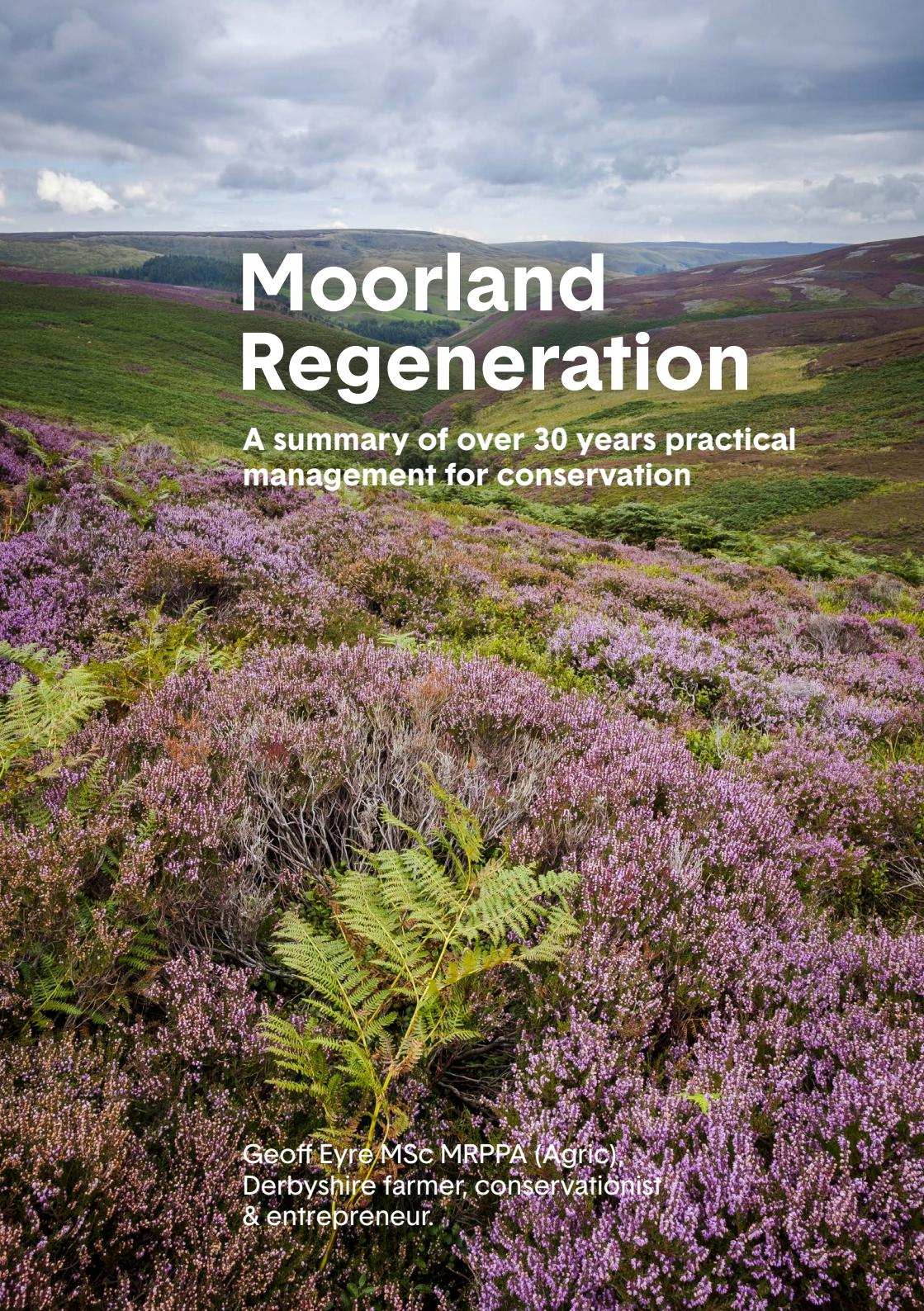




Moorland Regeneration

**A summary of over 30 years practical
management for conservation**

**Geoff Eyre MSc MRPPA (Agric),
Derbyshire farmer, conservationist
& entrepreneur.**

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Introduction

Geoff Eyre farms and is also semi-retired from an agricultural merchant business in the Hope Valley in the Peak District. He is a qualified agronomist (still getting CPD points at 73 years of age!). He has lived and made his livelihood in the Peak District Uplands his whole life, through the family business knowing most of the local farmers – their farms, fields, and all the local moors.

