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Scotland's National Nature Reserves

Ben Lawers National Nature Reserve Newsletter 2010

Welcome to the seventh Ben Lawers NNR newsletter which briefly summarises and illustrates some of the conservation work on the Reserve during the last year. From: The National Trust for Scotland, Lynedoch, Main Street, KILLIN, FK21 8UW or email: benlawers@nts.org.uk.

Staff News

We were pleased to welcome two new members of staff this year; Dan Watson joined us as a full time Ecologist shared with Glencoe and Eleanor Murray as part time Secretary. Paul Thompson returned for his third season on an extended contract to assist with the increased deer cull and Clare Rickerby for her second as seasonal ecologist. The Team was further augmented by several long term volunteers who contributed significantly to the work programme.

Deer Management

In 2009 the Deer Commission (now part of SNH) instigated negotiations to seek a voluntary cull agreement with the estates across the Breadalbane Deer Management Group. With a mixed reaction to this plan from estate owners and stalkers, this *Section 7* agreement was signed in 2010, after the first year of a 5 year deer reduction programme to decrease grazing on priority habitats on SSSI and SAC ground had started. There had been a helicopter count of the deer population across the area in 2008, from which cull targets and a new deer management plan had been drawn up.

Ben Lawers NNR mostly supports a winter hind population with very few deer in the summer months. It has not traditionally had high deer numbers due to competition from sheep, with the exception of the Tarmachan end of the Reserve which was previously managed partly for deer stalking. The Trust has only been actively managing its deer population since 1999, and since that time has steadily reduced the population from around 550 late winter beasts to a more sustainable 250 across the Reserve. The further reduction expected in this latest cull will bring the deer population well below the average in the Deer Group area. This is important not only to help protect sensitive habitats, but also to avoid higher deer densities occurring as ongoing woodland restoration work removes open hill ground from the deer range.

Stalking on the reserve is carried out in-house and presents many challenges with the high altitude nature of the ground and unrestricted public access, high visitor numbers and limited use of vehicles for extraction of carcasses. With 2 harsh winters in a row and long, continuous snow lie, the land available for stalking can also be restricted.

A second helicopter count is scheduled in 2011 to assess the population and effectiveness of the first 2 years of the reduction cull, and set new cull targets for the Deer Group estates.

Site Condition Monitoring

Both the ecologist and the seasonal ecologist spent most of the summer carrying out Site Condition Monitoring (SCM) on a wide range of habitats. SCM stems from the 1992 Habitats Directive which aims to protect habitats and species which are rare or threatened on a European scale. Member states are required to report on the conservation status of these species and habitats every six years, with the aim of ensuring that as many as possible are in 'favourable condition'. We are now at the end of the second six year cycle. The SCM methodology ensures that each such habitat is assessed against a number of 'mandatory attributes' such as 'feature extent', 'vegetation composition', 'vegetation structure' and 'physical structure'. Each of these attributes has a number of targets attached to it, for example the percentage cover of certain 'indicator species' within a 4m² area. Each habitat is assessed at 28 different locations.

Volunteer Violaine Aurel assisting with SCM of alpine heath

There are thirteen such habitats within the Ben Lawers Special Area of Conservation (SAC) and most of these are monitored by NTS ecologists as part of our partnership with SNH. In 2010 this included base-rich fens, alpine heaths, dry heaths and mountain willow scrub, whilst contractors carried out SCM on species-rich grassland with mat-grass in upland areas and montane acid grassland. This completes the second six year cycle, with the other protected habitats having been monitored in previous years. The results have been submitted to SNH, whose target is to increase to 95% the proportion of protected nature sites that are in favourable condition. Our results indicate that many habitats at Ben Lawers SAC remain in unfavourable condition, so SNH will continue to work with the Trust, as landowners, and graziers to improve these habitats.

