

• ISSUE 01 •

Moorland Conservationists

The Untold Story



Inside: mountain hares, curlew, lapwing, golden eagles, merlin, black grouse, cotton grass, ring ouzel, juniper and more...





Joe Dimbleby
Game & Wildlife
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Welcome

This collection of case studies aims to raise awareness of moorland conservationists, whose efforts and achievements often go unheard. For these land managers, moorland management is about much more than grouse. They regard themselves as practical conservationists who care greatly about the wildlife and habitats they look after.

Their stories show that, with the right approach, it is possible to combine thriving local communities with a productive countryside and the preservation of our precious heather moorland and its biodiversity. They demonstrate how, free to use their expertise in decision making and given the right kind of advice and financial support, private land managers are ideally placed to deliver a range of public goods.

I would like to thank all the land managers for inviting us to visit their projects. I hope you enjoy reading about these inspirational individuals as much as I enjoyed meeting them and discovering how they look after some of our rarest wildlife and most spectacular landscapes.

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*The actions of moorland
managers are the last
bulwark in what is a
crisis of species decline
across Britain*

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Foreword by

Richard Benyon

Former Environment Minister

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The story of the management of Britain's uplands is remarkable. As these case studies show, it is a story of generations of skill and knowledge, combined with modern technologies and science. Our moorlands provide incalculable services for every single person in these islands. They provide clean water, lock up carbon, protect homes from flooding and are home to an extraordinary number of endangered species. And yes, they lift our spirits and heal us when we are sick in mind or body.

As this book shows, they are managed by people who care not just for the here and now but for the generations to come. There is an institutionalised view that only the state can protect the natural environment. But what is happening in our uplands is a vast injection of private finance that is protecting flora and fauna. More than that, the actions of moorland managers are the last bulwark in what is a crisis of species decline across Britain.

The thread running through the stories you will read here is uplands being managed for game shooting, particularly driven grouse. The story here is that if those who want to end driven grouse shooting ever succeed causing the work and investment you read about here to stop, it would be the greatest calamity for the biodiversity of our uplands. This is not just a hunch. It is an opinion backed by top quality scientific research done by the Game & Wildlife Conservation Trust and by the knowledge and passion of those you will read about in this book.



© Chris McAndrew

Richard Benyon

The Game & Wildlife Conservation Trust

An evidence-led organisation



On the complex and often controversial issues involved in moorland management it is vital that policy is based on science. The GWCT employs 22 post-doctoral scientists and 50 other research staff with expertise in birds, insects, mammals, farming, fish and statistics and it is not afraid to change its advice based on new findings from its peer-reviewed research. As a result of this evidence-led approach, statutory bodies including Defra, Natural England, Scottish Natural Heritage and Natural Resources Wales have based much agri-environment policy on GWCT research. The Trust is also responsible for a number of Government Biodiversity Action Plan species and is lead partner for grey partridge and joint lead partner for brown hare and black grouse.

As the UK's leading independent wildlife research charity, the GWCT is uniquely placed to incorporate the pioneering approach of private land managers into national conservation policy. For more than 80 years it has worked closely with farmers and gamekeepers to publish ground-breaking science, including some of the longest running farmland wildlife monitoring projects in the world. In addition, the Allerton Project in Leicestershire and Auchnerran demonstration farm in Aberdeenshire allow research to be applied in the context of real farming businesses.

Past experience has shown that where funds are more specifically targeted, and land managers respond voluntarily, rather than through compulsion, with the benefit of good advice, better outcomes can be achieved. Specialist knowledge is a key ingredient for success, and the GWCT's advisory service provides practical advice across the UK on how to manage land with the aim of increasing biodiversity.

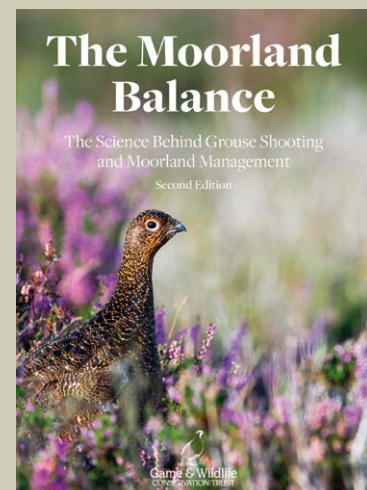
Few organisations have the same degree of trust from land managers established over generations, and with ever greater pressure on the countryside to produce food, and deliver a range of public benefits, the future of our wildlife depends on that trust.