Geoff was awarded an Honorary MSc Degree from Liverpool University in 2005 for Moorland restoration ecology in recognition of his proven, practical work.

In 2005, he won the prestigious Purdey Award for Game and Conservation for his Howden Moor regeneration work in the Peak District National Park and an English Nature National award.

Geoff sits on the Uplands Management Group where he tries to get his points across based on practical experience, but which seem too often be ignored in favour of preconceived models derived from desk studies.

He first became hands-on with large-scale moorland management when he met his wife over 50 years ago and began to help her father look after 6,500 acres of leased moor; undertaking the heather controlled burning to 'spread sheep', repair the tracks etc. In 1990, Geoff took on the sporting lease when his father-in-law retired, at the same time the JNCC (Joint Nature Conservancy Council) supported a new scheme, called the Environmentally Sensitive Areas (ESA). Its main aim in the region, being to stop the loss of heather from the area (large areas had been removed after the war and turned into grass pastures or arable).

* <https://willameyre.co.uk/>

In his own words...

At the time, MAFF ran the scheme and it was widely adopted by farmers /landowners. The National Park wanted to oversee running the scheme, but local farmers didn't support this, given their view of the poor management seen on the National Park's own moors. ESA payments required increased controlled burning, basically to 'spread the sheep' and so stop localised overgrazing, and in the early days even paid for draining the moors to help grow heather. The other reason was that the moors represented a fuel- load hazard and during the 1980s uncontrolled wildfires were occurring too often. The scheme was well taken up, although the prescribed 10% burnt annually only ever reached 1% or 2%. Burning in those early years required very dry days, as farmers and landowners only had old paraffin wick lighters that restricted them to only around 10 days a year and the size of burns had to be no wider than 30 yards so restricting the amount that could be achieved in a day – even employing up to 10 people I only ever achieved just over 2.0%.

I then developed a way of increasing burning days using fuel assistance to get a fire burning (similar to drip torches used in Australia) this more than doubled our available days and the fires were not as hot, only burning the leaves off the plant, leaving carbonated stalks (now seen as a carbon plus).

'Cool burning' in
practice – note
the remaining
snow cover



The proof is in the unmelted Mars bar!



For doubters, the accuracy of the descriptor 'cool burning' can easily be proven by placing a Mars bar level with the peat surface before setting off the burn – afterwards the Mars bar can be retrieved unmelted. I'd be happy to demonstrate the same with a Minister's or official's mobile phone...

I called this 'cool burning' (see photo above) and it became accepted across the UK moorlands by other farmers and keepers as a safer way to control burn. It took around 5 years of effort to 'spread the sheep' to see localised grazing reduced plus it safeguarded the moors from wildfires. *NB. I have never had a wildfire under my management.*

Along with the ESA prescription was a requirement for bracken reduction and the request to increase heather, which I got hooked on as an agronomist /farmer such that it became a crop challenge. I began to use agricultural methods to control species-poor monocultures and started harvesting heather seed with my farm workshop purpose-built equipment for spreading later on prepared areas.

Success was increased when I found smoking the seed increased germination and, when combined with refining methods, I could grow heather within 4 years on species poor *Molinia* /Bracken /*Nardus* and *Rush*. I initially regenerated over 4,500 acres in the Peak District between 1993 -2006, showing up from satellite pictures as the largest vegetation change in the area.

Given my proven formula and methods, interest came from across the UK – mainly from privately owned moors and, with increasing seed harvesting facilities /cleaning I was able to see 10s of 1000s of acres 'going purple' annually. I estimate that I have been responsible over the years for over 500 square kilometres seeded in this manner (not far off the area of the Isle of Man) – although it has largely been undocumented). In the late 1990s, I started using moss spores to sow and 'capsulate' the prepared ground as it was a good 'blotting-type' medium to germinate seeds of various heath varieties (although English Nature decided mixed heath / berries was better). I used sphagnum on wetter areas, ferric moss on drier areas and they both saw fast seed germination.

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The ESA scheme began to like moss growing and I treated many areas to see good initial growth over well-prepared ground which had to have been burnt first, otherwise spores never set and grew (I will return to moss later).

