

## **BRITISH LICHEN SOCIETY (BLS)**

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### **INTERNATIONAL RESPONSIBILITIES**

Throughout, we should bear in mind the relative international importance of Scottish beavers and lichens/bryophytes. Old growth lichen communities have declined historically in Europe (and England, Wales). Scotland (especially western Scotland) supports the best populations of a number of species that are Threatened in Europe. Some of these populations are healthy in parts of Scotland but in other areas they are threatened (e.g. many old growth species populations are less robust as we move further east). We have an international responsibility to safeguard all these populations and protect those at threat. In contrast beavers are secure and expanding in many areas of Europe.

### **BEAVERS AS ECOSYSTEM ENGINEERS**

The 'unparalleled' ability of beavers to modify their habitat seems to effectively polarise views. Some welcome it, for others it has serious financial implications.

Most participants appear to agree that beavers have positive effects on biodiversity and negative on agriculture etc. and the case for financial compensation for impacts on livelihoods has been made, and will hopefully be addressed. However, the potential **negative biodiversity impacts, although acknowledged, are underplayed** and viewed as 'local issues' that can be dealt with by local mitigation. There may be significant biodiversity benefits but there are potentially significant negative impacts and the long term impact of cumulative damage to lichen habitat within whole catchments is potentially very significant and without early intervention some losses could potentially be effectively irreversible in the foreseeable future.

The BLS objected in 2008 to the original introduction on biodiversity grounds, partly based on observations by lichenologists working in European countries where beavers had been released. Now the beavers are here and likely to expand in range. The BLS now regards that beavers should be completely excluded from the most sensitive areas and the most threatened areas and this would probably be most realistic and perhaps most cost effective at the catchment scale. Defining the most 'sensitive areas and most threatened areas' is essential prior to further expansion.

### **NEGATIVE BIODIVERSITY IMPACTS**

The NatureScot 2015 report to the Scottish Government has an excellent overview on potential negative beaver impacts to lichens, bryophytes and fungi (<https://www.nature.scot/beavers-scotland-report-scottish-government>, pages 64-71). However, these considerations appear to be quickly glossed over in most other literature I have seen which seems to underplay the potential negative impacts - there appear to be a general consensus that in some undefined 'general' way, the overall biodiversity impacts will be positive. This seems to largely relate to observed restructuring / diversification of riparian and adjacent habitats which appears to be taken to outweigh the potential negative impacts that occur during restructuring (e.g. loss of epiphytes due to felling trees /coppicing by beaver). Diversification in habitats is in principal welcome but landscape context (e.g. proximity of suitable quality adjacent habitat) in conjunction with the patchiness of impacts, the timescales over which initial restructuring occurs (see below), and cumulative impacts over time, will determine whether the overall impact on biodiversity is sustainable, positive or negative.

## **SUSTAINABILITY, CUMULATIVE & LONG TERM IMPACTS,**

How **sustainable** is beaver damage. In addition to landscape context, a key issue is timescale. Beaver damage is done at the scales of 10s of years. Restored woodland habitat might potentially not be suitable for lichen colonisation over much longer timescales (for more specialist old growth species this might be of the order of 100++ of years). To look at a worst case scenario: if the landscape does not have sufficient high quality habitat, and lichen colonisation sources are significantly depleted (by whatever means) within, say, 100 years of beaver introductions, the lichen flora of our landscape might never recover.

It would be better to anticipate and plan to prevent this than start dealing with it rather than wait for the results of any long term monitoring.

## **ASSESSING NEGATIVE IMPACTS**

The potential negative impacts should be explicitly stated so that they are not overlooked when it comes to management planning, mitigation, funding etc.

Given the international importance of lichens and bryophytes in Scotland, Impact assessments for particular catchment should be required to formally consider lichens and bryophytes during a scoping process and be required to formally justify and scoping out the potential negative impacts on lichens. Lichens are often not automatically considered during the scoping processes unless the site is a SSSI that has been specifically designated for lichens; Outwith such sites the consideration of lichens is all too often an afterthought that relies on somebody sympathetic to lichens being in the right place at the right time. Lichens should be explicitly, formally considered during any impacts assessments and scoped out formally with good reasons and appropriate consultation (absence of data is not good enough justification). This is important because in reality, much lichen and bryophyte interest in Scotland occurs outwith formally designated areas. The Beaver management framework discusses Zones of Detailed Appraisal (ZDAs) with minimum 10km buffers and these are a very welcome attempt to address this issue (though there are some concerns, see below).

## **REDUCING NEGATIVE IMPACTS**

### **Woodland restoration**

Woodland restoration is regarded as a good way to offset beaver damage. The issues of timescales were mentioned above. Ideally we would have restored/expanded the habitat BEFORE beaver introduction/expansion (ideally 100+ years before!) to ensure we have a resilient habitat able to withstand additional negative impacts for beavers (on top of historical management impacts, *Chalara*, and imminent impacts as a result of climate change).