Find out more about the GWCT and support us at www.gwct.org.uk

Further Reading

Several of the GWCT's areas of scientific study in the uplands are referred to in the Research in Practice panels throughout the case studies collection. For more information on our projects and scientific research, visit www.gwct.org.uk.

The science behind grouse shooting and moorland management is explained in the new edition of the GWCT's *The Moorland Balance*. Based on research by the Trust and other organisations, it includes chapters on heather burning, mountain hares and raptors with references to more than 200 scientific papers. To order a copy, visit gwctshop.org.uk.



Mountain hare heaven

Upper Donside's blue hare population is booming. Grouse keeper Alex Jenkins shares the secrets of success

Estate Facts

Location: Donside, Aberdeenshire

Type of farming: sheep and beef

Acreage: 15,000 acres (12,850 moorland, 1,200 pasture, 700 woodland)

Funding Grants: Agri-Environment Climate Scheme

Conservation measures: fencing, extensive grazing, cattle grazing, muirburn, predator control, scrape digging, tree planting, wild bird mix, drain blocking, hare and wader surveys

Conservation in Numbers

100 percentage of estate in conservation

230 mountain hares counted in two tetrad squares

38 pairs of breeding curlew counted on Edinglassie

170 pairs of breeding waders counted on Edinglassie

“We’ve always had a lot of mountain hares. It’s a success story for us,” said Alex Jenkins, headkeeper on the 15,000-acre Edinglassie estate in Upper Donside, Aberdeenshire. Alex attributes their flourishing number to two main factors: good habitat and the predator control carried out as part of his grouse management. This tallies with the wider picture in North East Scotland where in spite of their range shrinking nationally, mountain hare numbers are 35 times higher on driven grouse moors compared to unmanaged areas.



Alex Jenkins on part of the moor where serpentine rock produces rare habitat.

In particular, hares benefit from the new heather growth after managed burning. Muirburn plays a vital role in the management of Edinglassie, which is a mix of dry heath and wetter moor at altitudes of up to 2,500ft. Controlled burning is an essential tool to rejuvenate heather moorland, huge swathes of which were lost after World War II through commercial forestry and over-grazing. In Donside, entire moors were covered in non-native commercial plantations, which support very little wildlife. The current trend in the Cairngorms National Park is for planting native woodland, and Alex is concerned that it might lead to the loss of more heather and mountain hares

with it. He said: “It’s important to remember that the majority of Europe’s upland heather moor is found in the UK. These moors were designated SSSIs largely because of the habitat and wildlife preserved by grouse management, so these techniques need to be maintained to keep them in good condition.” Indeed, today’s conservation successes at Edinglassie are a continuation of the work of previous keepers, in particular Alex’s predecessor, Derek Calder, who retired in 2016 after 28 years and put in place much of the estate’s conservation infrastructure.

“Mountain hare numbers are 35 times higher on grouse moors”

As well as afforestation, moorland suffered from being drained for agriculture in the post war drive for food production. A common misconception is that this was done for grouse. In fact, the reverse is true and like most grouse moors Edinglassie has been filling in its ditches, creating 150 dams last year alone. Regulating the intensity of sheep grazing is another essential element in restoring the heather and other moorland plants on which hares, grouse and other threatened wildlife depends. Alex said: “Historically the sheep roamed where they liked and plants got hammered, particularly along the hill fringe and around the gates. Now the estate is farmed virtually all in hand, the number of breeding sheep has been reduced to about 2,500 on 12,000 acres, and they are kept off the hill in the winter.” The grazing regime benefits heather and other moorland plants. The parts of Edinglassie within SSSIs are overall in ‘favourable maintained condition’ including the Green Hill of Strathdon, which features rare serpentine rock and supports important native grasses such as black spleenwort, common scurvy-grass and mossy saxifrage.