In the late 1990s, I was asked by a major water company, then called **North West Water** (now **United Utilities**) if I could re-vegetate bare peat that was leading to serious run-off into streams and causing blockage problems downstream. It was a task I gave a lot of thought to and started with pH tests that showed tests down to 2.4 pH, so I suggested adding lime. There was hesitation until they realised it was

“
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simply Calcium Carbonate that they were adding to drinking water briefly. I then took various seeds (of 40 species) and small bags of lime in rucksacks with a friend high up the moors and seeded rows along with various amounts of lime, returning to see results of each species weeks later to get a suitable mixture and balance that would grow and create a root structure and so stop the peat blowing. First go was on 60 acres and I got a helicopter to apply lime and I then ground-spread the seed mix. This work was undertaken on Arnfield (now managed by RSPB). I used the local farmer's shed for storing and when I returned weeks later he was ecstatic that I had greened his moor – something he said they'd tried for years and failed.

The neighbouring moor owner then asked me to do a larger area next to a moor called Stalybridge and my method worked there too. Sadly, both burnt out in 2018 during the wildfire that actually burnt more bare peat. Natural England policies had stopped controlled 'cool' burning on my restored areas – in my view a critical error and factor, as seen in the media coverage, with the army having to be called in to put out the resulting wildfire. From my experience and evidence, revegetating bare peat is a simple exercise and my pioneering methods have been used by various authorities – albeit at a far greater cost (£4K a hectare extra), as they use imported heather-brashings flown in by helicopter to give seed protection where I used just ground wheel markings to give protection and moisture.



© Raymond Hennessy

Hen Harrier in flight

Recently, sphagnum and rewetting have become the 'ecology flavour of the month' for the moors. Where there is a peat depth of over 400mm, it is classed as a 'blanket bog'. However, the rewetting can only be achieved where moorland drainage 'grips' are blocked – as these are few and far between on Peak District moors, the term rewetting is basically false for 90%+, as only rainwater is available. There has now been a move to construct dams across natural flood gulleys in a quest to stop flooding. These the proponents claim can hold back water by just over an hour after heavy rain, '*slowing the flow*' downstream. The downfall of this theory was obvious after several hours of rain, the dams were continually full and so with another downpour, it went straight down off the hills even faster (the water flows over the dams faster than through the previously vegetated gulleys).

* <https://www.gwct.org.uk/policy/briefings/driven-grouse-shooting/moorland-drainage/>

It is also claimed that this so called rewetting will stop wildfire spread. Yet when its dry for a period the whole moor dries out – including the dams and blocked gulleys. As seen at Darwen Moor*, where a wildfire took out 400 dams and destroyed all the planted sphagnum and heath plants. The iconic Hatfield lowland moor took no notice of the so-called wetness and burnt for days after a long dry time. Nature has a way to bite back and all these preconceived ideas have failed. In my view, it's time to go back and study proven, local methods of controlling wildfires

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The rewetting at Darwen Moor that was supposed to stop wildfire

* <https://www.bbc.co.uk/news/uk-england-lancashire-53098483>



Carbon sequestration value – heather compared to sphagnum

Having grown more sphagnum than most, I consider it as a useful plant, but not that good at storing carbon compared to most moorland plants – indeed, heather takes some beating as a carbon sequestering plant. I grew some sphagnum to eight years old and weighed a square metre's worth; after full drying it amounted to only 250 grams of dry matter. I then weighed a square metre of adjacent eight-year old heather I had grown, which weighed in at 3 kilos, I then burnt the leaves off the heather and reweighed it, losing only 500 grams and so still leaving 2.5 kilos of carbonated stalks.

I am awaiting University laboratories to re-open so we can work out how much carbon is in 250 grams of dried sphagnum and how much is in 2.5 kilos of stalks, as it's ten times the weight and the sphagnum just seems like greenish powder and hardly carbon.

I would suggest that the best combination must be like I treat my moor, when cool burning the fire still leaves all the moss layer untouched to stop peat drying out, and getting rid of heather leaves allows sunlight and so rootstock green growth recovery. I believe my method of controlled 'cool burning' is carbon negative and mitigates against large wildfires. Perhaps I could qualify as a 'carbon farmer' and get paid for my work!

Where the wild fires have occurred most

Contrary to official, accepted 'wisdom' and expectations, most of the recent large wildfires have been on so-called natural blanket bog wetted vegetation i.e. Marsden Moor, Crowden, Darwen, Dovestones.

“
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speak of?”

That is hardly surprising given the policy to allow biomass build-up seen year-on-year since Natural England took over moorland management control, with reduction of grazing and controlled burning. In my view, we are seeing the damaging results due to their policy, one which has put the Peak District Moorlands into carbon-deficit for decades.

