The Heather Trust

Sustainable, Resilient Moorland

Burning on blanket bog?

Expert views

PLUS

Moorland cattle grazing

Farmer insights

Tree Planting

Is it right for moorland soils?

Peatland strategy

What farmers want

Annual Review 2020

www.heathertrust.co.uk

Contents

The Heather Trust
Scottish Charity no: SC049374
All photos: The Heather Trust and contributors as indicated.

Editor: Eppie Sprung
Printed by Alba Printers, 1 St. Michael Street, Dumfries. DG1 2QD. Tel: 01387 266992
ISBN No. 1 899316 23 X

The Heather Trust, PO Box 7749, Lochmaben, Lockerbie DG11 9AE
Telephone/Fax: 01387 723201 **Web site:** www.heathertrust.co.uk **e-mail:** info@heathertrust.co.uk

Rob Marrs, President

Rob Marrs

It has been an interesting year. At the beginning of the year, who would have thought that a small micro-organism could bring the world to its knees. New words and phrases have been commonplace; lockdown, social distancing, self-isolating and Zoom have come into current use. Moreover, concepts like the "R-number" and "seven-day average" are now used routinely in BBC news bulletins, whereas before it was only geeks like me who considered such concepts interesting. For me this has been a relatively boring year, consolidating research in my home office, with so few field trips that I really can count them on one hand. I did a couple of days recording Blogs for the Ecological Continuity Trust about my long-term experiments in the Peak District and on the top of the Pennines on Great Dun Fell. Another highlight was the day I spent "doing consultancy" in Galloway as my contribution to the Heather Trust's auction. We had a brilliant day initially on a farm where I was introduced to "Riggit" Galloways followed by an afternoon on some hill land that is being rewilded. I was also presented with a copy of Patrick Laurie's new book "Native: Life in a vanishing landscape". Patrick is a long-term friend of the Heather Trust and the book records his experiences of running a small farm in Galloway. I really do recommend reading it; it is brilliant. The absolute downside to this year was that my planned conference in Vladivostok was cancelled!

But what of the Heather Trust? It has maintained its work on trying to bring people together remotely to provide better management of our uplands. Our Director, Anne Gray, and her dedicated staff have adapted to the virtual world, bringing all who are interested in the management of our uplands together, trying to bring compromise and common-sense together. This is evident in the article in this report on "Do we need to carry out prescribed burning on blanket bog?" - like everything in the uplands, things are never black and white. What does not waver is the passion that the Heather Trust staff bring to improving the management of our uplands which cannot be quantified easily. It is certainly worth the membership subscription. A major part of our funding, of course, is derived from the Heather Trust charity auction [in 2020 even under lockdown it raised in excess of £25,000]. I have already alluded to my involvement by providing a day's consultancy, but to be quite honest I think I get more out of this than the bidders. On each occasion I have done it, I have met a whole range of people, including farmers, gamekeepers, land managers and tenants, and all have been really interesting and I have learned a lot. This is the key to the Heather Trust's success. Its formula is quite simple to say but difficult to achieve in practice - bringing people together and getting them to work in harmony, reconciling issues and moving forward. Long may it continue.

Antony Braithwaite, Chairman

Antony Braithwaite

The Heather Trust supports sustainable management of the uplands, which of course includes ECONOMIC sustainability. The strands supporting sustainability in the uplands have changed over the years and we must keep abreast of these changes. Mining was once a great influence on sustainable life in various parts of the upland hills. It has now largely gone. Sustainable agriculture and its way of life in the uplands should always be a major strand. Sporting income is at present very important and under pressure politically. Covid 19 restrictions have reminded many of the value of health and enjoyment of the natural environment in our crowded United Kingdom and many of our upland areas have provided much needed respite for people living in our towns and cities, although the behaviour of some has been a problem for landmanagers.

The concept of Natural Capital measurement and improvements is a major consideration being developed for valuing land in the uplands. What is the baseline measurement and how will government initiatives, such as the huge 'Nature for Climate Fund' earmarked for tree planting and peat restoration, deliver the required environmental improvements? How can carbon credit valuation and trading help us towards Carbon Zero 2050? Sustainable management and improvement of natural capital on our moorlands in particular is something that the Heather Trust is keen to help deliver.

The Heather Trust has always promoted best practice towards sustainability and these are some of the new topics to grapple with. To these ends, we are pleased to welcome Hamish Waugh, ex-chair of the National Sheep Association and a tireless advocate of the upland farming way of life, on to the Board of Trustees. We also welcome Dr Oliver Moore who has been appointed to co-ordinate the Moorland Management Best Practice Guidance in Scotland.

Our activities are always developing and we both welcome and need new members to help the research and promotion of our aims.

Board report

One of the great strengths of the Heather Trust is our ability to get people with diverse upland interests and agendas onto a piece of moorland or farmland, whatever the weather, and have a good, constructive discussion about the issues in hand. A cup of tea and piece of cake afterwards in the village hall, conversations continue until everyone departs content that their views have been heard and respected and, perhaps the other person's point of view wasn't so bad after all! Put the same people round a table facing each other in a formal setting discussing the same issues and the outcomes usually are not half as constructive or amicable.

Together with most organisations with land management interests, the Heather Trust has had its outdoor wings clipped for much of 2020 and we have not been able to facilitate and educate as much as we would have liked. However, indoors we have been Zooming along trying to fulfil all the objectives in our Strategic Plan. We would very much have liked to plan and deliver a Resilient Moorlands conference and start a Sustainable Moors programme, possibly with long term demonstration sites, but these are having to wait.

With the part-time appointment of Dr Oliver Moore we have moved forward with the development of Moorland Management Best Practice guides on behalf of Scotland's Moorland Forum. Guidance on juniper has been completed and Oliver is now working on peatland management and further development of the Muirburn Code.

We continue to manage Scotland's Moorland Forum and administer the Working for Waders initiative. Both are financially supported by NatureScot for which we are extremely grateful. We also co-authored and project managed the Forum's ground-breaking "Valuing Scotland's Moorlands" document laying out its thinking about the value of moorland habitats to Scotland's future.

Our representative role on over ten committees in England and Scotland continues. This is an important part of our work, especially as the UK prepares for changes in our farming support systems as we leave the EU. We will continue to counsel for pragmatic approaches to change, always taking into consideration the vast experience that land managers have to offer.

This experience was exemplified in the three excellent presentations on moorland cattle grazing at our October AGM. All three emphasised the need for any schemes promoting targeted grazing to allow farmers the flexibility to control numbers and cattle movements in tune with the moorland that they know so well.

Another point mentioned by two of the presenters was the increase in rainfall that they have seen over the past few years, a fact that many readers will have experienced. Climate change is bringing new challenges for the uplands but also some opportunities as governments seek to reduce flooding risk and improve water quality. In our representation on forums looking at new environmental schemes we will continue to emphasise the role and expertise that moorland and farm managers can bring to 'slowing the flow' and how they could be suitably rewarded. Our new board member, Hamish Waugh has some thoughts on the matter in our Review.

Many believe that climate change is behind the increase in infestations of heather beetle, so dramatically demonstrated in the tidal flotsam of dead beetles on the North York Moors coast earlier this year. Whilst our research indicated that there is no quick fix to restoring the health of heather damaged by the beetle, we continue to seek answers to this difficult problem. Using our small project research fund we have just agreed to contribute to research being carried out by the University of Greenwich exploring chemical signals the heather beetle may use in its life cycle. Fruits from our fund this year have resulted in the publication of two research papers guided by Rob Marrs on the effects of long-term removal of sheep grazing on upland plant communities.

From all the above, you may rightly conclude that the Heather Trust continues to make a notable contribution to promoting sustainable moorland management across the British uplands. As a board, we were fortunate to have a socially distanced meeting on a sunny day in the beautiful College valley this August. Like many charities, our income stream has been limited this year and our meeting was to explore how we could raise funds to continue with all that we do. Any suggestions, or donations from readers will be gratefully received!

We could not achieve all that we do without the hard work and dedication of our Director, Anne Gray, and her very able and dedicated team who work so hard to support her, run the Country Market and Sporting sale and, of course put together this Annual Review. To them, our warmest thanks.

It is with great sadness that we report that Rob Dick, Vice President of the Trust since 2013, passed away in March. A lifelong farmer, environmentalist and sportsman, Rob joined the Board of The Heather Trust in 2002. He quickly stepped into the Chairman's role at, a time when his calm head and business expertise were much needed, and remained active in guiding the Trust until a few weeks before his death. He was very well known in the Border countryside and loved its environment and way of life. He championed the role of our charity in looking for a balance in all activities in the uplands. We owe him an enormous debt of gratitude and he will very much be missed.

Office Bearers

President
Professor Rob Marrs
Rob is a Professor in the School of Environmental Sciences at the University of Liverpool and has a particular focus on bracken, fire and peatland.

Chairman
Antony Braithwaite
Antony is a landowner based in Northumberland with a keen interest in grouse and fisheries.

Vice President
Mervyn Browne MBE
Mervyn was a founding member of The Heather Trust over 30 years ago and specializes in bracken control work, particularly in Ireland.

Vice President
Malcolm Hay
Malcolm's estate at Edinglassie near Huntly in Aberdeenshire has become an important site for peatland restoration work.

Board

We are delighted to welcome Hamish Waugh as new member of our Board.

Dr Colin Shedden
Colin is Scottish Director of the British Association for Shooting and Conservation and lives near Dunkeld.

Ian Condliffe
Ian lives in Ilkley and was Defra's national principal technical advisor for upland environmental research and development.

Robert Benson
Robert was formerly the Chairman of the Moorland Association and is an experienced sporting manager based in Cumbria with extensive links across upland management communities.

Colin Matheson
Colin was a chartered surveyor and land agent for over 45 years and is currently a Director of the College Valley Estate in North Northumberland.

Roger Burton
Roger has recently retired after 26 years with Scottish Natural Heritage and has a strong insight into the public benefits that well-managed moorland can deliver.

Viscount Devonport
Viscount Devonport has been a moorland owner since 1972. He was part of a 15-year demonstration farms and moors project with the Countryside Commission and participated in the Otterburn Project.

Hamish Waugh
Hamish Waugh is a traditional hill farmer in the Scottish Borders farming over extensive unfenced moorland with heather on the highest areas and on North facing slopes. Hamish uses traditional farming practices which promote biodiversity and encourage a wide array of both plant and bird life.

Meet the Team

Director
Anne has been Director of the Heather Trust since March 2018 and came to the team from Scottish Land and Estates.

Director's Assistant
Anne Stoddart has been with the Trust since 2011 and supports the Director in all the Trust's activities. She also provides administrative support to Scotland's Moorland Forum and Working for Waders.

Membership and Finance Officer
Clara Jackson started working for the Trust in 2010 and manages memberships, finance and sponsorship.

Events and Business Support
Eppie Sprung joined the Trust in 2017 and co-ordinates our annual Country Market and Sporting Sale and our communication channels. In addition, Eppie provides general business and governance support to the Trust.

Consultant
Simon Thorp (previous Director) provides input to the Trust running the Bracken Control Group and the Graze the Moor Project, and Chairing the Uplands Management Group and England & Wales Wildfire Forum.

Moorland Management Best Practice Guidance Officer
We are pleased to welcome Dr Oliver Moore as Moorland Management Best Practice Guidance Officer.

Dr Oliver Moore

Oliver took up the part-time post of Moorland Management Best Practice Guidance Officer with The Heather Trust in April. Oliver is a keen naturalist and brings his knowledge and love of upland wildlife to the role. He spent three years at Letterewe, Wester-Ross, researching the impact of Red Deer management on bryophyte and lichen ecology that resulted in several scientific papers and a recently published book. Since then Oliver has worked as a Lecturer in Applied Ecology, for the University of Gloucestershire, and today works part-time for Taylor Wildlife, as Senior Ecologist/Botanist, when he is not on Heather Trust duty. Oliver is currently based in Highland Perthshire but his work has taken him all over the Highlands and Islands where he has seen different approaches to estate management. Oliver keeps an open mind when it comes to helping people manage their land sustainably for livelihoods, wildlife and planetary health.