Conservation management at Edinglassie is supported by other agricultural businesses run by its owner Charles Pearson. Alex said: “Charles’ mindset and mine are similar in that everything we do here has to be for the benefit of wildlife. We are fortunate that he has profitable farming enterprises in other parts of Aberdeenshire that underpin the work done at Edinglassie.” The interdependence of the sheep farming and grouse management is key to delivering the conservation

At Edinglassie a reduction in grazing has seen a recovery in the moorland plant species including juniper and heather.



goals, and the system provides vital employment in what is a Least Favourable Area (LFA) for agriculture. Alex said: "A lot of people who live in Upper Donside are directly or indirectly connected to the estates. My wife works at the local shop and we have two kids at the village school. At one point there were only 21 pupils, a large proportion of which were children of keepers or shepherds."

In addition to supporting grouse and mountain hares, the habitat management at Edinglassie provides suitable breeding ground for several red-listed bird species at risk of extinction elsewhere in the UK. Alex said: "In this part of the world we are bucking trends on waders, which are stable or increasing on Edinglassie. This spring we counted 59 pairs of nesting lapwing, 66 oystercatcher and 38 of curlew. There are probably more successful breeding pairs of curlew in Upper Donside than in the entire country south of Birmingham. The National Park Authority acknowledges the work grouse managers do for waders, and we are part of the RSPB Grampian Wader & Wetland Initiative. However, there is a tendency to think habitat can solve everything. It is essential to create the right environment, but there's no point, if all the chicks get eaten."

"There are more breeding curlew up here than there are south of Birmingham"

Mountain hares, like ground-nesting birds, appear to benefit hugely from the predator control carried out to help chick survival. One study showed that foxes account for up to 90% of hare predation. On Edinglassie and neighbouring estates, stoats, weasels, crows and foxes are kept to a level where other vulnerable species including curlew, lapwing and black grouse have a chance of survival. However, Alex believes some protected predators may be inhibiting the recovery of other species. He said: "We have zero tolerance of wildlife crime on this estate and are proud of the many species of birds of prey we have at Edinglassie. Golden eagle, sea eagle, hen harrier and peregrine falcon are regular sights and we have breeding pairs of buzzard, goshawk, sparrowhawk, kestrel, merlin, tawny, barn, short and long-eared owls. But some protected species are having such an impact on everything that it's difficult to watch. With ravens it's not so much the adult pairs; it's the juvenile flocks of 50-60 birds that appear in spring. They work a hill face together and devour large numbers of ground-nesting bird chicks in a



Cattle grazing has been increased to improve the grassland for waders, which prefer a mix of tussocks and short grass.



Mountain hares thrive on the new growth of moorland plants stimulated by muirburn, which leaves the peat layer intact.



Alex has recently dug several scrapes or shallow pools for waders. The shallow muddy areas allow chicks to forage for invertebrates.

Wildlife Highlights



Red Squirrel

© Laurie Campbell

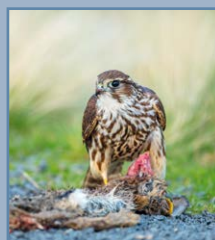


Black Grouse

© David Kjaer



Osprey



Merlin

© Tarquin Millington-Drake



Curlew

© Laurie Campbell



Freshwater Pearl Mussels

single day. The irony is that we have been granted licences to control ravens to protect sheep, but when one is granted to help an endangered species like curlew, Scottish Natural Heritage is subjected to intimidating abuse and ultimately withdraws it. What's the point in having a licensing system, if a licence is unobtainable?"



A black grouse lek site on Edinglassie. The number of leks in Upper Donside is increasing thanks to the efforts of grouse managers.

The challenges of conserving grouse and other moorland birds does not end with predation. In recent years, despite the estate's best efforts, it has lost species that are suffering dramatic national declines, including capercaillie and grey partridge. In addition, ticks, and the louping ill virus (LIV) they carry, have greatly increased across Scotland. Edinglassie used to be tick free but now has a serious problem. Alex believes tick have spread partly due to reductions in grazing. In the past, sheep were regularly dipped with insecticides, which would kill any ticks attached to them. Sheep still play a very important role in mopping up and killing ticks, but Alex is sure that the parasites and LIV remain the biggest limiting factor in grouse recovery. He said: "Three out of five neighbours did not have a surplus of grouse to harvest this season and it's the same across Donside. I think it's the increased tick burden combined with four years of very poor spring weather. Tick is a big issue for wildlife conservation. I've seen curlew chicks completely covered in them. It seems no-one but grouse moor managers are trying to tackle it. We need to get the message to a wider audience." Mountain hares also suffer from tick, which transmit infections harmful to humans such as Lyme disease. To reduce the impact of tick borne diseases, a certain number of hares are culled each year, all of which go to local game dealers.