I can now grow moorland plants more resilient to fire, replacing volatile Molinia areas with not just heather, but various other grasses, heath species, and even sphagnum that increase wildlife and biodiversity. There is no need for a Molinia, Nardus or bracken highly flammable landscape. There are millions of hectares that could be fire resilient and

full of various flora and fauna. Yet all I see is fuel load increase and the fear of wildfires the size not seen in previous living memory.

The popular press picks up on blaming the use of disposable BBQs (which, of course, should be banned in such dry conditions), but surely it bears questioning and proper thought that just one such BBQ was capable of burning over 3000 acres of an NGO 'rewilded' wetted moor that had no firebreaks to speak of?

It is a concern, rather than something that I'm proud of, that I have apparently the only moor in the Peak District with an active wildfire mitigation policy in place.

Home grown
sphagnum being
smothered by
cranberry, five
years from initial
seeding



Putting the PR in peat – neither economic or practical!

There has been a rush to grow sphagnum from plants with some areas costing £100K per hectare to achieve quicker visible results, which are then promoted in glossy brochures and on websites to gain more funds using the 'carbon' catch-word. In my experience, (as possibly the first person to grow acres of the moss) it can do well on prepared ground for up to five years, but after ten years most has been smothered out by other plants growing out of it – a fact, which is ignored and so millions are being spent without watching trials or considering my years of work. This vegetation growth is also very burnable in a dry time.

I have watched with wry interest, amusement and some frustration as peat attracts more funding, more labour, more conferences and larger committees – yet the methods used on the ground are rather poor (economically). Certainly in comparison to practical, agricultural terms, with hand application hugely labour intensive and costly, when modestly adapted farm machinery can do the job. I have even seen a hand plug-planting area of cotton grass at £30 pounds a sq m (£300K a hectare) when it can be easily grown from seed for just £100s per hectare. To cap it all, I have witnessed the highest biomass growth ever seen, followed by the greatest loss of moorland through wildfires in the Southern Pennines – taking the carbon balance sheet into the red for decades. To date, I have witnessed no active work on firebreaks putting more of the past good work into jeopardy

I certainly agree that all peat should be revegetated and that the blocking of previous "man-made "drainage ditches is a must. However, both are basic agricultural operations which can and could be better carried out by local farmers and contractors, paid fairly for the job – and not requiring a retinue of form-filling officials or superfluous, costly marketing. As a practical farmer, familiar with agricultural operations, I was able to regenerate a 1000 acres in my spare time in just one season – with no office staff and half a side of A4 specifying the instructions and desired results.

If 90% of the funding for work went directly into the local upland community with 10% spent on the essential administration and oversight, that would deliver the job faster, effectively and more economically, whilst also sustaining a vibrant upland community.

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In conclusion – prioritise proven solutions, recognise practical ‘on the ground’ know-how

If 90% of the funding for work went directly into the local upland community with 10% spent on the essential administration and oversight, that would deliver the job faster, effectively and more economically, whilst also sustaining a vibrant upland community.

To prevent future, large-scale wildfires, Government should introduce legislation for Wildfire Risk Assessments to be mandatory on all burnable vegetation areas and with a size-limit imposed (requiring firebreaks). It should also be required that moorland managers and those undertaking the operations, should have proven, practical knowledge, some form of a controlled burning certificate, and several years of experience. It is plain, and evident from the recent

disastrous wildfires, that theoretical knowledge is not sufficient, with office-based, laptop-managers demonstrating little or no idea of what will actually burn in varying weather, growth conditions.

Those choosing to ‘rewild’ moorland areas should be required to apply for a permission licence and take out insurance cover to pay for Fire & Rescue Service assistance and costs when the inevitable wildfire happens.

Projected climate change impacts will inevitably bring longer, intense dry spells and so national government and local authorities need to rethink fashionable practices that have demonstrably failed to curb, indeed have exacerbated or even caused wildfires, whilst ignoring proven, effective traditional practices. There has recently been too much theoretical-ecology founded viewpoints and guidance, supported at best by just a few academic papers, but without acknowledging or also referencing available agricultural university knowledge and the practical work of the specialists (farmers, landowners) in Upland land management.

The RASE motto, Practice with Science is one that would be wise to follow. The law of unintended consequences catches everybody out at times, but at least farming communities pass on their knowledge and experience verbally and through the generations. Unsurprisingly, very little is published in academic journals, but it’s none the less relevant for that.