FINANCIAL HEADLINES

As presented at our AGM on 22nd October 2020

TOTAL INCOME
£204,423

UNRESTRICTED
£114,305

DONATIONS AND LEGACIES
£39,358

INCOME FOR CHARITABLE ACTIVITIES
£69,289

INVESTMENT INCOME
£5,619

OTHER INCOME
£39

RESTRICTED
£90,118

DONATIONS AND LEGACIES
£90,118

TOTAL EXPENDITURE
£229,311

UNRESTRICTED
£139,352

RAISING FUNDS
£9,073

CHARITABLE ACTIVITIES
£130,279

RESTRICTED
£89,959

CHARITABLE ACTIVITIES
£89,959

DEFICIT IN 2019
£24,888

SAVE THE DATE:
7TH MAY 2021

Eppie Sprung, our Events and Business Officer, shares her thoughts on our 2020 Country Market and Sporting Sale and looks forward to 2021.

With an auction full of "experience" auction Lots, our 2020 Country Market and Sporting Sale really hung in the balance this year. Set to take place in the middle of the first nation-wide Covid lockdown, tough decisions had to be made about whether or not the Sale made sense.

However, having approached all of our donors to ask for their thoughts on whether or not the Sale should go ahead, the decision to continue was unanimous.

All Lots were offered with the opportunity of either rolling the experience forward to an appropriate post-lockdown time or a refund if the experience was no longer possible.

Given the significance of the Sale in contributing to The Heather Trust's annual income, we were incredibly grateful for the support of our donors and bidders in making the decision to continue supporting the Sale.

As is so often the case, the final day of the sale was full of excitement with bids stacking up and Lots flying off the metaphorical shelves!

Some of our newer Lots were particularly popular, including the day with a red squirrel ranger and the day with a traditional hill shepherd.

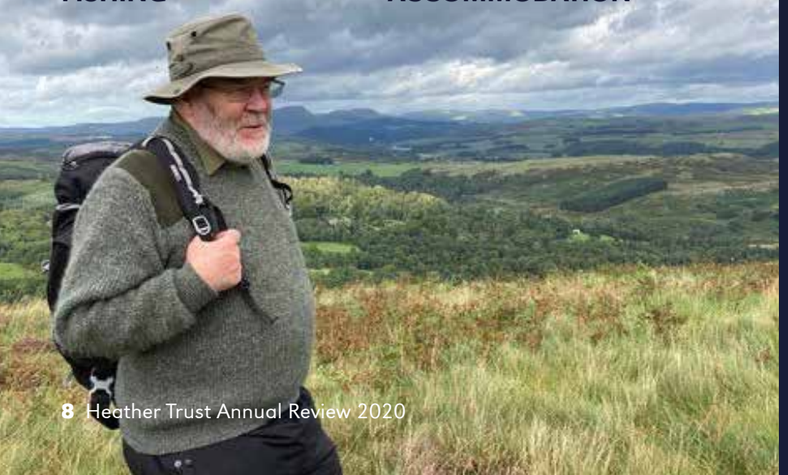
In total we raised £27,802, made up of both auction Lot purchases and cash donations.

Over the coming months, I will undoubtably be in touch with each and every one of you to ask for Lot donations for the 2021 Sale. However, please don't feel you need to wait to hear from me to make a donation. If you have an idea for a Lot donation, under any of our categories, please send me an e-mail on: events@heathertrust.co.uk.

2021 Categories:

SHOOTING
STALKING
BESPOKE MACNABS
FISHING

COUNTRY LIVING
TICKETS AND DAYS OUT
ART AND BOOKS
ACCOMMODATION



MOOR Flavour
Heather Trust Country Market & Sporting Sale

Sale Experiences with The Heather Trust Chairman and President

Chris Amos enjoyed 2 days of fishing with his brother-in-law and Heather Trust Chairman, Antony Braithwaite, on the Tyne at Haughton Castle and then Greycourt opposite the famous Styford. His brother in law had 3 fish 6lb, 7lb and 16 lb and Chris managed a fish of 10lb - a superb red-letter day.

Dr Mary Ann Smyth and Richard Cunningham enjoyed an advisory visit with Professor Rob Marrs, President of The Heather Trust. A day packed full of information on bracken and moorland management, personalised to their 70 hectare ex-rough grazing site near New Galloway.

New research on driven grouse moors in Scotland

Colin Shedden, Board member of The Heather Trust and Director Scotland for the British Association for Shooting and Conservation, provides an overview of the Scottish Government research published in November 2020.

November saw the publication of new research that will be of interest to all who shoot or manage grouse as well as all with an interest in sustainable moorland management. The work is entitled "Phase 2 Grouse Research – Socioeconomic and biodiversity impacts of driven grouse moors and the employment rights of gamekeepers" and follows on from previous work undertaken by the SRUC and the James Hutton Institute. This work was commissioned by the Scottish Government and can be found here **https://sefari.scot/research/phase-2-grouse-research-socioeconomic-and-biodiversity-impacts-of-driven-grouse-moors-and**

The four papers look at socio-economic impacts, the employment rights of gamekeepers, mapping the area and management intensity of managed moorland and finally biodiversity consideration on grouse moors.

The key findings were that, when compared to forestry and woodland creation, and most other land uses, driven grouse shooting and deer stalking deliver higher levels of local-regional spending. Driven grouse shooting also employs more staff than other comparable land uses and, like deer stalking, requires no direct public funding. Sheep farming and conservation received, on average, 66 and 79% of revenue from public funding.

Unfortunately, 83% of gamekeepers surveyed were less optimistic about their future and 64% had experienced abuse from the public, mainly verbal. The results also provided a unique insight into wage rates, tied housing and employment terms of gamekeepers.

The presence of grouse butts and the percentage of ground managed by muirburn has shown that 858,000 hectares of land in Scotland is managed for grouse shooting and this is less than 10% of the land mass, half of the area commonly described as being managed for grouse.

Finally, the biodiversity work overlaid current species distribution data on the muirburn burning intensity maps. This allowed the researchers to assess the effect of grouse moor management intensity on the distribution of selected upland species. For example, golden plover and merlin showed an increased occurrence with greater burning, peaking at intermediate levels of burning. Curlew, whinchat and lesser redpoll also appeared to increase. Green hairstreak butterfly, adder and kestrel showed fairly consistent occurrence across the range of muirburn measured. Birch was the only species that appeared to decline though blaeberry also showed evidence of lower prevalence in the highest category of muirburn intensity.

It has already been agreed by Ministers that this important research would be considered alongside the independent Grouse Moor Management Review (Werritty) before the Government response was made on the 26th November.

Managing the flow of rivers and streams in a changing climate

Hamish Waugh, an upland sheep farmer and Heather Trust Board Member provides a personal perspective on the challenges of future flood prevention.

The effects of climate change are becoming ever more of a problem in terms of extreme weather events and an ever growing population will require a lot more food than we are producing at this moment in time. From a farmer's point of view, I am of the opinion that the way we manage water in our rivers and streams is in need of some joined up thinking as we hear more and more that flood events are becoming more damaging and more frequent. All around the world for millennia, man has chosen to build his dwellings on flood plains and, as a consequence of climate change, these dwellings are now being flooded more often than at any time in history.

The Lake District village of Glenridding sits on a flood plain on the shores of Ullswater and was flooded in the wake of storm Desmond in December 2015. It would have been flooded again just a few days later had digger drivers not defied health and safety officials and insisted on working in very hazardous conditions to ensure rubble washed down the beck didn't divert water into homes and businesses once again.

It is well recognised that the environment we enjoy today has been created totally by man's farming practises over many thousands of years. In order to increase farming efficiency humankind recognised the need to manage water for growing crops and for the welfare of animals. This dates back more than 6,000 years where evidence has been found that the earliest civilisations of Mesopotamia drained and irrigated the land to make it more productive. Indeed, historians have identified poor irrigation and water management as being responsible for the collapse of the Sumerian Empire.

The world's population has more than doubled since 1970 and is estimated to grow by a further 25% in the next 30 years from the current 7.8 billion to over 9.7 billion. With this in mind, I think it is fair to say that the land we use for food production is going to need very careful management if, as a species we are going to be successful in feeding such a large populous. Some areas will need to be irrigated, but perhaps more so in our UK climate it will need to be protected from flooding. Hand in hand with flooded homes making headline news over the last decade of winters it is more and more common to hear of crop failure due to flooding in winter and, over the last two years at least, followed by a drought in early summer compounding the issue.

During Storm Ciara in February 2020 the Bridge Guest House in Hawick was dramatically caught on camera as it collapsed into the River Teviot at its confluence with the Slitrig . Incredibly no one was hurt or killed in the incident, but it should be noted that the cause was a total lack of riverbed management over the last three decades which had allowed an island to form in the River Teviot, shrubs subsequently became established on that island, restricting water flow in times of high rainfall and targeting that water directly into the foundations of the Bridge Guest House.

Rather than removing the island and using the stone in the construction industry there are plans estimated to be worth £44 million to build flood defences which will impact on the character of Hawick. Had this event happened in the countryside it would have gone unnoticed, but the creation of such an island would have diverted the river onto farmland denuding fields of their ability to produce food and creating pollution as hundreds of tonnes of soil and stone would be washed further downstream to create more islands etc. It's a vicious circle, increasing diffuse pollution that environmentalists are trying to avoid.

We cannot afford to jeopardise the growing potential of any of the land we farm, be it low lying fertile land growing cereals or hill land free of peat where sheep and native breeds of cattle have grazed for centuries.

I believe wholeheartedly that however we manage rain water and the way it gets to the sea, it is imperative that we protect our peat soils and the carbon that lies in them. But, it is crystal clear to me that if we don't employ water management techniques that are suitable for our society in this age of a warming climate then I worry that the human race could very well go the same way as the Sumerian Empire, where hunger and famine will be far more commonplace than it is today.

https://www.youtube.com/watch?v=Cv4HwHHJEEY

RSPB review policy on gamebird management and shooting

Pat Thompson, senior land use policy officer with the RSPB summarises this recent review and what some may consider its controversial findings.

The UK's uplands are internationally important, comprising a wide range of habitats and species assemblages of high conservation importance. In parts of Scotland and England, large areas of bog and heath managed for driven grouse shooting are dominated by heather and lack some characteristic species. The RSPB is concerned with the increasingly intensive and sometimes illegal management practices associated with big bag grouse production on some moorlands, especially the burning of peatland habitats, the killing of protected species (including mountain hares), the use of veterinary medicines (to treat grouse disease) and the use of lead ammunition.

On 10th October, the RSPB published the results of a year-long review of policy on gamebird shooting and associated land management commissioned by RSPB's Council. The policy was informed by a review of the scientific literature on the impacts of driven grouse shooting and shaped by the views of RSPB members, staff, volunteers, organisations and individuals with an interest and expertise in the subject. It culminated in the adoption of seven conservation principles to guide RSPB thinking on how to improve the environmental performance of gamebird shooting and associated land management.

The intensification of land management practices associated with grouse production, as evidenced over the last two decades, is unsustainable and damaging. The RSPB concluded that reform leading to an improvement in the environmental condition of our uplands will only be achieved through the introduction of licences for "driven" grouse shoots. Licensing is common practice for gamebird shooting in other European countries (on state owned or regulated ground) and those who behave responsibly and legally should have nothing to fear from this approach. The RSPB would expect shooting organisations to be involved in the design of a suitable licensing scheme, setting minimum environmental standards which, if breached, would result in the loss of the right to shoot for an agreed period.

The expectation of large bags (and increased capital values) associated with driven shooting appear to be at the heart of the problem. A shift in culture toward a more environmentally sustainable shooting experience, with smaller bags, would better align grouse moor owners with the increasingly urgent need to address the twin threats of the nature and climate emergencies. If reform is not forthcoming within five years, the RSPB will campaign for a ban on driven grouse shooting.

Scottish Government response to the Grouse Moor Management Review Group

Colin Shedden provides a Heather Trust perspective on the Werritty Review - a year on.

The report from this review group was submitted to the Scottish Government in December 2019. Almost one year later, on the 26th November 2020, the Scottish Government published its response. The Heather Trust has wider interests than just grouse shooting so does it really matter how Government address the report and the 26 recommendations?

The Heather Trust is all about "sustainable, resilient moorland" and in Scotland and the North of England a significant part of the (economic) sustainability is down to driven grouse shooting. The GMMRG report does recognise this. The Group's remit stated that they "ensure that grouse moor management continues to contribute to the rural economy" so there is no mention of a ban on grouse shooting. However, the headline recommendation was one of unanimous support for a licensing system for "the shooting of grouse", to be introduced within five years of publication if there is no marked improvement in the sustainability of grouse moor management. Grouse moor management probably covers half of Scotland's heather moorland, so the Heather Trust does have considerable interest.