More information on SCM can be found here: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/site-condition-monitoring and information about the current condition of each protected habitat at Ben Lawers SAC at http://gateway.snh.gov.uk

Landscape changes

The first stage of an ambitious programme to create new visitor facilities for the Reserve was completed in September with demolition of the Mountain Visitor Centre, which had been closed since 2009. Plans for re-location of the car park to a less visible site within a woodland setting nearby, restoration of the existing site to moorland and provision of outdoor interpretation making it available to visitors all year round are progressing. The latter will take inspiration from the shielings (small stone dwellings used by past inhabitants of the area during the summer months) which are abundant on the slopes of the Reserve.


The final stages of demolition

The demolition, which included landscaping the site, went smoothly, opening up views both up and down the hill. The following article was published shortly before it was complete; http://outdoors.caledonianmercury.com/2010/10/08/a-mixed-farewell-to-ben-lawerss-starship-enterprise/001233

2010 Species of the Year: Alpine Gentian

The Alpine gentian (*Gentiana nivalis*) is perhaps one of the most iconic of the arctic-alpines occurring on the Reserve. It is very rare, being recorded from only one other site in Britain and is unusual amongst high altitude plants in being an annual. It flowers from mid-July to August, although the deep blue flowers only open in warm weather which often makes it difficult to find.

Alpine gentians grow on partially vegetated rock ledges and within the dwarf herb grasslands which are so characteristic of Ben Lawers, usually above 900m altitude. A large proportion of the Ben Lawers plants have only a single flower but 2-5 flowers are not uncommon. Plants with larger numbers of flowers than this are in the minority, perhaps as a result of grazing. Studies have also shown that grazing may have increased the size of the Ben Lawers population, by reducing competition from perennial species such as grasses.

Annual monitoring of gentians within fixed quadrats has been carried out for the last 20 years by Claire Geddes, whose patience and commitment should not go unrecognised. This work is important to inform decision making on potential grazing management for botanical conservation.

2010 Habitat of the Year : Alkaline Fen

Alkaline or base-rich fens are common throughout the Breadalbanes, and particularly at Ben Lawers NNR. They can typically be found where there is near-constant irrigation with base-rich water, either below a springhead or where water emerges more diffusely. If the ground is sloping the fen appears as an elongated patch among drier vegetation, often running in vertical strips from lines of springs. On flatter ground they can branch out over large areas. At Ben Lawers this habitat can occur at any altitude between about 300m and 1050m, although at

higher altitudes Alkaline Fen grades into Alpine Flush. This is largely dependent on the number of montane plants present. Alkaline Fens are maintained by grazing as this keeps the sward open, preventing domination by the most competitive species. However, too much grazing can lead to damage through trampling, so getting the right level can be a difficult balancing act.


Bog asphodel

These species-rich fens can often bring considerable interest to otherwise relatively botanically monotonous stretches of grassland. They are usually dominated by sedges, particularly carnation sedge (*Carex panicea*), dioecious sedge (*Carex dioica*) and common yellow sedge (*Carex demissa*). Bryophytes are also an important component of the vegetation, the most commonly encountered species being *Campylium stellatum*, *Scorpidium scorpioides* and *Ctenidium molluscum*. Colour is provided by flowers such as butterwort (*Pinguicula vulgaris*), eyebright (*Euphrasia* sp.) and bog asphodel (*Narthecium ossifragum*). In places rarer species occur, including russet sedge (*Carex saxatilis*), false-sedge (*Kobresia simpliciuscula*) and blue moor-grass (*Sesleria caerulea*).

Footpath management

The Trust's in-house Mountain Footpath Management Team continued to carry out most of the maintenance and repairs on the 32km of upland paths on the property. The 4 full time members have been with the Trust for a number of years now and are consequently building up a good knowledge of the property. They also work on the Trust's properties at Glencoe, Ben Lomond and Goatfell on Arran. The Team is partly funded through our Framework Agreement with SNH but with match funds coming from the Sole Trading Appeal (for details go to www.nts.org.uk).

