European Bryophytes.

This species has a National SAP, its main objective is:

- Maintain the range of this species in Britain and enhance its total population size.
- Bt 2005, if appropriate and feasible, establish viable populations of this species at two suitable former sites.
- By 2005, establish ex-situ stocks of this species to safeguard extant populations.

OBJECTIVES

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Objective 1 **Have as full as possible knowledge of the distribution and status of the Priority and Conservation Concern Mosses in the Stirling Council Area.**

Target By 2005, survey all known areas containing Priority and Conservation Concern species.

Target By 2010, institute regular monitoring of all known sites containing Priority and Conservation Concern species.

Objective 2 **Maintain the existing populations of the Priority and Conservation Concern mosses in the Stirling Council Area.**

Target Identify local threats to these and take measures to remove or reduce these threats.

CURRENT STATUS AND DISTRIBUTION

These are the mosses mentioned in the Stirling Biodiversity Audit. The comments on these species come from Gordon Rothero, Bryologist and Dr Stephen Ward, SNH.

Priority Species.

Scottish Beard Moss *Bryoerythrophyllum caledonicum.*
Found in a number of sites in the Stirling Council Area, particularly on Ben Lui and the Beinn Heasgarnich area.

This moss has a very restricted habitat, growing on damp montane schist or basalt ledges, which are regularly irrigated. This species was not recognised as a distinct species until 1982. It has been reported from 12 ten-kilometer squares. The highest density and largest populations are in the Breadalbane mountains of mid-Perth and Argyll with outliers in Lochaber, Skye and Rum.

Perthshire Beard moss *Didymodon mamillosus.*
This species is found at one site above Balquidder. It grows on limestone.

Lead moss *Ditrichum plumbicola.*
This species is found on lead mine spoil at Tyndrum, where there is no real threat as yet.

Lead moss grows as scattered individuals or in dense, yellow green patches up to 15mm high. The stems are brittle and the main method of dispersal may be fragmentation. It is a pioneer species and is restricted to sparsely vegetated, acid, peaty, silty or gravelly soils on old lead mine spoil heaps. It typically occurs on rough knobbly surfaces, probably caused by frost heave. Lead moss probably does not benefit directly from lead itself but, being a very small plant, it must benefit from reduced competition from species that are less tolerant of high soil concentrations of lead.

Conservation Concern species.

Long leaved anomodon *Anomodon longifolius.*
This species is on Schedule 8 of the Wildlife and Countryside Act. Two sites in Scotland – Den of Airlie in Angus and a tiny population at Killin. Further survey of this species is necessary.

Bryum cyclophyllum.
Bryophyte Red Data Book Endangered. This species is found in wet soil by streams and lochs. Further survey of this species is necessary.

Dixon's thread moss *Bryum dixonii.*
Apparently a Scottish endemic. Though rare, it is widespread in the Highlands with several sites in your patch. I do not think it is under any threat and no action is necessary.

Scleicher's thread moss *Bryum schleicheri var latifolium.*
Schedule 8 of the Wildlife and Countryside Act. The only extant British locality is in the Touch Hills. *Bryum schleicheri var latifolium* is not uncommon and can be abundant in the montane areas of Europe.

Local Concern.

Grimmia *Grimmia ovalis.*
Bryophyte Red Data Book (RDB) Vulnerable. The status of this undoubtedly rare species in Scotland is unclear. Its RDB status is primarily due to its loss from a number of English sites. There have been some new records in Scotland recently. Further survey work necessary.

Habrodon perpusillus.
Bryophyte RDB Endangered. Seems to have been lost from a disquieting number of sites during the last century. Had a stronghold around Killin where it still occurs. Some assessment of the status of this species around Killin should be an urgent priority.

Homomallium incurvatum.
RDB Endangered. There are good records of this difficult species from Creag na Caillich on the Lawers SSSI but I failed to re-find it on a recent survey (not specifically looking for *Homomallium incurvatum*). This species appears to have declined markedly in Britain and an assessment of its status on your patch should be a priority.

Hypnum revolutum.
Only known from the Lawers SSSI in Britain but widespread in montane Europe. The only recent records are from Ben Lawers itself, outside your patch, but there is a 1960's record from Creag na Caillich, which is in your area. I could not re-find this on a recent survey here. Further survey work necessary.

Molendoa warburgii (formerly ***Anoectangium warburgii***). It would appear that a considerable proportion of the world population occurs in Scotland, but new sites are turning up from Norway to the Himalaya. However it is locally frequent and occasionally abundant throughout the west of Scotland on schistose rocks and no action is necessary.

Rugged collar moss *Splachnum vasculosum.*
RDB Lower Risk (near threatened). The Splachnaceae in general would appear to have suffered a decline in Britain over the past century and this affects the rarer species, like *Splachnum vasculosum*, disproportionately as each loss is from a smaller whole. Further survey work is needed to assess the true status in your area. I know of only two sites seen recently.