The improvement in the sustainability of grouse moors, that would have avoided licensing of grouse shooting, was to be evidenced by the favourable condition of populations of golden eagles, hen harriers and peregrines "on or within the vicinity of grouse moors". Work had started to collect this data, but it would have been unusual to find all three raptor species, doing well, in the same general area. Eagles do not like harriers, and vice versa.

This work may now stop because the Government response states that a shoot licensing scheme should be introduced, but "implemented earlier than the five-year timeframe suggested by the review group".

Shoot licensing is a new concept, supported in the RSPB's recent review of game bird shooting, but has not been employed anywhere else in Europe apart from on state-controlled land. This could act as a disincentive to investment in moorland management – why take the risk of investing when the main driver, grouse shooting, could be removed on evidence probably based upon the civil burden of proof?

It was good to note that the Government's response took into account the recently published research on the socio-economic impacts of moorland activities in Scotland. This research, part of a suite of papers looking at aspects of driven grouse shooting, and the work of gamekeepers, filled important knowledge gaps. For example, it shows that driven grouse shooting delivered a higher per hectare employment impact than all other moorland land uses. It also illustrates how grouse shooting and deer stalking do not receive any direct public funding, compared to all other land uses.

The Heather Trust are also interested in "resilient moorland" and while part of that is economic it is also environmental. The GMMRG looked at many environmental issues and one was muirburn. One recommendation supported the introduction of a fire danger rating system. This would be, "to better support decision-making about where and when to burn". This is welcome along with increased training for land managers and, possibly, an increase in regulatory control through the Muirburn Code. The Heather Trust has been, and remains, closely involved with the Code and its review. Muirburn should remain an important management tool and hopefully be seen as the main preventative measure against wildfire.

The Government's response is to agree that muirburn should be "subject to tighter regulation and oversight" and that in future it should only be undertaken under license from NatureScot, who will also be expected to administer the shoot licensing. There will be a full consultation on the licensing of muirburn, on all land, not just grouse moors; a likely ban on muirburn on peatland as well as a review of the current definition of peatland.

The report had a section on mountain hares and a recommendation that shooting of hares should be subject to increased legal regulation. This would have included, for example, a reporting requirement on numbers present and numbers shot. However, in June at Stage 3 of the Animals and Wildlife (Penalties, Protection and Powers) (Scotland) Bill we saw a late amendment that gave the mountain hare complete protection. Stakeholders are now engaged with NatureScot's licensing arrangements that should still allow the management of mountain hares. It could be argued, however, that this legislation has been rushed with little heed to the recommendations from the GMMRG, or the science.

The Government response also said that a code of practice on the use of medicated grit should be developed and that there should be greater regulation on the use of traps, including spring traps, "for land management purposes in Scotland".

The Government response states also that, "Grouse shooting makes an important contribution to the rural economy and many grouse moor managers already follow best practice guidance and take good care of the land they manage". However, it is clear that the introduction of licensing for the shooting of grouse on Scotland's moorlands will bring changes to our uplands' natural and cultural environments.

LivingUplands project breaks new ground

LivingUplands is a Weardale-based project dedicated to providing insight and resources for learning about our amazing upland moorland - a very special landscape. It is a collaborative project, working with Durham Wildlife Trust to explore the special characteristics of an environment that sustains rich flora, protects endangered British fauna and wildlife, and is a carbon-capturing colossus of deep peatland reserves.

Alongside Durham Wildlife Trust, *LivingUplands* aims to bring our uplands to life, and into our schools and communities.

The *LivingUplands* project was first created in 2015 to focus the attention on one of the UK's most endangered birds, the iconic black grouse. While developing educational resources on this species, it became obvious that its story lies within a far wider, richer and massively diverse balance of nature. There is a far bigger story to tell about the managed uplands of England and the huge success in improving conservation and biodiversity, creating safe habitat for many of the UK's most endangered wildlife to flourish.

We are exploring projects ranging from the geology of upland areas to the impact of pollution and many wildlife and conservation activities. Many of these projects demonstrate how they are having a profoundly beneficial impact alone, but when taken together are richly enhancing and restorative to the balance of nature across our living uplands.

The big challenge is how to inspire a new generation to appreciate the wonderful nature of the uplands. To that end we are looking at new ways to tell the story of the uplands, its wildlife, landscape and communities. There are so many factors that go towards shaping the uplands, and we are endeavouring to reach a wider range of audiences by taking a different approach to what might otherwise be taken for granted.

For example, we will look at the geology that lies beneath the uplands, which has been fundamental in shaping the land above. The water too, from the blanket bog-covered uplands to the sea, bringing life and etching lines through the landscape – connecting rural and urban communities. In a similar vein we will look at the 'life' of the uplands through the climate and weather, the people and places, and those aspects that have provided community and character to this corner of England.

Over the summer LivingUplands upgraded its website and is in the process of building the content that meets our ambition – linking to social media; principally Instagram and Facebook.

The coming months will see new educational resources available, part of our programme to provide free online education packs that are suited for learning in schools or at home. This online resource has been very much valued by schools and parents as a means of engaging with young people during what can seem all too frequent breaks in schooling because of a local outbreak of Covid.

There are also many families desiring to learn more about the countryside, and 'post-lockdown', at whatever level, looking forward to a meaningful visit to the great outdoors. For detailed information an online companion to the highly regarded 'Natural History of Upper Teesdale' publication will be added for Upper Weardale. We also feature issues that are in the public mind at this time - looking at water and plastic pollution from uplands source to the North Sea.

There are many under-told stories out there, which means that all too often the underlying value of our uplands landscape is not fully understood nor appreciated. *LivingUplands* intends to change that. Please keep an eye out for new content on our website and follow us on social media.
www.livinguplands.com

Photo: Black grouse
© Workingline images

An ecological perspective on the heather beetle and its impacts

Elspeth Ingleby, Ecologist for the North York Moors National Park Authority

The North York Moors are famous for their vast swathes of lilac blossoming heather sweeping from horizon to horizon. However, many local residents and regular visitors will be well aware that the mauve haze is rarely unbroken, and blotches of gingery heather often mar the purple hillside. These tan coloured patches of moorland can appear in different areas each year, and often once they have passed the heather becomes bare, brittle and grey – dead branches swaying stiffly in the breeze.

The culprit for this transformation is a small native beetle, known as the heather beetle or *Lochmaea suturalis*. Unassuming in appearance, at only 6mm long with a bronze tinge to their dark brown wing cases, these insects have lived and evolved alongside heather, its sole food source, for millennia. Whilst *Calluna vulgaris* or ling heather, the dominant heather species of the North York Moors, makes up its preferred diet, the beetle can also feed on ericaceous heaths such as bell heather and cross-leaved heath which are both also common across the moorland area.

With each beetle only surviving for a year, adults hibernate overwinter by burrowing into the soil before emerging in the spring and beginning to graze. In April or May, once daily temperatures are warm enough, the adult beetles take to the wing and mate before dispersing where the wind takes them. This spring, many people noticed piles and piles of dead heather beetles washed up along the Yorkshire coast, presumably the result of vast swarms blown out over the sea by strong westerly winds. Whilst this led to hopes that with an apparently large proportion of the breeding population being wiped out there would be less of an impact on the moorland this year, this sadly does not seem to be the case.

Once the females reach a suitable patch of heather, they lose their wing muscles as they divert energy to developing and laying their eggs in damp moss or leaf litter beneath the plants. The larvae that emerge then feast on the heather leaves, growing rapidly before pupating to become an adult beetle in mid-August. They then continue to feed until temperatures drop in the autumn and the cycle begins again.

The singed appearance of beetle grazed heather is caused by the rasping jaws of the beetle and its larvae that scrape away the protective coating that helps the leaves retain water, exposing the plant to dehydration and leading the plant to essentially 'cut off' the affected leaves by halting the flow of water and nutrients to prevent further loss. Whilst in many years, the grazing pressure of the heather beetle may make no more mark than the odd gingery clump here or there, when conditions align the population can explode resulting in vast swathes of brown foliage evident across the landscape.

We don't currently understand what causes heather beetle numbers to explode in some years, but factors could include weather conditions, particularly during the winter prior to emergence, predators and management techniques affecting the growth or absence of the heather it depends on. Unfortunately, at present much of the available literature on heather beetle and their impacts is scientifically inconclusive, with insufficient robust and peer reviewed research to explain how the population or effects of heather beetles can be best managed.

Historically, one advocated method of managing heather beetle involved burning off affected plants as soon as possible after the infestation was noted with the intention of wiping out the beetles in that area and to encourage new growth from the affected plants and the existing seed bed. However, recent reviews of the literature have been unable to find any concrete evidence that this management technique is effective, with anecdotal reports of the beetles and larvae dropping off plants and burrowing into the soil in the presence of fire and thus escaping the blaze. A recent study by the Heather Trust in the Peak District concluded that there was no difference in heather regeneration from plots treated with the three different management approaches of cutting, burning or control (i.e. do nothing) when considered in the long term. This suggests that heather beds affected by the beetles are as likely to recover in the absence of specific active management as with it.

As an indigenous native species, several predators and parasites have evolved alongside the heather beetle, which may provide population control in the correct circumstances. The Hieroglyphic Ladybird *Coccinella hieroglyphica*, the Heather Shieldbug *Rhacognathus punctatus*, and Black Grouse *Lyrurus tetrix* are all known predators of heather beetle, whilst parasitoids such as the fly *Medina collaris* and wasp *Asecodes mento* lay their eggs in heather beetle adults and larvae respectively which then get consumed by the parasitoids' offspring as they develop. Whilst in theory it would be logical that, following an outbreak of a prey species, the number of predators or parasitoids would rise to reduce or prevent future infestations in following years, other factors may be in play suppressing increases of these predators. The significant impacts of heather beetle observed annually in the North York Moors, and other sites across the country, between 2018 and 2020 seems to indicate that this natural control process may not be currently effective at supressing the beetle population and therefore further research into the ecology of these predators and parasitoids would be hugely valuable.

Some reliable evidence of factors affecting beetle ecology is available, often from laboratory-based experiments where factors can be more easily controlled. These have found evidence that where heather is exposed to higher levels of nutrients, particularly nitrogen, that heather beetle grow more quickly and have more offspring. This may indicate that emissions of nitrous compounds such as ammonia from the area around the North York Moors may have a role to play in the impact of heather beetle, as well as the wider ecological implications of nitrogen and acid deposition on an already vulnerable habitat. Similarly, warmer temperatures showed an increase in the number of offspring produced and increased grazing damage, although larval growth was negatively affected by drought. This indicates that whilst the impact of climate change is likely to be complex, warmer but wetter spring conditions could lead to significant population increases.

Beyond the immediate impact of heather beetle on our celebrated purple landscape, the effect of more frequent outbreaks of heather beetle has the potential to influence the future ecology of the moorland habitat as we know it. Serious infestations can lead to a local depletion in available summer flowers, impacting bumblebees, hoverflies, moths and other native pollinators that depend on the annual nectar bonanza as well as apiarists that bring hives on to the moorland to make the distinctive heather honey. Other grazers including sheep and red grouse may have less food available and lose condition, with moorland owners having to reduce or cancel shoots during bad years. Heather beetle has also been blamed as a potential cause for the transition of heather dominated moorland towards a grassier sward, as opportunistic species take advantage of open spaces to become established in the aftermath of an outbreak. Whilst this may at times lead to a more ecologically diverse habitat, depending on the invading species, such a transition will inevitably also have impacts on those species that have adapted to the more homogenous swards of ling heather prevalent over recent decades.

With climate change and possible changes in other factors potentially leading to more frequent and larger infestations of heather beetle, gaining understanding of the underlying causes, controls and effects of heather beetle outbreaks will be vital to anticipating how our moorland habitats may change in the future. We must also learn what changes in management practice may be needed to manage the threat of heather beetle and enable moorlands to be maintained in the long term in the North York Moors and across upland Britain, for the benefit of the species and communities that depend on it. Without such information, it appears possible that the vast swathes of purple blooms, bringing with it the distinctive heady scent of moorland summers that overwhelms the senses, may become simply a memory of bygone days whilst an unpredictable future for our uplands awaits.