Regular maintenance, such as clearing drains, is vital to ensure the paths remain in good condition, particularly with changing climatic conditions. Repair and consolidation of previous work is sometimes required, especially on steeper sections of popular routes at high altitude. During 2010, this type of work was carried out on the Ben Lawers main path, An Stuc and the Coire Odhar shieling track.


A section of the path linking the new car park site to the main path up Meall nan Tarmachan.

Contractors were on site in the autumn creating new links between the Ben Lawers and Tarmachan main paths and the site of the new car park. Both were constructed to a high standard using machines, the first time this type of work has been carried out at Ben Lawers.

Group visits

In addition to our scheduled programme of guided walks in July and August, we often receive requests to host bespoke visits for groups with particular interests in various aspects of the Reserve. Students from the University of Leiden and the University of North Carolina visited to learn about management issues on the Reserve. In September, a site visited was hosted for sixteen delegates from the Eurosite Annual Conference organised by SNH on the theme of *The Challenge of Managing Sites in a Changing Environment.*

Members from Inverness Botany and Dunblane Wildlife Groups visited to see some of the flowers for which the Reserve is famous.

External Research

We are often approached by individuals interested in carrying out research on the Reserve. We are usually happy to facilitate this, particularly if it informs management and does not damage any of the significant features. Here is some information about some research carried out in the last year;

The effects of climate change on amphibians

Anna Muir

Ben Lawers Nature Reserve, with its many marsh areas, slow flowing stream pools and ponds provides an ideal habitat for amphibians, including the common frog, *Rana temporaria,* and the palmate newt, *Triturus helveticus.* The common frog occurs throughout the altitudinal range of the area, from the edge of Loch Tay to 1100m above sea level at the pass between Ben Lawers and Ben Ghlas. As a PhD student from the University of Glasgow, my interest lies in how the common frog is likely to respond to climate change. To do this I look at both high and low altitude populations of frogs that already experience very different climates, even over short geographical distances. How they have adapted to these different environments is a key indication of the potential they have to survive when climate changes.

2010 was a difficult year for frogs with the prolonged cold winter followed by a very dry spring and summer. The long winter meant that frogs at the base of mountain didn't spawn until mid March (about 3 weeks later than the previous year) with those at the top of the mountain spawning at the beginning of May. Despite this, over a hundred spawn clumps were counted, which roughly translates to a breeding population of over two hundred common frogs on Ben Lawers, with more being recorded on Meall nan Tarmachan.

Dataloggers are currently placed at high and low altitude on both Ben Lawers and Meall nan Tarmachan. These record the water and air temperature every two hours throughout the year. This comprehensive data set will provide valuable information about the conditions that populations experience. This is especially of interest in the extreme mountain top environments. Frogs hibernate during the winter and are known to survive freezing for a short period of time. However, it is likely that high altitude frogs must freeze for much longer periods than those at lower levels. There are also increasing reports of common frogs delaying their development and overwintering as tadpoles, especially at high altitudes.

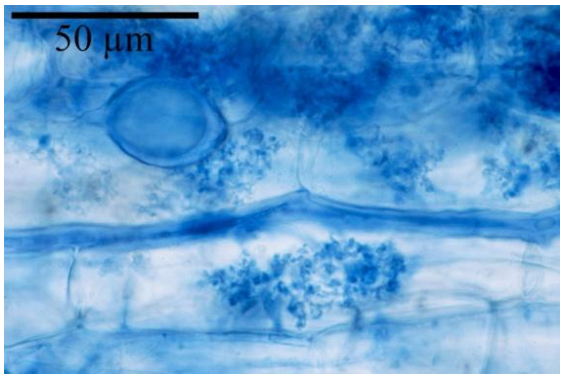
My research within the Ben Lawers National Nature Reserve, as well as four other mountains in the area, will continue over the upcoming breeding season. Revealing how frogs move around in different climates, whether frogs are adapted to specific climates and the effects of this on disease spread, will provide the information necessary to form successful conservation plans in a changing climate. You can find out more and contribute your frog sightings by visiting my project website www.scottishfrogs.co.uk