However, beaver are here and as we have heard, are likely to expand their range imminently as the promotion of beaver expansion (either natural expansion or new introductions/reinforcement) will be promoted by the government in 2022. This means we need to ensure our riparian woods (and adjacent woods) are brought into favourable condition (for lichens/bryophytes in addition to other woodland features) as a matter of urgency, and these are appropriately restored/expanded PRIOR to further beaver expansion/introductions. Woodland restoration will not guarantee to save our biodiversity unless we do it appropriately with lichens and bryophytes in mind i.e. establish fully functioning ecosystems with niches suitable for lichen/bryophyte effective dispersal/colonisation\* (some lichens disperse only slowly through a

landscape as effective colonisation distances are of the order of 50m .....within the zone potentially utilised by beavers). Large, resilient, fully functioning ecosystems with relevant niches/opportunities for colonisation should be able to withstand impacts from beavers as long as there are checks on beaver populations in the face of low levels of natural predation (the talks mentioned predation of kits by otter, badgers and foxes which was interesting).

We need to anticipate what might happen and have appropriate mitigation/protection in place. **We should be proactive not reactive.** Appropriate impact assessment should be undertaken **prior** to expansion of beaver range, and plans in place for any necessary control measures to be implemented without delay.

\*Exclusion of all browsing with deer fences is generally not an appropriate way to achieve this.

## **THE NATURESCOT BEAVER MANAGEMENT FRAMEWORK**

### **1) Zone of Detailed Appraisal (ZDA)**

The idea of a **ZDA** with minimum 10k buffer around is welcomed and it will be interesting to see how this works in practice. The NatureScot webpage on the management framework mentions an obligation to monitor 'natural habitats and species listed on the annexes to the [Habitats] Directive'. If all Habitats Directive woodland types qualify for ZDA + buffer that is great (provided Atlantic Hazel, and aspen stands are also considered). However, as discussed above if only those sites designated specifically for lichens or bryophytes qualify for the lichen/bryophyte monitoring within the ZDA+ buffer then that would be worrying. The Habitats Directive is woefully inadequate concerning the importance of lichen species in Scotland (the Reindeer lichen group *Cladonia subgenus Cladina* is on it but no epiphytes which is what Scotland is far more important for in an international context!). A far better starting point for consideration of ZDAs+buffers is the Scottish Biodiversity List\*. Local habitats should also be considered e.g. those in LBAPs.

\*The Scottish Biodiversity List (SBL) is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. It is a very good starting point for assessing sites and the BLS holds data on all SBL lichens recorded in Scotland.

### **2) Wider landscape survey**

The Management Framework states it will encourage a citizen science approach for the wider landscape survey (i.e. beyond the Zone of Detailed Appraisal ZDA buffer) and monitoring of woodland lichens, bryophytes fungi and the River Jelly Lichen *Collema dichotomum*. There is an excellent opportunity here for citizen science and land managers to get involved and identify ecological concerns, but any *reliance* on citizen science would be worrying.

Initial desk study (BLS/British Bryological Society BBS data etc), identification of knowledge/survey gaps is essential and should identify areas that require with follow up field survey (and whether specialist survey or citizen science would be most appropriate).

If a citizen science project was managed well it could very effectively target indicators of potentially good quality habitat include riparian hazel, and large native trees sp. of willow, aspen, ash but also veteran alder and old birch and mature sycamore (an accepted surrogate for lichens of ash in face of ash dieback). In Poland, large mature Scots pines have been ring barked by beavers. One of the workshop presentations mentioned the intrinsic value of large trees as a landscape feature and that is a good point - isolated trees and linear features associated with pastures, boundaries, wayside, and watercourse/waterbodies can be very

important for lichens too (e.g. large old veteran riparian willows can support old growth lichens and are targeted by beavers).

In the absence of specialist survey or existing data the safest option is to assume these trees/hazels are important for lichens (either as sources for colonisation *or* as suitable substrates for colonisation). However, with suitable training citizen science would be appropriate to more confidently identify some potential high quality lichen/bryophyte habitats and some of the Scottish Biodiversity List (SBL) lichen species. To be useful it would have to be systematic survey so we know which areas remain unexamined, and some field checking by specialists would be advisable to check the citizen science survey/monitoring is actually working effectively.

### **URGENT RECOMMENDATION**

One thing that could be done quickly (?!) is to interrogate the BLS data to identify initial **constraints and help us define highlight the most sensitive and most threatened areas**. BLS data on rare and Scottish Biodiversity List species could relatively easily be imported to GIS and overlain with ASNW maps, Atlantic hazel and aspen maps. In conjunction with locations of existing beaver populations, and models of beaver colonisation, the lichens under imminent threats could be identified and knowledge gaps be identified (e.g. ASNW without any lichen records). Presumably the British Bryological Society BBS has similar datasets. There has clearly already been some overlaying of broad habitat data on maps during the beaver modelling but incorporation of additional higher resolution datasets is recommended as a matter of urgency.

### **MODELLING and monitoring**

It would be useful to monitor damage and feed this into models to model potential impacts/predicted cumulative impacts (to both trees and lichens), habitat fragmentation etc. (riparian woods can be very important for lichens in otherwise fragmented landscapes) in tandem with beaver dispersal/colonisation.

### **PRACTICAL CONCERNS**

The Beaver Management Plan recommends galvanised wired recommended for individual tree protection - run off from galvanised wire is toxic to lichens. Plastic coated is safer but this obviously raises other issues.

### **FUNDING**

Landowners/farmers require substantial compensation to offset financial losses. The worry is that mitigation for biodiversity would be competing for a limited pot of money. Someone in the workshop chatroom posted:

'In her statement in November, SG minister Slater was clear there would continue to be support for mitigation for as long as it is required. There will also be substantial SG resources for supporting and restoring biodiversity, as well as support for agri-environment schemes. These resources will among other things, aim to support land managers to host beavers on their land'.