Government and Natural England should accept and recognise that they have the finest moorland fire-fighting team already on-hand in the upland areas, comprised of experienced keepers, hill farmers and



landowners. Many of whom, have shown in recent years that fires can be contained when they work as a fast-response team. Tens of 1000s of additional acres could have burnt without their quick assistance in the Peak District alone. The ELMS scheme should recognise and reward these on-the-ground specialists for supplying this public service and good. The focus should be on grassroots environmental management by those with the direct experience and local knowledge of and love for the moors, rather than unproven theoretical 'management' designed by distant officials working to theoretical, computer-based models.

Recently our local area formed a 'farm cluster', now with over 40 members and it is hugely encouraging to see the eagerness they all show for co-operation in enabling environmental advances and improving the state of nature. If the new ELMs is to be successful, then farmers need to be directly involved and indeed 'back in the driving seat' – otherwise it will be a failure.

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I urge the Government and relevant authorities to give serious study to my 'cool burning' methods and examine the results in detail. Cutting as an alternative has failed to create effective firebreaks, as the cut material readily burns when dry. In contrast, most of the smoke resulting from my cool burning method is white – that is mainly steam. I have probably seeded and grown more moorland species than most and can confidently say that no moorland plant / moss / lichen need be classed as rare – given they will grow where conditions are right.

My Molinia/Bracken/Nardus and Rush to mixed heath areas are seen as the most advanced in the UK and each site sees a 100-fold wildlife increase – including attracting Hen Harriers* back to the Peak District for the first time in 140 years, which have nested on my restored areas on four occasions. The moorland I manage in partnership with the National Trust, even attracted a wandering Bearded Vulture* – so I must be doing something right! There are over two million acres of poor quality Molinia, Nardus, bracken (also carcinogenic) left that, with proper management and the incentives and encouragement to do so, could support myriad species and more effectively sequester carbon.

I would gladly take a group of interested politicians, senior policy and decision-makers, and open-minded conservationists willing to see and hear the proven facts from a practical farmer and lover of the uplands out onto the moorland I manage and have regenerated. Indeed, a group of walkers I spoke with recently commented that my Abney Moor was the best in the Peak District – it does indeed look 'wild' and as nature intended, but in fact is is a carefully, highly managed landscape.

Thank you for reading the above.
Geoff Eyre

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Mill Farm House, Brough, Hope Valley.

*It is regrettable that some 'conservationists' chose to use the lost vulture to make entirely false allegations about bird of prey persecution on Howden moor, which I lease from the National Trust. I do not and would not countenance any such persecution or illegal activity. Of the 21 alleged cases those same 'conservationists' have cited more generally over 2012 -18, I am not aware of any resulting in a prosecution by the police and being an actual, proven case of persecution. At least one of the claimed cases has been shown to have been a faked 'set-up'.



Bearded Vulture ©Jiri Zuzanek

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My Molinia/Bracken/Nardus and Rush to mixed heath areas are seen as the most advanced in the UK and each site sees a 100-fold wildlife increase – including attracting Hen Harriers back to the Peak District for the first time in 140 years, which have nested on my restored areas on four occasions. The moorland I manage in partnership with the National Trust, even attracted a wandering Bearded Vulture – so I must be doing something right!

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Edited from Geoff Eyre's original draft by Robin Maynard, who has worked over the years for a number of conservation and land-care organisations, including Friends of the Earth, the Forestry Commission, Soil Association and the Wildlife Trusts.

N.B.: I was fortunate to be taken on as a general labourer at William Eyre & Sons by Geoff during my University vacations, and learned a great deal about farming and the countryside from a practical farming point of view that has stood me in great stead over the years.

Appendix

Bracken (*Pteridium aquilinum*) – concerns and control methods

Bracken is encroaching our uplands at a rate just over 5% annually. This is of wider concern than just the spread of an invasive plant or habitat change. Government officials refer to 'clean water' coming off our uplands, but rarely mention the fact that bracken produces a toxic emulsion called Ptaquiloside that can get into our water supplies, as well as its spores being known to be carcinogenic in certain years. Bracken is also a great host for ticks, which cause Lyme Disease. In terms of habitat and landscape change, its dense canopy supports few birds and impedes public recreational access.

I have spent the last few years using my agronomy skills to control and convert bracken into a more useful habitat on my own and other moors. I have tried various agricultural methods, despite many scientific papers stating that it is virtually impossible to fully control bracken. It is certainly a challenge! But I can now say after 8 years that I have eradicated it (where I wanted to) from over 300 acres replacing it with mixed grasses, heath species and various mosses and lichens resulting in a significant increase in wildlife: from bees, butterflies and other pollinators, to many bird species including skylarks, pipits, curlew, lapwing, stonechat, whinchat, wheatear and even a rare and beautiful ring ouzel, as well as upland brown hares. I have been told that my bracken restoration work is now the most advanced in Europe, if not the World!