Author's note: Information for this article is largely drawn from two reviews of available literature published in 2015, commissioned by Natural England and the Heather Trust, into the Ecology of the Heather Beetle and Management Options for Control. These reviews along with further information and details of recent studies mentioned in this article are available from the Heather Trust website: **www.heathertrust.co.uk/heather-beetle**.

Heather beetles on strandline, Cayton Bay 17 April 2020 © J Childs

Bracken Control update

Simon Thorp coordinates the activity of the Bracken Control Group (BCG) and this includes liaising with the authorities to obtain an Emergency Authorisation to allow Asulam, the main chemical agent, to be available to control bracken.

The Bracken Control Group exists to coordinate the views of all those with an interest in the control of bracken throughout the UK. Representatives of different sectors take part in meetings of the Group and there are over 400 supporters who receive updates in the form of newsletters .

The Group believes that the threat from bracken is increasing in several ways:

- The coverage of bracken is increasing. It is difficult to quantify this as, in addition to the large beds of bracken, which can be monitored, bracken also grows in smaller patches on roadside verges and under forestry. It can also exist alongside other vegetation and is therefore difficult to assess.
- In designated areas, the expansion of bracken can overcome the habitats or archaeological features that the site was designated for.
- Expansion of bracken often takes place close to the boundary between in-bye and hill ground, as these areas have higher fertility than open hill ground. These areas are an important area for livestock and birds (for example, waders such as Curlew). In many areas, walkers have to traverse areas of bracken to reach the open hill.
- Bracken litter is an ideal habitat for sheep ticks, *Ixodes Ricinus*, to breed in and the bracken plants provide an ideal ladder to allow ticks to reach mammals for the blood meal they require.
- Tick-borne diseases have a significant effect on humans, wildlife and livestock. The public health bodies view the recent identification of cases of *Tick-borne encephalitis* in the UK as a significant new threat.

While the BCG considers all types of bracken control, activity in the last 12 months has focused on maintaining an effective approval for the use Asulam to control bracken.

Since the 2013 bracken control season, the Group has submitted the annual application for an Emergency Authorisation to the UK pesticide authority (the Chemicals Regulation Division (CRD) of the Health and Safety Executive) for approval to use Asulam during the following season. The 11th application was submitted at the end of October for the 2021 season; it is likely that a response will be provided in late January or early February, but this will depend on the timing of a meeting of the Expert Committee on Pesticides.

The full Environment Agency application is available on the Asulam page of the website. The research programme might be of particular interest, as the BCG is continuing to develop the evidence base to support the need for bracken control by all means, including chemical control with Asulam and/or other active ingredients (see Annex C of the application).

For the 2020 season, the initial response from CRD to the application was a partial approval. Only aerial use of Asulam was approved, and this was with an increase of the buffer zone against surface water bodies from 50m to 90m. In discussion with CRD, it was agreed that a further application should be submitted to provide information to support the Group's concerns about the restrictions. This produced no change to the revised buffer zone but allowed ground-based control to take place within designated sites and in other areas where there was an agri-environment agreement that included chemical control of bracken. Ground-based control is important to allow secondary (follow-up) treatment and to permit treatment of smaller areas and for use in forestry.

The EA application for 2021 has highlighted three issues that the BCG would like to see addressed:

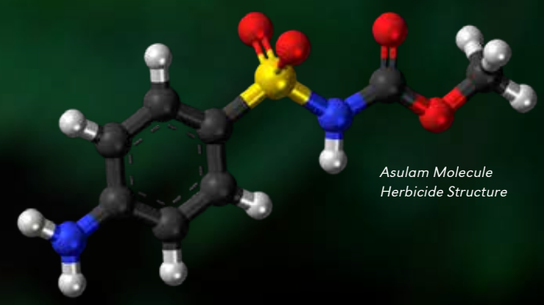
- Review of the 90m buffer zone introduced in 2020
- Review of the one-month exclusion period for livestock from treated areas, and
- Continuation of ground-based control options

As part of the increasing scrutiny over the use of pesticide, CRD is asking for more information to support the application for use of Asulam. In 2020, a start was made to collecting data from end-users of the product, and the efforts of those who provided information were much appreciated. Lessons were learned from the way the process worked this year so that improved records can be obtained in future years. This may feel to be over-bureaucratic, but unfortunately it is necessary to provide CRD with the evidence they need to continue to allow the use of Asulam.

The full registration process is continuing and, if the registration application is approved, it will avoid the need for annual Emergency Authorisations. Registration will now be made under UK law, but this is unlikely to speed the process up. It is likely to be several years before a response to the registration application process is received.

With the bracken threat increasing it is essential that land managers are provided with the most effective tools to reduce the threat by controlling. Currently, Asulam offers the most effective and safest control, but the BCG is encouraging research to establish if other techniques or chemical agents, used in addition, in isolation or combination, will increase the range of options to control this problem species.

For more details about the activities of the BCG, see the website: **www.brackencontrol.co.uk**



Asulam Molecule
Herbicide Structure

SUMMARY OF ACTIVITY
FOR ANNUAL REPORT 2020

ZOOM MEETINGS AND DISCUSSIONS

- **Working for Waders Communications Group meeting** 17/3, 21/4, 30/6, 22/9, 1/12
- **MMBP Group** 18/3, 15/6, 29/6, 2/7, 26/8
- **Scottish Forum for Natural Capital, Land management Group meeting** 19/3
- **Uplands Stakeholder Forum & Uplands Alliance Steering Group** 23/3, 21/4, 28/4, 7/5, 17/6, 4/9, 15/9, 15/12
- **Uplands Management Group** 17/11
- **The Heather Trust Audit & Risk Group** 25/3,12/5, 23/9
- **Bracken Control Group and Emergency Authorisation of Asulam** 15/4
- **Working for Waders Facilitation Group** 25/3, 14/5, 28/9, 7/12
- **Heather Trust Board and Team** 16/5, 21/5, 21/10
- **RSPB Code of Shooting Practice consultation** 28/4
- **Peatland ACTION Project Board** 7/5, 30/7
- **Scotland's Moorland Forum and Deer Management Round Table** 13/5
- **Scotland's Moorland Forum Chairman's Working and Full Forum** 15/5, 12/6, 9/10, 14/12
- **Scotland's Regional Land Use Partnerships workshop** 2/6
- **Natural Capital Events** 7/8
- **Skills Development Platform insights session with Lantra** 16/9
- **The Heather Trust AGM & Moorland Grazing Discussion** 22/10

Dr Oliver Moore introduces our Question and Answer piece on Peatland Restoration in which we hear from Dr G. Matt Davies (Assistant Professor of Soil and Plant Community Restoration) from the School of Environment and Natural Resources, The Ohio State University and Dr Andreas Heinemeyer (Senior Research Fellow/Associate Professor) from the Department of Environment and Geography, University of York.

Peatlands have locked up carbon over the millennia which explains why many people are concerned about losing this accumulated peat resource. Here we focus on those peatlands associated with moorland environments that have accumulated peat to a depth of ≥0.5 m. They only store carbon when they are wet enough to halt the normal processes of vegetation decay. Peat breaks down rapidly and releases carbon into the atmosphere when it becomes dry and exposed which is why re-wetting and re-vegetating is so important. Most moorland managers understand this, but a major point of contention exists around whether or not to carry out prescribed burning in moorland environments and particularly on peatland. There is a lot of science around just now concerning this debate and we explore some of the issues below.

There appears to be two schools of thought: one promoting the need and importance of muirburn for the continued management of vegetation on peatlands that are on a restoration trajectory; and the other advocating no further burning of peatland, after initial restoration work, as it takes the long-term path to a near-natural and self-regulating condition. Science can be found to support both of these arguments.

The view that burning is unnecessary comes from the standpoint that peatland will recover to a near-natural state over time as a result of re-wetting alone. There is also concern that prescribed burning is known to eradicate species that are sensitive to fire (including many species with high conservation value associated with near-natural wet bogs). This counters the increase in very common species associated with bare peat and vegetation gaps that result from burning. Once a bog has become fully functional, with a good coverage of *Sphagnum* mosses, below a mixed canopy of Hare's-tail Cotton-grass *(Eriophorum vaginatum)* and Heather *(Calluna vulgaris)*, there is no need for vegetation management since the conditions are too wet for Heather to gain ascendency. A re-wetted bog, with less vigorous and scattered Heather, is understood to be more resilient against wildfire events. It also serves as an important habitat for Red Grouse *(Lagopus lagopus scotica)* seeking invertebrate food – especially when drought makes this difficult in other parts of the moorland.

The alternative line of thinking recognises that even after initial restoration work, peatlands remain modified and can act more like heath than blanket bog for a number of years. Therefore, it may be appropriate to intervene with some management to reduce Heather and avoid wildfire risks. Recent evidence suggests that cool-burning of peatlands may lock-up more carbon in the form of charcoal and reduce the amount of methane gas that might otherwise be emitted as a result of anaerobic respiration from re-wetted peatland. Muirburn has also been shown to increase biodiversity in situations where Heather has become dominant. Some species of *Sphagnum* moss appear to be unaffected by cool-burning – in the short-term at least.

There is a great deal of uncertainty about how to do long-term peatland restoration. We have never restored peatlands on such a large scale in the UK or in so many different places and situations. It may be that a more flexible and pragmatic approach is required than the sometimes quite entrenched standpoints set out above. In some places, intervention might well be required, whereas in other places it won't.

We invited a selection of specialists in peatland research/management to respond to some questions concerning this subject. Dr G. Matt Davies (Assistant Professor of Soil and Plant Community Restoration) from the School of Environment and Natural Resources, The Ohio State University and Dr Andreas Heinemeyer (Senior Research Fellow/Associate Professor) from the Department of Environment and Geography, University of York were able to find time in their busy schedules to kindly provide us with some thought-provoking responses. We also received some polite refusals and others suggesting who else we might contact. We apologise if you were not approached to participate on this occasion (we just ran out of time) and warmly invite you to contribute to the comments section on The Heather Trust website[1] ,where there is a shorter version of this introduction posted as a blog. Please remember that there are other scientists working in the field with different opinions on the subject to those that have responded here. We encourage readers to check out the IUCN position statement about burning on peatlands[2] and there is a critique of this position statement within the Peatland Protection document[3] published by the Moorland Association. In the meantime, practitioners are encouraged to follow the advice set out in the Muirburn Code[4] and/or follow government guidance as appropriate.

[1] https://www.heathertrust.co.uk/

[2] https://www.iucn-uk-peatlandprogramme.org/news/burning-peatlands-position-statement

[3] https://www.moorlandassociation.org/wp-content/uploads/2020/07/peatlandprotection.pdf

[4] http://muirburncode.org.uk/

Questions around prescribed burning on bogs

1 There are lots of studies showing the short-term (3-10 year) benefits of muirburn on peatland that has become dominated by Heather (*Calluna vulgaris*); fuel load is reduced, space is created for common species of *Sphagnum* moss, carbon is locked-up in charcoal, young Heather is able to accumulate carbon dioxide quickly as it re-grows, methane is not emitted as occurs from wet peatland and so on but is there evidence that peat is actually being formed before the next round of prescribed burning on blanket bog? Does this matter?

AH: The evidence that rotationally burnt heather-dominated blanket bog can also be 'active' (i.e. accumulating peat and thus carbon) is based on recent, but rather limited (i.e. a low number of studies), peat core evidence. However, whilst the evidence base is small, it is consistent: every study shows that rotationally burnt blanket bog accumulates, rather than loses, peat. Moreover, several carbon flux studies using chambers or flux towers also show active carbon sequestration, although no study to date has measured carbon fluxes over an entire management rotation – this clearly needs to be addressed if we are to fully understand the impacts of managed burning on blanket bog greenhouse gas (GHG) emissions. Finally, a consistent problem within the evidence base is that the impacts of managed burning are not considered separately from moorland drainage – deep drainage clearly causes increased decomposition and thus peat carbon losses. Therefore, the findings of burning studies must be judged in relation to the management history (e.g. drainage) of the sites used.

MD: This is kind of a leading question. Firstly, I would note that burning can have a number of environmental benefits and disbenefits that are experienced at a range of spatial and temporal scales and that depend on the fire regime (frequency, severity, seasonality) applied. While the benefits outlined above are valid, disbenefits may include changes to site hydrology, altered soil thermal regimes and short-term increases in both CO2 and CH4 fluxes. Regarding the specific question here, most research tends to suggest that more frequent fire reduces C accumulation via Sphagnum growth. Some recent studies have suggested that peatland carbon accumulation can occur in the context of regular managed burning. In one study this was slower than in unmanaged areas and in another charcoal played an important role. Does it matter? Arguably. C sequestration by peat is small in comparison to the magnitude of C savings needed to minimize climate change. It is, however, vital that we protect our existing peatland carbon stock to prevent further impacts on water quality and climate. Whether it matters if peatlands are more or less C-neutral, a small net sink or a very small net sink is debateable. What matters is that we manage for peatlands that are resilient in the face of climate change.