Alex keeps meticulous records of mountain hare in order to monitor the population. The new counting system promises to be more accurate.

Looking ahead, along with other estates in Upper Donside, Alex has begun to count mountain hares at night using the new system developed by the GWCT and the James Hutton Institute (see panel). The counts and locations are meticulously recorded and will prove an invaluable tool for monitoring population health of mountain hares in the long-term. Edinglassie will see additional conservation projects taking shape in the coming years and Alex hopes the current proposals for licensing grouse moors don't threaten Edinglassie's conservation successes. He said: "I'd like to reach a middle ground where we have a system of accreditation rather than licensing. The problem with the latter is it could lead to innocent land managers being wrongly accused of wildlife crime, benefits to wildlife being lost and keepers losing their jobs and homes. We recognise there are areas that need to improve, but all sides of the debate should be looking for common ground and recognising the positives. The new generation of keepers understand that their role is no longer simply to manage grouse. They see themselves as working conservationists."

Sheep play a vital role in mopping up and killing ticks.



GWCT Research in Practice

Hare counting



Dr Nicholas Hesford
GWCT Senior Research Assistant

A new study, published in 2019, examined mountain hare counts from 2001 to 2017 undertaken at 76 sites across north-east Scotland. We found that mountain hare abundance was up to 35 times higher and either relatively stable or increasing on driven grouse moors compared to moorland not managed for driven grouse shooting, where declines were 40% per year in some areas. It is likely that the control of predators and habitat management carried out by keepers may improve mountain hare survival and reproductive success.

One of the difficulties in studying mountain hares is that they are notoriously elusive and difficult to count. However, in 2018 a project by The James Hutton Institute and the GWCT, which aimed to determine the best method for estimating numbers, concluded that night time counts with a spotlight were likely to be the most reliable and cost-effective. The GWCT set up workshops for land managers to receive training in the new method and, aided by the Scottish Gamekeepers Association and Scottish Land & Estates, developed a members' questionnaire to update the mountain hare distribution map. Following a fantastic response, the new map will be the most extensive yet and will enable us to assess 20-year changes in range.

A champion for curlew

Tom Orde-Powlett is determined not to see curlew disappear on his watch and is hoping to host a pair of hen harriers



Estate Facts

Location: Bolton Castle Estate, Wensleydale, North Yorkshire

Type of farming: sheep, beef and dairy

Acreage: 12,500

Funding Grants: HLS, Forestry Commission, Yorkshire Dales National Park

Conservation measures: on the moor: cool muirburn, predator control, bird surveys, protection of water catchment, woodland management, hedge and tree planting, tagging curlew. In the valley: extensive grazing, low input grassland, fencing, predator control, winter feeding, overwinter stubbles, feeders, corrugated iron shelters, cover crops and beetle banks

Conservation in Numbers

41 curlew colour ringed

180-acre farm managed for curlew

5,500-acres in HLS

200% increase in bird species since 2007



Had it not been for driven grouse shooting, Bolton Castle's iconic heather moorland and the wildlife that depends on it would have been lost.



Tom Orde-Powlett is committed to helping his local curlew population.

Tom Orde-Powlett is involved with a wide range of conservation projects on his family's estate at Bolton Castle in Wensleydale, North Yorkshire. The 12,500-acre estate includes 6,000 acres of upland grouse moor run by Tom's father Lord Bolton. The remainder is made up of 23 tenant farms averaging 260 acres with a mix of sheep, beef and dairy, much of which supplies the local Wensleydale Cheese Creamery. Some permanent pasture and wildflower hay meadows remain alongside the silage fields, which make up the majority of the cropping regime.

Tom's interest in conservation started at a young age and grew from his love of country activities. He said: *"I've always loved fishing and grew up dreaming of having salmon and otters in the river, which we now have. The management of the fishing put me in touch with the Rivers Trust and we've worked with them and the Environment Agency on the Ure recovery project, which has been incredibly successful. Contrary to the global trends, our wild salmon are increasing."*

When asked how much unpaid work Tom does for conservation he replied: *"After a time the real interest starts to become the management. Last season I probably fished for two hours but spent several days working on the river bank coppicing some ancient woodland. If you asked my wife she'd say 'far too much!'"*

"I don't want to be part of the generation that loses the curlew in Wensleydale"

Tom's current conservation focus is the curlew, which is globally threatened and since 1970 has declined 64 per cent across the UK, 97 per cent in Northern Ireland and 80 per cent in Wales. Bolton has one of the remaining healthy populations of both breeding and overwintering birds left in the UK.