Interesting fungi at Ben Lawers – *Acaulospora brasiliensis*, *Acaulospora alpina* and *Glomus ambisporum*

Chris Walker

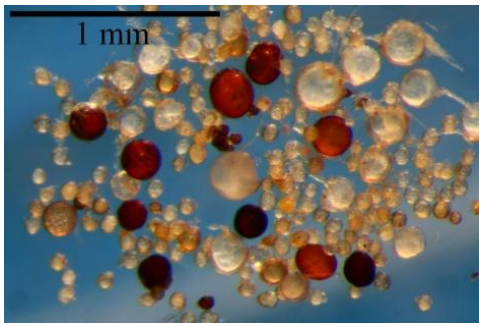
During an earlier investigation into mycorrhizal fungi associated with alpine willow, some interesting but rather obscure fungi were discovered. New samples were taken in May 2010 to study them further.

Soil samples were taken from the Meall nan Tarmachan, Lawers National Nature Reserve and subjected to a technique that involves breaking up the soil and roots in water, washing it through various sieves, and spinning it in a tube of strong sugar solution in a centrifuge at nearly 900 times the force of gravity. This method extracts the spores of specialised fungi that form a symbiosis, usually known as an arbuscular mycorrhiza, with the roots of suitable host plants. The majority of the plants in the Reserve are likely to have this kind of mycorrhiza, rather than the (perhaps) better known ectomycorrhizal type that is formed with fungi that form many of the common mushrooms. (The symbol μm in the pictures refers to a micron; one millionth of a metre or one thousandth of a millimetre).



Typical arbuscular mycorrhiza. The word ‘arbuscule’ means ‘little bush’ and refers to the finely branched structures in the root cells (bottom) that act to exchange nutrients. The plant provides sugars to the fungus, and the fungus reciprocates by providing nutrients from the soil, particulary phosphorus. The rounded structure (upper left) is a fungal storage organ known as a vesicle.

These arbuscular mycorrhizas are more or less completely hidden from view, though we trample on them in their millions every time we walk over a sward of vegetation.



The spores found in an extraction of soil from close to Lochan na Lairige dam. The large whitish spores appear to be an undescribed species. The spores named in this article are from among the very small specimens.

Although it was not surprising that spores were found in the extractions, it was surprising that three of the species had never been recorded from the UK before, and two of them were previously known only from rather warmer environments than the Scottish mountains. One of these was originally described from Florida as *Glomus ambisporum.*

A cluster of *Glomus ambisporum* spores. These are detached from a larger spore mass, though even when complete, such sporocarps (spore bodies) are not much more than a half to three quarters of a mm in diameter.

The second species was known only from Brazil. It had been called *Ambispora brasiliensis*, but the original Brazilian material is identical to that from Ben Lawers, and it has now been shown through analysis of the DNA that it was placed in the wrong genus, and really belongs within *Acaulospora*.

Species of *Acaulospora* form their little spores in the soil from a little sac-like structure (left) that collapses when the spore (right) matures. Although very small, these spores are quite ornate, with little rounded bumps covering the surface. This is *Acaulospora brasiliensis*.

The other species was known from the European alps, an environment perhaps a bit more like that around Ben Lawers, and is known as *Acaulospora alpina*.

The name *Acaulospora* means 'spore without a stalk'. Once the spores are mature, they usually, like this specimen, become detached from their parent sac, and are just found loose in the soil. This, *Acaulospora alpina*, has very ornamented spores covered with irregular to rounded depressions.

There is still a lot of work to be done on these spores, including possibly the description of new species from the Lochan na Lairige dam area. Efforts are being made to isolate the fungi in culture for future scientific use, but this is proving to be very difficult. So far, it seems that they require something to grow that we cannot supply away from their home in the wild Scottish countryside.