Tongue leaved gland moss *Tayloria lingulata.*
RDB Endangered. Another member of the Splachnaceae. Always very rare and with most sites on the Lawers SSSI, but only one or two at the most in the Stirling Council Area. There is a pre-1950 record from Ben Lomond and the priority should be assessing the current status there.

Sphagnum and Leucobryum glaucum.
These are given priority because of their vulnerability to collection by florists or their agents for hanging baskets and displays etc. Also many *Sphagnum* - rich sites are priority habitats.

Species of Local Concern not identified in the Audit.

Carrion moss *Aplodon wormskioldii.*
RDB Endangered. Not seen anywhere in Britain since 1981 (Newtonmore) and that site has now gone. Three records from Teesdale in N England from the 1960's; no other post-war Scottish records of this arctic species. Several records are from the Creag na Caillich area of the Lawers SSSI, in the Stirling Council Area. There is work in progress on this species here, funded by SNH.

Blindia caespiticia
RDB Vulnerable. Two extant populations outside your area but there is an old record from Ben Lomond. It would be useful to know its current status here.

Heterocladium dimorphum
RDB Vulnerable. Well-known on Ben Lawers and one other site, with perhaps 5 other records including an old one from the Stirling Council Area. Some assessment of its status would be useful.

Paraleucobryum longifolium.
RDB Vulnerable. One site in the Stirling Council area on the Lawers SSSI. Probably not under any threat but needs monitoring.

Racomitrium himalayanum.
RDB data deficient. The only European populations of this species are in Scotland and the only other sites are in the Himalaya. Only at all frequent on the Lawers SSSI with a few stands the Stirling Council Area. No action necessary.

Syntrichia norvegica
RDB Vulnerable. Known from 5 localities in Britain, all in Scotland but only seen recently in two of these. At least one stand on Creag na Caillich but in small quantity and vulnerable to rock fall. Monitoring required.

ETYMOLOGY, CULTURE AND FOLKLORE

Bryophyte comes from the Greek *bruon* meaning moss and the Latin *phyta* meaning plant.

Moss comes from Old English *mos* (a swamp), related to Old High German *mos* (bog) and Old Norse *mosi* (bog).

The Highland drystane blackhouses had the cracks between the stones packed with moss and turf, to reduce draughts.

Various species of the weft forming mosses such as *Hylocomium splendens*, may well have been used for packing and wiping purposes. This was a common use throughout Europe, forming an important part of the economy in Swiss, German and Italian villages.

ECOLOGY AND MANAGEMENT

The higher plants, making up the major part of land vegetation, have elaborate vascular systems, leafy shoots and roots, which anchor them to the soil. Such plants are known as Cormophytes. Plants of simple structure, lacking leaves, stems or roots are called Thallophytes.

Bryophytes are in many ways intermediate between Thallophtes and Cormophytes. Mosses have leafy stems but the fine, hair-like structures anchoring them to the soil are not true roots, as microscopic study shows. Some liverworts have a simple, ribbon-like form, without stems or leaves and are clearly Thallophytic in character. At one time the thallose forms were called "liverworts" and the leafy forms "mosses".

However this situation was further complicated when improved methods of study revealed that some of the leafy forms were clearly more akin to liverworts than mosses in their anatomy and mode of reproduction and these were therefore classified as "leafy liverworts"

In very broad terms bryophytes are divided into the large groups, mosses, liverworts and the thallose "hornworts". Bryophytes are an exceedingly old group and its main divisions are now held to be the separate products of different lines of evolution from an unknown but very ancient ancestor dating from the Devonian period (350-400 million years ago).

Bryophytes reproduce by producing male and female gametes, these may be produced on the same or different plants. The male gametes need a thin film of water to travel to the female reproductive organs (the archegonium). The gametes fuse to form a fertilised cell (or zygote). This goes on to form a sporophyte that produces spores that give rise to a new bryophytes.

Although water is essential for their sexual reproduction, bryophytes are land plants and only a few species have secondarily adapted to aquatic environments. Only rarely is a thin cuticle developed and most species dry out readily. Therefore the majority of bryophytes are characteristic of moist or shady habitats. On the whole bryophytes thrive in lower light-intensities than lichens and most higher plants. They become the dominant plant forms in forests and caves.

CURRENT FACTORS CAUSING LOSS OR DECLINE AND FUTURE THREATS

International.

- Global warming.
- Air pollution.

Local.

- Rock fall.
- Lack of suitable habitat.
- Decontamination of lead mine spoil (lead moss only).
- Lack of knowledge of the distribution and abundance of various species.
- Botanical collection.

OPPORTUNITIES AND CURRENT ACTION

- Ongoing study of Priority species through the National Action Plans.
- Loch Lomond and The Trossachs National Park, could commission further study on the distribution of these species, most of which are found within their boundary.

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