Tom said: *"My step-grandfather came up here a few years ago and we drove over the moors in spring listening to the calls of the curlew and he was close to tears saying this is what his native Shropshire used to be like only 40 years ago. I don't want to be part of the generation that loses the curlew in Wensleydale."*

Last April, a 180-acre farm known to support a good population of curlew and lapwing came back in hand and Tom engaged GWCT advisor Jennie Stafford to develop a conservation plan. The farm presents some challenges. The drainage is largely blocked so it's wet, which is great for waders, but most of the boundaries will need to be repaired before they can plan a proper grazing regime to deliver the desired fauna and flora. There is also a mole infestation, which are a serious problem in the Dales. Tom explained why it is an example of a clash between modern farming methods and conservation, whether hay or silage: *"When a cut is taken, any earth picked up contaminates the crop, making it useless, so farmers usually chain harrow the ground to get rid of the molehills. This is fine in most places, but not here where we have ground-nesting lapwing, curlew and skylarks, so we need to find a way round."*

In addition to the farm and hosting an annual Curlew Conference to bring stakeholders together, Tom has teamed up with the British Trust for Ornithology, Jill Warwick of the local Nosterfield Nature Reserve, and licensed canon netter Robin Ward of the International Wader Study Group to tag some of the overwintering birds. So far, they have managed to colour mark 41. Of these, 28 have been re-sighted post 2016 breeding season, one of which was also seen with two chicks on the moor, just eight kilometres from its winter roost.

Another essential pillar of curlew conservation is control of generalist predators such as foxes and crows. At Bolton this is carried out by the gamekeepers who are employed by the grouse and lowland pheasant shoots run by Tom's father:

Tom explained: “The benefits of keeping were definitively proven by the GWCT’s Otterburn study. If driven grouse shooting ended, predator control would stop and there would be no future for any ground-nesting birds in the uplands. Across the country you would be looking at hundreds of thousands of curlew, lapwing, golden plover, merlin, ring ouzel, all disappearing, over the next 30 years.”

Tom believes there is much common ground between non-shooting conservationists and the shooting community because the vast majority on both sides want to see a healthy balance of predator and prey. The divergence is often about where that balance lies and the current controversy surrounding hen harriers is a case in point. He explained: “I couldn’t be more positive about having a pair of hen harriers nesting at Bolton, but I would be terrified of having a colony because it would make grouse shooting unviable, and when we could no longer afford to employ keepers, all the vulnerable prey species like curlew and golden plover would be lost.”

The brood management trial launched in 2019 by Defra allows qualified experts to see if chicks can be successfully removed and captive-reared then released away from the donor estate in nearby suitable habitat. Tom sees it as a solution to the conflict. He said: “I wish more of the debate about hen harriers and brood management had focused on curlews. Predation of curlew chicks has played a huge part in their decline, and brood management is a fantastic way of protecting our remaining strongholds of vulnerable waders, alongside increasing the numbers and range of hen harriers. I am absolutely confident that we can have sustainable populations of curlews and hen harriers, but both will depend on gamekeepers maintaining their habitats and controlling predation.”

“Brood management is a fantastic way of protecting our remaining strongholds of vulnerable waders”

For Tom, rather than being in conflict with conservation, driven grouse shooting is actually driving it. He said: “The irony is that moors were designated SSSIs because of their management as grouse moors. It is thanks to 150 years of keeping that they look as they do and support such a range of wildlife. In the '80s

it was only grouse shooting that protected these uplands from forestry, and if they ever become woodlands it would be bye bye waders! Simply stamping SSSI on something won’t help the wildlife in itself. Someone’s got to actively manage it.”



© Laurie Campbell

Tom believes brood management can increase hen harrier numbers.