Snippets

Rabbie's Trail Burners generously donated £1500 towards ongoing habitat restoration on the Reserve. More than 3000 trees and shrubs, most raised in our tree nursery from locally collected seed, were planted within exclosures.

Lower plants have been under the magnifying glass this year. Ben Lawers is the most important site in Britain for lichens and bryophytes (mosses and liverworts) so we were fortunate to benefit from the knowledge of Oliver Moore, BTCV Bryophyte Apprentice. Oliver set up a programme to allow us to monitor the effects of climate change on high altitude bryophytes which included training staff in identification.

The rangers run the **Green Team**, a club for local youngsters to learn about their environment, in partnership with Killin Primary School, although we also have members from Kenmore Primary. Most of our activities are centred on habitats within walking distance of the village, but in May, members spent an evening enjoying the delights of the Ben Lawers nature trail, thanks to the availability of the Thistle Camp minibus (and its driver!). As usual the Edramucky Burn and its occupants proved a popular focus, but we also encountered some interesting beasties on dry land.

The meetings room at **Lynedoch,** where some of the interpretation from the Centre

had been re-located**,** was opened on an ad hoc basis during the year enabling visitor access to information about Ben Lawers. It also held an exhibition of photographs of rock art on the property taken by archaeologist Dr Aaron Watson which proved very popular.

It may not be the most eye-catching species to grace the flushed slopes of Ben Lawers NNR, but monitoring this summer has shown that the nationally rare **False Sedge** *Kobresia simpliciuscula* is more widespread here than previously thought. It has been found in over 200 different flushes from one end of the property to the other, and in some cases forms dense swards containing hundreds of plants. In some areas it shares its habitat with other nationally rare plants such as bristle sedge *Carex microglochin* and scorched Alpine-sedge *Carex atrofusca*. Time did not allow visits to all of the potential habitat on the reserve so it will undoubtedly be growing in many more flushes.

Thistle Camp volunteers built a bridge linking an existing track within the developing woodland west of the Morenish Burn and that on neighbouring land belonging to Loch Tay Highland Lodges. This has created a pedestrian route between the Reserve and the A827, along the north of Loch Tay.

The first **Meall nan Tarmachan** hill race**,** organised by a local business, took place in April as part of the Scottish Hill Runners calendar of events with 64 competitors braving the snow showers. Ecologist Dan Watson received a prize as the first local home.

Poster exhibits on high altitude revegetation and habitat restoration were prepared for a conference on **Wild Land** in May.

Oliver Moore studying high altitude mosses

The Green Team at Ben Lawers

Acknowledgements

The Trust gratefully acknowledges ongoing support from Scottish Natural Heritage for the management of Ben Lawers NNR. We are also grateful to Rabbie's Trail Burners for their donation towards ongoing habitat restoration on the Reserve.

As usual, much of the work would not been possible without the help of volunteers. Peter Dawson remained with us until March and Violaine Aurel arrived for 3 months on a Leonardo Scholarship to assist with ecological monitoring in April. Locals Atholl Houston, Gina Angus and David Mardon continued to contribute regularly to various aspects of our work. Sarah Watts and Stephen Rawlinson from Kiltyrie assisted with ecological monitoring and practical management respectively and Alicja and Don Fraser offered their services soon after moving to Killin.

The Trust's Conservation Volunteer groups, two Thistle Camps and a Trailblazer contributed over 163 days of work throughout the year. That's almost $^{3}/_{4}$ of a full time equivalent.

The National Trust for Scotland

The Trust is a national **conservation charity**, not a government agency. As such it depends on its members, currently about 310,000. The future of the natural heritage at Ben Lawers, and that at all our properties, which include a total of some 74,000 hectares (183,000 acres) of countryside, depends on meeting ever-increasing financial demands. Please support our work: we depend on membership subscriptions, donations and legacies. Purchase of the Meall nan Tarmachan part of the property was made possible by a successful public appeal in 1996.

Join the Trust at Ben Lawers and contribute directly to the management work on the Reserve or online at www.nts.org.uk .

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