If we saw just 10% of bracken nationally cleared and restored in the same manner to more diverse, moorland vegetation there would be a consequent rich flush of fauna and flora.

Previous governments have wasted millions of pounds trying to control bracken and after a few years without follow-up it will reinvade, putting all that money and effort to naught. In contrast my methods work, but attention to detail and repeated, if less than initial, efforts are required. By doing so, an additional benefit for society downhill would be water catchment areas cleared of this obnoxious plant and its potential to pollute our drinking water.

The best agronomy program for controlling bracken that I have found to work requires the use of **controlled burning** – which is also key to establishing other plant species to grow from seed and so for restoring that rich, thriving biodiversity.



“

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Top: Harvesting initial supply of Sheeps sorrel seed using a lawn mower

Middle: The same harvested seed then growing on cleared bracken beds as a nurse crop also to prevent erosion

Bottom: Heath Bedstraw on cleared bracken beds as a pioneer nurse also to prevent erosion

I decided to concentrate on full monoculture bracken and control burnt it off during a dry period and even burnt again up until the end of the burning period to **remove as much debris as possible**, but without causing any significant damage to the surface of the underlying peat soils. I would then allow sheep to wander about the burnt areas until the bracken regrew - which it did with vigour, as burning is a growth stimulant for many plants and seeds. By late July to early August that regrowth of bracken was at its highest and I then sprayed it with approved chemicals (Asulam and glyphosate) using a high water rate and horizontal rain jets (vertical crop sprayers are designed to reach the lower weed layer) so as to ensure the expensive spray only hit the foliage.

The glyphosate sprayed green bracken changes to a brown colour into the Autumn and when dry was then burnt off again. The asulam treated areas could also be burnt early Spring. Once the bracken debris was thoroughly burnt off, the cleared ground offered an ideal seedbed for applying a fast growing 'nurse crop'. Initially I used *Ferri Moss* spores, but found that crows and other corvids would disturb it looking for grubs, so moved onto using: *Deschampsia Flexuosa* (Wavy Hair Grass); *Galium Saxatile* (Heath Bedstraw) and *Rumex Acetosella* (Sheep's Sorrel). These 'nurse crop' species also help stabilise the ground on steep slopes.

I then applied various plant seed mixes onto the nurse crops. On one area, applying just a native upland grass mix for grazing, but across most of the resown area I used a heath mix, containing ten different varieties. The nurse crops soon began to reduce as the other species grew and out-competed them. In my view and experience, the cleared ground prepared as described above, could have grown whatever plant was required - especially if lime was used, even supporting landscaping with tree copses and wild flowers.

The key to full bracken reduction was (and is) to follow up by controlling any returning fronds, taking up to four years of effort (manual on steep areas). The glyphosate treated areas saw the best follow up reduction as spot-spraying early fronds turns them brown, making it easy to go again in the Autumn to control the second growth of later fronds.



Top: Geoff's sprayer on a soffrac. It can also spread seed in water and can cover 20 metre bouts (Derbyshire word for width) covering 25 acres an hour using satellite navigation assistance

Middle: Early seed harvester adapted onto a grounds-care tractor

Bottom: Home made seed harvesters very efficient after 5 models before

I have no hesitation in stating that, over the decades in which I have managed moors, one of the objectives has been to support grouse – and support them so as to achieve a resilient population able to provide a harvestable surplus for sustaining seasonal shooting. But that is far from my only motivation: so too are creating the ideal habitat for a wide variety of moorland species, alongside supporting sufficient grazing for economically viable flocks of sheep, whilst enabling access to and maintaining a historic landscape that many people adore – and for all of those, most importantly whilst ensuring minimal risk of and mitigation against uncontrolled wild-fires. Those are all key drivers and objectives for me. As I know, they are for most moorland owners, upland farmers, and managers.

But grouse are the catalyst to enable all those 'public goods' to be delivered and afforded. At my age (73), I will probably never shoot another grouse on my own moor, but I am proud that through my management the resident population has increased from handful when I took it on to over a hundred birds today. I fear that when I stop actively managing the moor that population will decline to none, as the suitable habitat is overgrown. That would be a great tragedy for the UK's only wholly native bird, one which is found nowhere else but in the UK's upland moorland.