2 What would you say to someone who is concerned that regular (every c.20 years) prescribed burning on near-natural blanket bog will eventually cause the vegetation to shift to dry heath that is dominated by Heather?

AH: This is merely an assertion as there is very little empirical evidence on this. Especially if we consider the impacts of burning separately from deep drainage (the two are often being confounded in many research studies). As the context is now changing, we need to determine if a wet and heather-dominated blanket bog will actually turn into a 'degraded' bog as a result of rotational burning. It is likely that by suppressing heather growth burning will enhance nutrient recycling, which could potentially benefit other blanket bog species, such as *Sphagnum* and *Eriophorum*. Furthermore, a hydrologically intact (i.e. undrained) deep peat site should not develop into a dry heath in response to long burning rotations (≥20 years) unless site conditions are too dry to begin with – a pre-management vegetation and hydrological assessment should provide clarity about this. Such an assessment must also consider the site topography. Indeed, steep slopes drain more easily with faster runoff than flatter areas. Faster run-off increases erosion risk, which may be further enhanced by burning because it reduces surface roughness (vegetation removal increasing run-off speeds) and occasionally leads to small-scale exposure of the peat surface. Thus, burning should not take place on steeply sloping areas of blanket bog. However, we lack clear data on this but there is plenty of observational evidence to support this view.

MD: Frequent managed burning has been associated with increasing heather cover in some situations but I find it hard to separate the effect of burning from other impacts such as drainage, deposition of atmospheric pollution and grazing. Research from a number of sites, and from studies overseas, shows critical wet heath species (e.g. Sphagnum) are resilient to fire and recover rapidly following low severity burns. In some studies regularly burned areas have higher covers of Sphagnum than unburned areas. Burning has also been shown to enhance the landscape-scale diversity of other lower plants such as lichens. I am generally far more sanguine about the effects of fire use on wet heaths than dry heaths where, though fire is a critical component of their ecology, severe burns are much more likely. Overall, many of our peatlands are derived, at least in part, through human use of fire. Fire management dates back millenia and has always been a part of their ecology. That does not mean current practice, which developed in the Victorian era to produce grouse, is necessarily the best approach in all situations.

3 Should people be concerned about fuel load building up in re-wetted and recovering bogs for which muirburn has been prohibited?

AH: Yes, people should be concerned about this. Even a 'near-natural' peatland can dry out periodically during summer, causing vegetation and peat surfaces to become flammable. A build-up of litter from sedges and other vegetation is natural and the biomass can and will ignite if conditions are dry enough. However, we are only now starting to see projects investigating the impact of fuel load and build up on ignition potential under current and future climatic conditions. Another important issue is that rewetting alone may not inhibit heather growth (and thus the build-up of fuel) as some experiments and sites clearly show. Whilst alternative management, such as cutting, might be an option, we clearly lack basic knowledge about the impacts of this new management option. For example, mowing might leave brash behind, which can also dry out and ignite whilst also causing the release of carbon into watercourses (i.e. cutting may cause water quality and colour issues).

MD: In short, yes. Fire hazard is significant in all peatlands particularly in spring and autumn. Even re-wetted peatlands are flammable during these times and I would describe these ecosystems as "ignition limited" during the autumn and spring. The abundance of fine dead fuels (shrubs, sedges and grasses) means the fuels dry rapidly and become available to burn quickly following rain. In recently restored sites there may be significant heterogeneity in both fuels and, importantly, the moisture content of peat. Additionally, small patches of recovering Sphagnum may be sensitive to burning. Peatland restoration does not happen immediately and sites may be at risk of severe burns as the vegetation and hydrology gradually recovers. Planning for resilient landscapes should mean fire risk is woven into management planning. Sites undergoing restoration will burn eventually. Our goal should be to maximize the fire return interval and resilience to fire – to do so we will need to actively plan and manage for exclusion of fire.

4 How come bog species that are sensitive to burning, such as Dwarf Birch (*Betula nana*) and Rusty Bog-moss (*Sphagnum fuscum*), have been able to survive for thousands of years in near-natural bog that has not undergone prescribed burning?

AH: Natural fires occur over much longer time scales than prescribed burning rotation lengths. Estimates of natural fire return intervals range over several hundreds of years but this depends on site conditions. Such species will have adapted to recover/re-establish over such long periods. Peat core records could provide some insights but we still lack a coordinated assessment of what 'near-natural' peatland actually looks like generally (i.e. considering a wide spectrum of climatic and environmental conditions). Coincidentally, the term 'peat-forming' species is often used. However, it is chiefly the hydrological conditions which determine peat formation. Sphagnum moss can facilitate wet conditions when otherwise not given but clearly any species will form peat if the water table is high enough.

Also, the loss of dwarf birch and rusty bog-moss may be due to factors other than rotational burning. For example, atmospheric pollution may be responsible for the loss of rusty bog-moss on blanket bog sites subject to prescribed burning since such sites tend to be nearer major industrial conurbations than 'near-natural' blanket bogs. Also, dwarf birch may survive better on 'near-natural' blanket bog because such areas are subject to less browsing pressure from sheep and deer (both now and in the past). Unfortunately, however, these covariables have received very little research attention.

MD: If I understand the question correctly, I'd say that though peatlands are resilient to fire, and plants and plant communities have evolved with fire over millenia, that does not mean they will disappear without burning. Unburned bog community composition will differ from areas that are regularly burned. I would not class dwarf birch as particularly fire sensitive (it readily resprouts), but it probably is sensitive to grazing and burning and grazing combined. It is not thought to readily regenerate from seed so frequent burning might gradually shrink clonal patches. Sphagnum fuscum I'm even less certain about – I can't think of any particular reason it would be more sensitive to burning than other, more common, hummock-forming species. It has a fairly restricted distribution globally. A lot more research is needed on the specific fire tolerances and favoured growing conditions for many Sphagnum species.

5 Wildfire could still race through vegetation sticking up out of a re-wetted and recovering bog. What are the consequences for the bog following such events compared to carrying out prescribed burning at intervals?

AH: We can only assume what might happen – several research projects are actively looking at this now. So far, we just don't know. When the moss and herb layer burns during a wildfire, it is likely to be far more damaging than a prescribed burn of the heather canopy. Moreover, it seems surprising, but one detailed fire study showed that a wetter peat can actually burn more easily than a drier peat (within certain ranges); this is due to porosity and oxygen supply. Anyway, if the heat is so high that the peat catches fire, then a 'hot' burn (like those experienced during a wildfire) is clearly much more damaging than a controlled 'cool' burn. People are always surprised about the "Mars Bar" test (i.e. a Mars Bar is placed on the peat surface within the moss layer, which remains intact during a prescribed 'cool burn' fire). This would not be the case during a much hotter and uncontrollable wildfire. Nevertheless, there are times when a controlled burn can get out of control and become hotter (and thereby, damaging to the moss and peat layers). Training and experience is pivotal for a successful 'cool' burn and the benefits it can bring.

MD: What you're alluding to here is the issue of fire severity – the short-term impacts of a fire that govern longer-term ecological effects. That is going to depend on the exact status of the bog post-restoration. It is difficult to make generalizations as factors like fire weather, position of the water table, peat and ground (litter, moss, duff) fuel moisture content, and vegetation composition are all critical. It is possible to have both low and high severity wildfires. In the latter case the effects may be transient – bogs with a high water table and high moisture content in ground fuel layers and good vegetation cover are resilient to occasional fires. Sites recovering from decades of drainage or those that burn during drought and experience more severe burns are likely to take longer to cover. Studies of the very severe fires that burned in the North York Moors during the 1976 drought showed long-term changes in vegetation and limited recovery. In general, we can say that managed burns tend to be of lower severity than wildfires.

6 To what extent do you agree with the statement *"It may be that a more flexible and pragmatic approach to peatland restoration is required and that there is a role for prescribed burning"*?

AH: I agree with this statement in so far as a blanket ban of prescribed burning on UK peatlands is not supported by the evidence. Ideally a more pragmatic approach will be adopted in which burning is tested and compared to management alternatives, and in relation to the current evidence and site context (e.g. topography and wetness). We also need to rethink the 'precautionary principle' (PP) in relation to burning on UK peatlands – if we are going to use the PP, then it should be equally applied to mowing or any other management alternative or the cessation of management (as all have potential negative impacts and risks we need to assess before a general switch). Indeed, it could well be that burning offers advantages under the right conditions (e.g. charcoal carbon sequestration and reduced methane emissions), whilst, in the same location, cutting could negatively impact biodiversity and water quality and rewetting might not offer much flood protection when it's most needed (during the wettest part of the year). We urgently need to know the context-specific consequences of any management decisions we make but in the right context.

MD: Prescribed burning is an ecological management tool. Prescribed burning is not equivalent to, or only associated with, traditional management on sporting estates. Prescribed burning can be used to achieve multiple ecological goals including managing sites to reduce the opportunity for and frequency of wildfires. Prescribed burning, as with any management intervention, has trade-offs. There are benefits for maintaining diversity in habitat structure and community composition and in managing fire risk. There are impacts on soil C cycling and hydrology. It is ecologically illiterate to not consider fire one part of the peatland managers tool kit. So short answer, yes but the balance between costs and benefits of fire use will differ depending on management priorities and site conditions.

7 What research do you think is necessary to get consensus on whether or not muirburn should be part of the bog restoration process?

AH: I think the key is in the evidence. We need to have three joined-up assessments: (i) have an independent assessment of the quality of the evidence; (ii) identify possible management options in relation to the site conditions; (iii) set up a national network of Before-After Control-Impact (BACI) experimental monitoring sites based on the outcomes of the first two assessments, and monitor the impacts of the various management options. All three assessments need the complete buy-in from all sides of the burning debate (scientists, agencies and practitioners). BACI assessments should include simple on-the-ground assessments that are linked to detailed technical assessments (including actual hydrological, botanical and carbon & greenhouse gas fluxes). A clear focus should be on net carbon and GHG budgets, which must both include overlooked aspects such as charcoal and methane emissions. We need an unbiased and well-informed debate linked to robust evidence and reliable data to solve this.

MD: Muirburn per se does not have to be part of peatland restoration but consideration of fire risk management does. There are significant issues, as terms like "muirburn" and "heather burning" are intimately tied up with other controversies such as hunting, raptor persecution, and land-ownership. I think all parties agree on the need to restore peatlands and mitigate the risk of wildfire. That is a common starting point. Unfortunately, the debate is dominated by a few loud voices that selectively use the evidence base and seek to make science fit policy rather vice versa. If you go back to journals from the early to mid 19th century, covering the early days of the Forestry Commission when much land was converted and traditional management stopped, they are full of reports on wildfire issues. Fire is going to be a problem. We should certainly aim to have more diverse, mosaic landscapes but fire is not going away and it tends to be worse when you pretend it's not a problem or part of an ecosystem's story. Talk of banning burning is a depressingly simplistic and ignorant response to a complex issue.

A Wildfire Perspective

From his position as chairman of the England & Wales Wildfire Forum, Simon Thorp provides his perspective of the current thinking about wildfire in the UK.

On behalf of the England & Wales Wildfire Forum (EWWF), the South Wales Fire & Rescue Service organised a very successful conference in Cardiff in November 2019. In view of the wildfires that had occurred in the early part of 2019, the theme of *"Manage the fuel: reduce the risk"* was very topical. There were 190 delegates from 15 countries and this range added to the quality of the presentations and the discussion they generated. It was disappointing that no representatives from UK government departments were able to attend. The next conference is due to take place in Northern Ireland in November 2021.

COVID-19 has affected all activity and has placed pressure on fire and rescue services. To reduce this pressure wherever possible, the requirement to plan and prepare for wildfire is more important than ever. The EWWF has been further promoting the Wildfire Risk Assessment approach in line with the guidance published by the Uplands Management Group , which the Forum helped to produce.