Tom explained that when the estate first entered HLS in the early '90s a lot of traditional moorland was being lost, so Natural England’s emphasis was on increasing heather cover. It is now agreed that a more varied habitat with patches of heather, sphagnum moss and white grass is preferable. Management at Bolton changed accordingly with tree planting in ghylls, controlled grazing, and burning only the tops of the heather (cool burn) and in smaller patches so the sphagnum can be allowed to grow where it would otherwise be stifled, eventually producing more peat. It has taken more than 20 years but it’s starting to bear fruit, with greater areas of moorland coming into ‘favourable condition’ every year.

The impact on birdlife is striking. A breeding bird survey has been done on the same grid square since 2007 and the number of bird species has increased by over 200% from 13 to 40 and total birds of any species from 87 sighted to 444, including curlew, red grouse, golden plover, lapwing, snipe, woodcock and oystercatcher. As well as wading birds, the moors are host to many raptor species, including short-eared owls, kestrels, merlins and peregrine falcons. Tom said: “People often see more birds of prey on a day of driven grouse shooting than almost anywhere else and it isn’t unusual to see red kite, hen harrier, buzzard and peregrines on the same day.”

Wildlife Highlights

• red listed • amber listed * wintering only



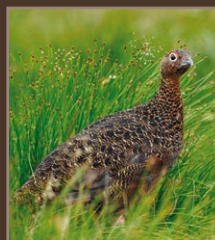
Lapwing •
Curlew •
Snipe •

© Mark Hamblin



Ringed Plover •
Woodcock •
Redshank •

© Ekaterina Chemetsova



Red Grouse •
Ring Ouzel •
Pied Flycatcher •

© Laurie Campbell



Hen Harrier * •
Merlin •
Kestrel •

© Laurie Campbell



Short-eared Owl •
Tawny Owl •

© David Mason



Water Vole
Otter



The small patches of cool burn are visible on the hill. These act as firebreaks and different heights of growth provide ideal habitat for moorland birds.

Despite putting up signs asking people to keep to the footpath and dogs on leads, those who ignore the countryside code pose a serious threat to birds. "If birds are being disturbed on the nest frequently when it's cold and they leave for too long, the eggs or chicks will chill and die." However, Tom recognises that improving public access to the countryside is essential and welcomes walkers to the moor. He said: "I've stopped to talk to hundreds of walkers over the years. The vast majority understand the work that goes in and want to celebrate what a beautiful place it is and how many birds they've seen. We leave our shoot lunch hut open for walkers to take shelter and we've had some lovely comments."



An area of cool burn where the top has been burned off the old heather. This method can be used to restore sphagnum moss.

GWCT Research in Practice



Managing for waders

Jennie Stafford
GWCT North of England Advisor

Pasture management is very important for waders. If stocking densities are too high during the early spring, eggs risk being trampled; conversely, if the stocking densities are too low, the grass can become too tall for waders to nest happily. Sheep grazing while chicks are very young can be useful as predators often mistake sheep droppings for lapwing chicks, thus camouflaging the chicks. The presence of cow muck is useful as foraging areas for chicks once they are a little larger due to the large number of insects it attracts.

Once we had assessed every field on the holding based on a combination of visits and survey data, we were able to identify areas of the farm where future management should focus on providing the best possible habitats for waders. This will incorporate grazing calendars, rush management programmes and fertiliser limits. We investigated the possibility of managing these measures through Countryside Stewardship Mid-Tier options. Such a targeted approach allows fields that are not suitable for breeding waders to be farmed more conventionally. For example, they can be grazed by livestock and cut for silage without seasonal restrictions.



Signs warn dog walkers about disturbing waders in the breeding season.

Looking ahead, Tom would like to see a return to a less polarised situation on both sides of the driven grouse debate and a more collaborative relationship between conservationists and the people who work the land for the benefit of curlew and other wildlife. For everyone involved it's got to be about genuine collaboration. "You've got to be able to go and have a pint and listen to each other's points of view. Tension soon breaks down and you discover a joint passion for birds and so much knowledge to share."