A key area for development is the linkage between wildfire and the management of vegetation. This can be achieved by grazing, cutting or burning; use of herbicide may also be a management option in some situations. Management of the vegetation reduces the availability of fuel, which in turn reduces the intensity of any wildfire and increases the likelihood of the fire service being able to control the fire. The risk assessment approach proposed above will help to identify where and how management can be used to mitigate the wildfire risk.

The EWWF has been encouraging Defra to complete their review of wildfire, which has been in progress since the end of 2018. As a way to highlight the issues that Forum members believe to be important, a Wildfire Statement was drafted and discussed with officials at the Home Office (as the lead department for wildfire in England) and Defra; the Statement was submitted formally to both departments on 26th June. A response to this statement has been promised but has not yet been received. It is being chased. The statement is available on the EWWF website .

The objectives of the Forum include encouraging and facilitating partnership working and collaboration on wildfire issues. In the last 12 months, the general activity of the Forum has included:

- Working closely with other local, regional, national and international wildfire groups to share knowledge, experience and good practice.
- Recruiting new members to the EWWF.
- Providing support for the Wildfire Research Group.
- Supporting the two ongoing research projects that are exploring the development of a Fire Danger Rating System (FDRS) for Scotland and the UK. The lack of an effective FDRS is seen as a significant gap.
- Working with the Met Office to enhance the references to wildfire included in their Daily Hazard Assessment, which is circulated to EWWF members.

It is accepted that the wildfire threat in the UK is increasing. The statistics published by the European Forest Fire Information System (EFFIS) illustrate this. Figure 1 compares the burnt area seasonal trend in the UK for 2020 with the average for the period 2008-2019. This information is backed up by the information published by the Forestry Commission for England . As stated in the box at the bottom of Figure 1, it should be noted that EFFIS only records burnt areas that are greater than 30ha. Many of the UK's wildfires are smaller than this and therefore the total area burnt will be an underestimate. However, the data highlight a clear increasing trend. If it were needed, this should serve as a reminder to everyone that the threat from wildfire is real and is increasing.

The key message bears repeating: in any area it is not 'if' a wildfire occurs, it is 'when'. There is no room for complacency. Everyone with an interest in land, both uplands and lowlands, should have a wildfire plan. For example, in the EWWF Wildfire Statement, it was pointed out to Defra that the full value of the investment of £640m in peatland restoration and woodland planting, which was outlined in the March 2020 budget, would be at risk from wildfire.

Wildfire is an international issue. It is clear from even a cursory inspection of the world's press that thankfully the UK is a poor relation when it comes to wildfire: the threat is much lower than in other countries. Look at the devastation on the west coast of the USA or in Australia to see what could be coming here.

There is a building sense of frustration amongst the wildfire community in this country. Even after the very public conflagrations on Saddleworth Moor and Winter Hill in 2018, which are only two examples of a much wider problem, it is hard or impossible to obtain even passing interest from government. It is difficult to maintain the momentum of voluntary organisations, such as the EWWF, if the knowledge and experience of the members is ignored.

There appears to be an ostrich mentality to the wildfire threat. This must change, before change is forced by more serious wildfire incidents that could kill people.

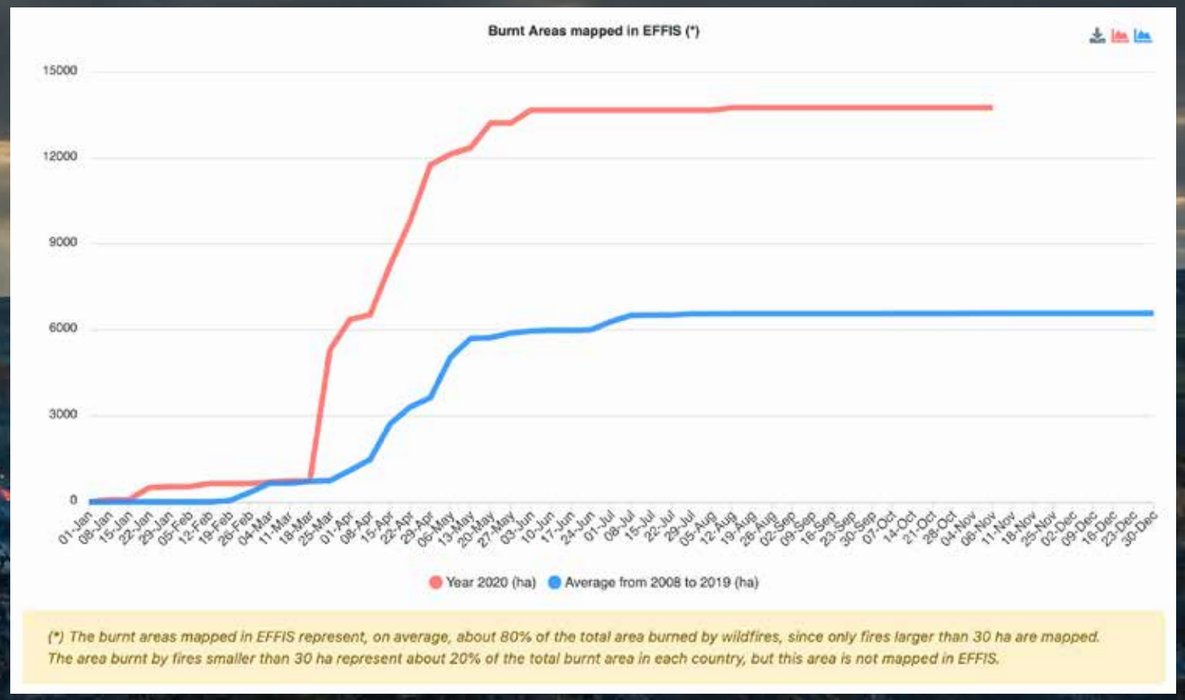


Figure 1 - UK Burnt Areas Mapped in EFFIS

[1] UMG T&F Group 4 - Moorland Wildfire - https://www.uplandsmanagement.co.uk/about1

[2] EWWF - https://www.northumberland.gov.uk/Fire/Wildfire.aspx

[3] https://bit.ly/3mXP44J

[4] https://bit.ly/353ftrH

Following our Moorland Grazing event on 22nd October 2020, each of our three event speakers provide an insight into their own grazing practices.

Christina Williams
The Graze the Moor Project, Molland Estate, Exmoor

The "Graze the Moor" Project on Molland Moor, Exmoor, managed by the Heather Trust, was established in response to my distress at what an ecologist declared was a "catastrophic" decline in heather cover and quality since the 2nd World War but particularly since 1990.

A reduction in stocking rates and swaling permissions had led to a marked increase in gorse, bracken and particularly Molinia [1]. It became apparent that the stocking rates for Molland were determined by research in the North of England where growing conditions are obviously harder. The Estate was keen to manage the vegetation by "match and mouth" rather than "machine or chemicals", a more sensitive toolbox. It must be remembered that the Moor had been heavily designated for its heather moorland, which had been maintained by grazing animals since time immemorial. It is also true that rainfall has increased, disadvantaging the heather.

Coincidentally, it was becoming harder to find farmers willing to stock the Moor; the feed value had deteriorated, the increased scrub made it difficult to manage stock, there was a perception that the moor was uneconomic to stock because of tick diseases and Bovine TB. A further problem was that the Molland farmers had sold their leered stock when the Environmentally Sensitive Areas came into effect, which introduced the 'no winter stocking' rules. The trend in the South West was to intensify the in-bye land with larger beef animals and under grazing could be a problem on the hills.

The project had many elements but the most important was a derogation from the ban on winter stocking with cattle, an increase in permitted numbers of sheep and greater swaling targets. The principle was to swale larger areas to prevent localised overgrazing, in widespread plots to keep the cattle spread out across the moor. These areas were then grazed hard and the heather and other plants e.g. Whortleberry and Tormentil could and did regenerate. This is a process, not an end in itself.

Key to the project was data collection and a peer-reviewed evaluation to provide robust evidence. Information was gathered by extensive vegetation surveys, an aerial photography analysis, on trial plots of Molinia control, stocking numbers and health records. In addition, and very importantly, there was an economic comparison of the low input / low output herd of pedigree Galloway and Welsh Mountain Sheep using the moor and a high input / high output in-bye herd of continental cattle breeds. Interestingly there was little difference in financial performance.

The last eight years have allowed trust to develop between Natural England, the Estate and the farmers, which in turn has allowed us to be more ambitious and experimental; an "outcomes focused" project before the term was invented. We now know the optimum stocking rates and management, with flexibility for weather conditions, for Molland to be an open, "wild", inspiring moor with a mosaic of different trees, shrubs and perennials as habitats for wildlife, not a monoculture of lifeless Molinia or impenetrable gorse. We have demonstrated how important it is to have a place-based environmental plan. Every moor needs different management and, with team-working between local landowners, farmers, NGOs and the statutory authorities, this is achievable.

[1] Molinia caerulea or Purple moor-grass

[2] Leered – stock graze in a particular part of the moor – also termed "hefted"

[3] Term used in the south-west term for 'heather burning'

Campbell Slimon
Breakachy Farm, Laggan, Inverness

Presmuchrach or the 'scrubby field of the pigs' is where our 35 to 40 eight-month old heifers are wintered. It had three townships in the 1600s and 1700s when cattle were the main source of income and the 'tacksman' of the 'Press' was known to be wealthy, indicating a fertile area albeit all over 1200ft (365m) adjacent to Dalwhinnie, the coldest place in Britain.

With the 'coming of the sheep' around 1800, cattle were removed and the townships disappeared. There was plentiful 'draw moss' or 'cotton grass' which was of great benefit to sheep in the spring before the days of feed blocks and 'nuts'. However, Molinia grass was taking over.

The benefit of cattle became evident when son, Archie, introduced Aberdeen Angus and Shorthorn heifers in 2005. They are fed 2kg 18% nuts from November to March, with no hay or silage even during the hardest weather. The sheep returned to the out-lying areas where heather and grass had become rank. The grouse followed, the dung being essential for the young grouse. A cattle beast produces a quarter of its own weight in insects per annum. There is an old Strathspey saying, "When a hill is white with sheep, it is black with grouse." It could equally apply to cattle. There were big numbers of grouse shot in the 1700s when only cattle grazed the hills.

The heifers are sold in-calf to the Limousin at two and a half years old in the autumn. This year they sold to £2,300 and averaged £1,900, a very healthy margin.

Under-grazing is as damaging to heather as over-grazing. On another area of 200 acres (81ha) of rough pasture and heather, which capercaillie frequented, I succumbed to ESA monies in the 1980s and cut back on the length of summer grazing. When reintroduced, the cattle crossed the Spey to get to the shorter sweeter pasture of our neighbour. The weed that is birch got established in heather and we failed to then keep it under control. So instead of an area of heather, we now have useless scrub and no capercaillie! Listen to the farmer!

[1] A tacksman was the leaseholder and Laird's representative in one or more townships, collecting the rents etc. from the sub-tenants.

[2] Press is what we called the Presmuchrach. In Gaelic "press" translates as scrub, "much" translates as pig and "ach" translates as field. ie the scrubby field of the pigs.

Marty and Malcolm Handley
Croasdale Farm, Forest of Bowland

We are tenants at Croasdale House Farm, a 2,500 acre hill farm on the United Utilities Bowland estate. We changed from commercial cattle to pedigree Belted Galloways in 2001, specifically to graze the 2,000 acres of enclosed moorland which is on a SSSI, under the Countryside Stewardship Scheme and since then on the H.L.S and currently C.S schemes. Without the monetary support of these schemes it may not be financially viable to keep these cattle as they are so slow-maturing and don't have a place in the local markets - hence we had to create our own market selling direct from the farm.

The cattle have proven themselves to be selective grazers and at different times of year eat the different grasses that are growing, resulting in the breaking up of the dense undergrowth, enabling the heather and dwarf shrubs to come through. The fell carries cattle and sheep at low levels and another benefit of the cattle grazing is they have opened up the sward to enable the sheep to graze more efficiently. We have moved away from Ivomectin based accaricides for the cattle and this has resulted in the cow pats on the fell housing a fantastic array of food sources for the little birds.

We started off working together with our landlords and a team from the R.D.S, who believed in what we were trying to achieve and they gave us tremendous support and advice. Sadly, over the years, policy and staffing have constantly changed, leaving us not knowing whether we still have a project officer and therefore are struggling to plan ahead to keep things moving forwards. This is a shame as so much has been achieved and we don't want to see the moor to start to go backwards.

The new ELMS has a lot to do. We need to get back to the flexibility and the "working together to achieve" situation again.

We know first-hand it really does work.

Malcolm and Marty Handley

Scotland's Moorland Forum by Hugh Raven

Hugh Raven took over as Chairman of Scotland's Moorland Forum (www.moorlandforum.org.uk) in 2018. The Heather Trust was one of the founding members of the Forum and provides both the Director and Administrator. This article was first published in the September 2020 edition of The Geographer Magazine and is reprinted with the kind permission of The Royal Scottish Geographical Society.

Forums are places for debate. Our forum debates moorland. It's better to talk than to fight and Scotland has plenty of groups with strong views on upland management. We also have a lot of moors. They cover over half of the country.

We were set up nearly 20 years ago to provide a place where organisations with professional experts could air their views and hear and discuss those of others. Twenty-seven organisation belong to the forum. That's a wide range of opinions. We exist to get them together round one table – farmers, crofters, gamekeepers, stalkers, civil servants, anglers, foresters, government agencies, academic specialists, conservationists, national park representatives, landowning bodies, wildlife charities, natural resource managers, water suppliers and regulators.

We are sponsored by NatureScot (formerly Scottish Natural Heritage). From time to time, it and other members suggest ways in which the collective clout of forum members can add value – plotting a course through contested issues, for example, or elaborating areas of common concern, rehearsing the arguments and contested views that will determine future land use policy and priorities. Our overarching aim is to have a sustainable future for moorland through collaborative work.

Organisationally we're in the expert hands of The Heather Trust. NatureScot pays them an annual stipend; the independent Chairman gets a fee and expenses from each member's modest annual subscription. This arms-length approach by NatureScot provides helpful space between the Forum and our sponsor, allowing us a 'critical friend' stance to government and its agencies.

We meet three times a year, once in the field. Our discussions range widely; our June meeting, for example, covered restoring peatland, creating woodland, carbon trading, controlling bracken, hill farming, deer policy and control, wading bird recovery, and grouse moor management.

Our members and sponsor have always had an appetite for more than just discussion. We also produce practical guidance, briefings, advocacy, research reports and surveys. Among our most enduring is *Moorland Management Best Practice* (**www.moorlandmanagement.org**), a portmanteau of expert guidance, drawn from the full span of our membership. Within it is our review of the Muirburn Code, advice on techniques for counting and managing mountain hares, use of medicated grit on grouse moors, heather cutting, peatland restoration, wildcat-friendly predator control, and night shooting. We are keen to increase this range of guidance, considering issues such as fire danger ratings, control of ticks, herbivore impact assessment, and management for raptors. We may have still more to do when the Scottish Government responds to the Grouse Moor Management Review.

Our work on Understanding Predation was born of the need to develop a basis for a common understanding between scientists, conservationists and those who work the land. All agreed that action was needed to stop the decline in populations of sometimes critically endangered wading birds. Our work recommended an adaptive, collaborative approach, linking scientific evidence with the practical knowledge and experience of those on the ground. The Working for Waders Initiative (**www.workingforwaders.com**) was an important output.

Increasing interest in natural capital and changing policies born of EU exit called for a vision statement on future priorities in managing Scotland's uplands. *Valuing Scotland's Moorlands* was our response, where we emphasised the value of healthy moorland habitats, and the benefits to Scotland in climate stability, clean water, employment, food security, wildlife and amenity.

Coronavirus is the all-enveloping current context, with its impacts on the rural industries both extreme and profound. As we rebuild from the standstill, the role of Scotland's moorlands will be central, in climate change adaptation and mitigation, in helping feed us and provide rural jobs and perhaps above all, in nurturing our wellbeing, as places where our people can get into the outdoors.

Uplands Management Group

Simon Thorp has been chairman of the Uplands Management Group, since its formation in 2015. He reports on latest developments and the interaction with Defra's Uplands Stakeholder Forum. It is a role that he will hand over when the discussions about the future of the Group are completed and its role is clarified.

The Uplands Management Group (UMG) in England was established in 2015, as a successor to the Best Practice Burning Group (BPBG); after 39 meetings, many of which had generated enough heat to create combustion on their own, it was time for change. As the last chairman of the BPBG, Simon Thorp was asked to become chairman of the new Group.

The members of the UMG come from organisations that represent practitioners (people who do things); it regards itself as independent and it receives no funding, although Natural England provides the secretariat. The Group aims to develop practitioner guidance and reports from a practitioner viewpoint that cover a wide range of upland issues. The intention is that there is a good link to the Uplands Stakeholder Forum (USF) that Defra runs. The Heather Trust was one of the original member organisations of the USF and has provided strong support for the development of the Forum, which provides an important opportunity for organisations with interests in the uplands to come together, share views, and build consensus.

Towards the end of the BPBG's life, the Group agreed to review the management of blanket bog, to support the delivery of Natural England's Blanket Bog Restoration Strategy. The Group carried out the now infamous series of visits that became known as Bogathon; these visits aimed to establish the management requirements of peatland against the requirements for carbon, water, grouse, farming and biodiversity.

The conclusions from the Bogathon visits demonstrated that valuable, consensus views can be developed amongst a range of stakeholders and this provided the incentive to redefine the Burning Group as the UMG, with a remit beyond issues relating to heather burning.

A key part of the UMG's work was to maintain influence in two directions: to practitioners through its member organisations and a link to the USF to enable practitioner views to be fed into the development of policy. To obtain full benefit from the output of the UMG, the USF must consider the reports and guidance it produces, and use this information to inform policy discussions. In return, the UMG can provide a route for USF concepts to be proofed by uplands practitioners during the development phase. The UMG can also produce guidance to help with the implementation of new policy in terms that practitioners understand.

The UMG has produced a range of guidance and reports but there is a concern that, as these have not been reviewed by the USF, they have not had the consideration they deserve. The Heather Trust has expressed concern about the way the USF has developed, as it is thought to have moved away from its original terms of reference.

The USF was set up in 2014 to provide stakeholders with an opportunity to provide input on upland matters to Defra and Natural England. However, as a result of the frequent changes of the chair and the secretariat, which have taken place as part of structural changes within Defra, the role of the USF appears to have drifted to become more of a one-way briefing opportunity for Defra.

The concerns raised by the Heather Trust have gathered some momentum, and Defra is leading a review of the way that the USF operates. The UMG has a keen interest in making sure that this review extends to forging more effective links between the two groups, so that the UMG output is given the consideration it deserves and the UMG can provide a route for policy discussions to be upland practitioner proofed.

During a recent meeting, the Heather Trust reminded Defra that new policy has no impact until people who manage the land do something different in response to the policy change. Therefore, it is essential that there are effective links between upland practitioners and policy makers, and a two-way flow of views and information. If the terms of reference for both groups are properly defined and an effective relationship is developed, this is where the UMG and USF can help.

From its unique, cross-sector position, the Heather Trust has an important role to play in facilitating the ongoing discussions that aim to improve the way that the UMG interacts with the USF, which will benefit both Defra and rural practitioners.

Working For Waders

Patrick Laurie, Communications Coordinator with the Working for Waders Initiative, provides us with an update on the project's progress in 2020.

It's been another busy year for the Working for Waders Initiative, which brings people together to protect wading birds in Scotland. Alongside a wide range of project partners, the Heather Trust has been heavily involved in the delivery of Working for Waders since the project was first put together in the aftermath of Moorland Forum's Understanding Predation project in 2016.

Collaboration, innovation and direct action on the ground have allowed Working for Waders to punch well above its weight this year, despite many limitations and issues raised by the Coronavirus pandemic. Original project proposals made early in the year were adapted to suit the lockdown conditions when they were imposed at the end of March. Some of the direct farmer engagement work was moved online via a series of events held on social media, and several videos and podcasts were released to build enthusiasm for wader conservation, particularly amongst our technically minded audience of farmers and land managers.

Surveys were piloted to allow farmers to gather their own wader breeding data, and a great deal of work has continued to go on behind the scenes to ensure that our mapping software and information gathering could be streamlined and improved. Later on in the year, a Small Grants Fund pilot was launched to encourage farmers and land managers to undertake practical steps towards wader conservation. It's still too early to say how this process will go, but there was certainly lots of interest from people across Scotland who are willing to get involved and find out more about wader conservation.

The Working for Waders website and social media feeds continue to develop and tick over, so if you'd like to learn more about wader conservation in Scotland, please visit our site at **www.workingforwaders.com**

Does tree planting help mitigate climate change?

Evidence from long term experiments on heather moorlands

Nina L. Friggens, Alison J. Hester, Ruth J. Mitchell, Thomas C. Parker, Jens-Arne Subke, Philip A. Wookey

Dr Nina L. Friggens, University of Exeter, provides a summary of her recent research.

The Scottish Government proposes to increase woodland creation targets from the current level of 12,000 hectares in 2020/21 up to 18,000 hectares per year in 2024/25 (The Scottish Government, 2020). UK-wide policy plans to increase UK forestry cover from 13% to at least 17% by 2050 by planting around 30,000 hectares of woodland each year (Committee on Climate Change, 2020). Deciding where to plant trees is a complicated process, involving economic and environmental considerations, yet these decisions are crucial for the efficacy of tree planting as a climate change mitigation strategy.

Planting trees to mitigate climate change relies on trees to remove CO2 from the atmosphere via photosynthesis and lock it into their biomass. However, trees interact significantly with the soils in which they are rooted. Soil is critically important for carbon sequestration, as more carbon is stored in soil globally than in vegetation and the atmosphere combined (IPCC, 2013). A large proportion of this is stored in soils in Northern and high latitude regions, including Scotland. It has been reported that 34% of Scotland's land area may have potential for woodland expansion (Sing et al., 2013), of which 29% (9.9% of Scotland's land surface) is currently classed as open or dense 'dwarf shrub heath' habitats, such as heather moorlands.

Figure 1. Map of experimental sites used across Northern Scotland by Friggens et al. 2020.

In a recent study we investigated the effects of planting native tree species in Scottish heather moorlands, on organo-mineral soils (Friggens et al., 2020). At multiple sites across Northern Scotland, including in the Grampians, Cairngorms and Glen Affric (Figure 1), replicated stands of birch and Scots pine trees were slot planted with minimal soil disturbance 12 and 39 years previously. We inventoried both

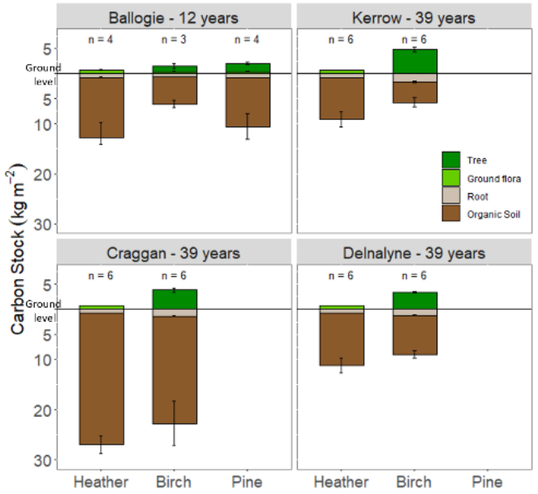


Figure 2. Mean ecosystem C stocks from four sites across Northern Scotland. Roots and organic horizon C stocks are represented beneath the zero-line on the y-axis and tree and ground flora above the line in planted birch and pine plots as well as in un-planted heather moorland ("Heather") control plots.

above- and below-ground carbon stocks and compared them to adjacent un-planted heather moorland control plots. All plots were fenced to exclude large herbivores and muirburn did not take place over the duration of these experiments.

Birch plots planted 12 years previously had 58% lower soil organic carbon stocks compared to unplanted heather moorland plots (Figure 2). Prior to planting, it had been shown that there were no differences in soil carbon stocks between the compared plots. The loss in soil carbon was not compensated for by tree biomass gains over the durations of the study. Therefore, when considering whole ecosystem carbon stocks, both above- and below-ground, planting birch trees led to a net loss of carbon 12 years after planting. In birch stands planted 39 years previously, the carbon sequestered into tree biomass approximately offset the carbon lost from the soil, resulting in no net change in ecosystem carbon stocks (Figure 2). Similarly, Scots pine stands planted 12 years previously resulted in no net change in ecosystem carbon stocks compared to heather moorland control plots (Figure 2). These results show that planting two native tree species onto heather moorlands on organo-mineral soils does not necessarily lead to net ecosystem carbon sequestration 12-39 years after planting.

While these results only show the impact of early stage tree establishment on carbon storage, the timescales here are similar to those for the UK to achieve net zero by 2050. Increased tree cover is a proposed mechanism for helping to meet this target (Committee on Climate Change, 2020) but may not be effective on organo-mineral soils within the stipulated timeframe.

The observed loss of soil carbon is likely to be driven by positive 'soil priming', whereby carbon fixed by plants above-ground and transferred to soils via roots can stimulate the soil microbial community, enabling the decomposition of pre-existing soil carbon stores and releasing CO2 into the atmosphere (Fontaine et al., 2007). This phenomenon has been detected from temperate peatlands to arctic permafrost soils. Indeed it may become a more prevalent mechanism as global temperatures rise, causing increased CO2 release and soil carbon loss in regions with large soil carbon pools and changing plant communities.

Further research is needed to investigate the effects of planting various tree species at a range of densities on contrasting soil types to understand in which ecological contexts tree planting can achieve maximum carbon sequestration. Spatial mapping is also required to identify areas where tree planting will result in net carbon sequestration and areas where it will not. Scotland-wide maps of modelled net carbon storage potential from tree planting, developed recently by Matthews et al. (2020), provide a valuable tool for policy makers and land managers when deciding what and where to plant, based on current knowledge.

Thus far, overwhelming emphasis has been placed on above-ground carbon stocks. However, our findings illustrate the critical importance of measuring and understanding the impacts of tree planting on both above- and below-ground carbon stocks if afforestation is to yield the desired climate outcomes.

References

Committee on Climate Change. (2020). Land use: Policies for a Net Zero UK (Issue January). https://www.theccc.org.uk/publication/land-use-policies-for-a-net-zero-uk/

Fontaine, S., Barot, S., Barré, P., Bdioui, N., Mary, B., & Rumpel, C. (2007). Stability of organic carbon in deep soil layers controlled by fresh carbon supply. Nature, 450(7167), 277–280. https://doi.org/10.1038/nature06275

Friggens, N. L., Hester, A. J., Mitchell, R. J., Wookey, J. S. P. A., & Parker, T. C. (2020). Tree planting in organic soils does not result in net carbon sequestration on decadal timescales. Global Change Biology, 26(9), 5178–5188. https://doi.org/10.1111/gcb.15229

IPCC. (2013). Climate change 2013 the physical science basis: Working Group I contribution to the fifth assessment report of the intergovernmental panel on climate change (T. F. Stocker, D. Qin, G. K. Plattner, M. M. B. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, & P. M. Midgley (eds.)). Cambridge University Press. https://doi.org/10.1017/CBO9781107415324

Matthews, K. B., Wardell-Johnson, D., Miller, D., Fitton, N., Jones, E., Bathgate, S., Randle, T., Matthews, R., Smith, P., & Perks, M. (2020). Not seeing the carbon for the trees? Why area-based targets for establishing new woodlands can limit or underplay their climate change mitigation benefits. Land Use Policy, 97(April), 104690. https://doi.org/10.1016/j.landusepol.2020.104690

Sing, L., Towers, W., & Ellis, J. (2013). Woodland expansion in Scotland: an assessment of the opportunities and constraints using GIS. RSFS Scottish Forestry, 67(4), 18–25.

The Scottish Government. (2020). Programme for Government 2020. https://www.gov.scot/publications/protecting-scotland-renewing-scotland-governments-programme-scotland-2020-2021/pages/2/

Are the UK's peatlands at a tipping point?

The Valuing Nature Programme's Peatland Tipping Point project sought to investigate how changes in climate and how we manage land might lead to abrupt changes, or "tipping points", in the benefits that peatlands provide to UK society. The project identified two potential tipping points linked to climate change and land management. Any future food self-sufficiency strategy that significantly increased grazing in the uplands could lead to an abrupt and potentially irreversible reduction in peat accumulation. There is also evidence that climate change may lead to years where there are very few Tipulids ("daddy longlegs") which could lead to a crash in populations of ground nesting birds (the research focused on Golden Plover primarily), which rely on these insects as prey.

The research found strong support for rewetting and restoration of damaged peatlands (80% of those surveyed), based on climate, water, wildlife, culture and economic benefits. However, there were trade-offs for certain groups, with walkers and cyclists less keen on more boggy, rewetted peatlands. The public were willing to pay £127–414 ha-1y-1, and in a subsequent workshop, peatland stakeholders deliberated a "fair price" of £100 ha-1y-1 for these benefits. The analysis found restoration to be cost-effective (benefit:cost ratio = 1.4-3.5), with more benefits accruing, the earlier restoration is done.

Find out more at:
https://www.peatlandtippingpoints.com/

Professor Mark Reed

New research tells Government what farmers want from new peatland strategy

Professor Mark Reed, Research England & N8 funded Chair of Socio-Technical Innovation, School of Natural and Environmental Sciences, Newcastle University, introduces new research commissioned by Natural England.

As Defra prepares to announce England's largest ever peatland restoration scheme as part of its Nature for Climate Fund, new research commissioned by Natural England from Newcastle University suggests the planned grant scheme needs to ensure that farmers and land managers have the right level of funding and greater control than previous schemes in order to succeed. The new Nature for Climate Fund is expected to be a key part of Defra's delivery of the England Peatland Strategy that is due to be launched later this year.

Professor Mark Reed from Newcastle University, who led the research, said, "Payment levels will need to increase substantially if the new scheme is to attract significant numbers of new entrants, and reflect the value of public goods we enjoy in society from well managed peatlands."

"Overly prescriptive policies feel condescending at best and manipulative at worst. Therefore, policies need to target the competent majority, giving them flexibility to use their expertise to deliver outcomes that fit with local circumstances, and with training and support given to those who need it."

While money is important, the research showed that land managers are also attracted to schemes for other personal and social reasons, for example if schemes enable them to collaborate with others, contribute to their local community or engage in activities that increase their sense of personal connection to the landscapes they manage.

Dr Regina Hansda, who conducted interviews and workshops with land managers across England, explained, "Land managers need to feature in the forthcoming England Peatland Strategy in ways that feel consistent with how they see themselves, for example as custodians and innovators, or diversifying into schemes that enhance their natural assets, rather than as park rangers who are saving the climate. Policies that appear to ask people to change their personal values and beliefs create instinctive opposition."

The research also suggested that the private sector could play a more significant role in paying for peatland restoration if Defra's new scheme is designed to leverage investment from companies and investors interested in mitigating climate change. There has been a significant growth in interest from the private sector in natural capital schemes over the last year, with no sign of recession slowing this down. The researchers suggested it would be crucial to work with people who are known and trusted by the land management community, to explain the risks and benefits, if significant amounts of private funding are to reach these often remote communities.

The research was part of Natural England's Peat Pilots programme, researching and testing policy options for the England Peatland Strategy in Dartmoor, the East Anglian fens, Greater Manchester Combined Authority, Cumbria and Northumberland, and the North York Moors. Naomi Oakley, Principal Advisor for Natural England, leading the Peat Pilots project responded to the research: "This report has provided important evidence that has informed the development of a peatland strategy and grant scheme that will be attractive to land managers and so help us deliver our net zero emissions targets."

Clifton Bain, Director of the International Union for the Conservation of Nature's UK Peatland Programme commented: "In the face of environmental emergencies we urgently need a green recovery where peatlands are properly valued and appreciated. This report shows that with the right level of public and private funding support, managing the land for healthy peatlands will be seen as an asset by land managers and wider society.

"We have the opportunity now to shape our future in a way that avoids the costly impacts of damaged peatlands and sets a new long term future where managing land sustainably becomes the default option."

Amanda Anderson, Director of the Moorland Association, said: "I congratulate the authors of this report for getting properly under the skin of real farmers and land managers in our uplands and understanding what motivates them.

"By harnessing the innate passion and drive of grouse moor owners and sheep farmers to leave their moor in a better condition for the next generation, coupled with their specialist knowledge and sense of place, peatland restoration at a landscape scale and pace is very achievable. Red tape needs to be cut away and clunky systems streamlined putting the land manager at the heart of decision making."

Read the full report here: **https://eprints.ncl.ac.uk/268895**

Peatland management values in the Yorkshire Dales

Kirsten Lees, a post-doctoral research associate at the University of Exeter, provides an insight into her research on understanding the values people place on our upland peatland landscapes.

I and my project team are developing a new social science method to understand and compare the values that different people have when it comes to managing their peatland landscapes. We will test this method in participant workshops in the Yorkshire Dales next year.

In 2018 I attended a discussion run by the Heather Trust on the challenges facing the future of upland management, and I was struck by the diversity of reasons underlying the different perspectives that were shared. I have worked in peatland research for over five years, and I am keen to connect my work on physical peatland processes with an understanding of the issues experienced by the people managing these landscapes.

Policy makers are moving towards encouraging peatland restoration, but this course of action can be controversial. Reasons behind resistance to restoration can range from practical considerations to fears of losing traditions. On the other hand, reasons for welcoming restoration can include new environmental payments, and a desire to support rare plant and animal species. I wanted to develop a method to understand which considerations are most important for land managers.

The project partner organisations are the Heather Trust, and the Yorkshire Peat Partnership (a peatland conservation and restoration group). The project team also includes Dr Rachel Carmenta, of the University of East Anglia, who has previously used social science methods to understand the values affecting peatland burning in Indonesia, and new researcher Olivia Brightling.

Early in 2020 the project partners met in Skipton to discuss how best to approach this project, our research questions, and our method. We decided to use a technique known as 'Q-method', where participants are asked to sort and rank a range of statements in response to a question, in order to quantify the values that different people hold in relation to a particular issue. We explored the diverse values that were shared in the 'What are Britain's Uplands for?' discussion series, and in other conversations, and distilled those values into a set of approximately 50 statements. These statements represent values related to peatland management, including ecosystem services, cultural traditions, and economic viability. The statements bring out different aspects of moorland management, such as field sports and hill farming, and consider how changing management might alter the mix of vegetation and the appearance of the landscape as well as its uses. Asking participants to rank these statements in response to a scenario and a specific question will enable us to build up a picture of the most important considerations for land managers.

We hope that this work will be useful for policy makers and conservation organisations to understand why restoring peatland landscapes may not always be a popular management choice. We would like to find areas where the values of land managers, conservationists, and policy makers are aligned, and in doing so to contribute to ongoing conversations on this topic.

We were initially hoping to run workshops with land managers in the Yorkshire Dales in June 2020, but that plan was affected by Covid-19, and we are now hoping to run these events sometime in the spring of 2021. If you are a land manager (farmer, gamekeeper, or landowner) working on peatland in the Yorkshire Dales, and would be interested in participating, please do get in contact (**k.lees@exeter.ac.uk**).

PURPLE PAGES

ECOLOGICAL SURVEYORS

GIFT IDEAS

Boreland Farm
W www.borelandfold.com

Fearann Eilean Iarmain Estate
T 01471 833332
E hotel@eileaniarmain.co.uk
W www.eileaniarmain.co.uk

Hepple Gin
E hello@hepplespirits.com
W www.moorlandspirit.co/

Perilla
T 01886 853615
E info@perilla.co.uk
W www.perilla.co.uk

LEGAL ADVICE

Lindsays
T 0131 229 1212
E edinburgh@lindsays.co.uk
W www.lindsays.co.uk

MOORLAND MANAGEMENT ADVISORS

MOORLAND MANAGEMENT CONTRACTORS

Rouden Pipetek Ltd
T 01403 275276
E mail@rouden.co.uk
W www.rouden.co.uk

PEATLAND RESTORATION

Dinsdale Moorland Specialist Ltd
T 01729 840088
E moorland@dinsdale.co.uk
W www.dinsdale.co.uk

Peatland Action
W www.nature.scot/peatlandaction
E peatlandaction@snh.gov.uk

Please mention The Heather Trust when responding to these adverts

The Heather Trust

Sustainable, Resilient Moorland

Become a Member

Your membership of The Heather Trust will help us to work towards our vision of sustainable, resilient moorlands for the benefit of everyone.

MEMBERSHIP TYPE & FEES

ANNUAL MEMBERSHIP	
Member	£50
Estate Member	£120
Gamekeeper/Student	£20

LIFETIME MEMBERSHIP	
Standard	£750
Couple	£1,000
Aged over 55	£500

Join today

Visit: **www.heathertrust.co.uk**
or telephone: **01387 723201**