The Heather Doctor

How Geoff Eyre has restored the UK's precious uplands with a mastery of invention



Farm Facts

Location: Derbyshire

Type of farming: sheep and arable

Acreage: 1,200

Funding grants: Walling Grant

Conservation measures: on the moor: bracken and grass control, moorland flora restoration, cool muirburn, predation management, bird surveys, protection of water courses. In the valley: woodland management, hedge and tree planting, feeders, wild bird mixes, pollinator mixes

Conservation in Numbers

40 square miles of moorland restored

40 upland plants cultivated

69 pairs of curlew

38 pairs of ring ouzels

G Geoff Eyre likens his moorland restoration work to gardening on a grand scale. Over 30 years he has pioneered methods of collecting the seeds of upland native plants and sowing them, single-handedly restoring more than 40 square miles of wild moorland to its former glory. This has been mostly done in his 'spare time' alongside running his 200 acres of farmland, the 1,000 acres of grouse moor he bought in 2012 and the family business, an agricultural merchants, which has been operating in Brough in Derbyshire's Peak District since 1885. Growing up in the stunning surroundings of the Hope Valley he developed a passion for wildlife: *"I love being out on the moor. From a very early age I'd be off for hours of adventures on the hills."*

After the war, the drive for food security meant many of the Peak District's privately owned moors were sold to local farmers and cleared for agriculture and forestry. During this period, more than 20 per cent of England's historic heather moorland was lost. The National Trust (NT) became a big landowner in the park in the 1950s, and in the late 1980s there was a call for moorland flora to be restored, backed by public funding in the form of MAFF and Joint Nature Conservation Committee's Environmentally Sensitive Areas programme. Geoff rose to the challenge, setting to work on 5,000 acres across the Peak District, including the National Trust's Howden Moor, on which he still rents the shooting rights.

He said: *"In one case what is now the United Utilities company asked for help with a large area of bare peat damaged by wildfire. The soil was too acid for anything to grow so we dropped lime on the area by helicopter and then as a trial we sowed strips of everything from turnips to sunflowers. I planted fast growing rye grass in one area and no-one believed it would*



Geoff Eyre on his moor with a restored area beyond the bracken.

work but within a few weeks there was a patch of bright green like a lawn on the hill. People said you shouldn't grow grass on the moor, but it was to establish a soil structure for the heather to follow and it worked."

A self-taught engineer and inventor, Geoff applied the same principles to moorland restoration as you would to agriculture. By adapting existing agricultural machinery, he developed a special harvester, which even incorporates discs normally used to separate pizza trays that pre-clean the seed. Once cut, the heather is processed at Geoff's farm supplies business where a series of custom-built machines separate the seeds. After discovering that fire stimulates heather germination, Geoff extracted a liquid chemical from heather smoke using water-cooled radiators acting as condensers. The seed treated with the extract went from 5 to 80 per cent germination. In all, Geoff has managed to cultivate 40 different moorland plants, including the microscopic spores of sphagnum moss, and was awarded an honorary doctorate by Liverpool University for his work.



Growth returns on a burned patch after one year. Geoff helped develop the 'cool burn' technique, which enables burning in winter.

Gathering the seed is only the start of the process, getting it to establish is another challenge. Geoff has applied a deep understanding of moorland ecology and agronomy learned from years of practical experience to develop a range of fascinating techniques, from harvesting sorrel seed on the hill with a Flymo to covering clay pellets in sphagnum spores so they can be cast using a fertilizer spreader.

To establish a seedbed, herbicide is used to clear monocultures of molinia grass, or bracken, which provides little in the way of habitat, is inedible to livestock and produces carcinogenic spores. Geoff then scatters the seed, a mix of plants such as heather, cotton grass, bilberries, crowberry, native cranberry and deschampsia grass. He has also discovered that certain plants make good pioneer species by forming a platform for others. For example, deschampsia protects young heather from extremes of weather while it gets a foothold and

Left: Reseeding has achieved a balance of heather, grasses and berries.



sphagnum provides an ideal bed for berry species, while sheep sorrell works well after bracken. The results are spectacular. Vast expanses where barren swathes of bracken or molinia grass held sway are transformed into colourful mixes of different hues of heather, varieties of grasses and the magical sight of red and blue berries growing through the extraordinary sponge-like structure of the sphagnum.



Harvested seed stored at Geoff's farmers suppliers business.



Tiny heather seeds separated from the brash and ready for sowing.

Once the habitat is restored, the wildlife returns with insects, reptiles and many of our most loved and threatened birds including curlew, ring ouzels, lapwings, skylarks, dunlins and golden plover in abundance. On one 1,500-acre piece of restored moorland, in 11 years bird counts went from six to 1,000 with the highest density of lapwings in the area, 38 pairs of ring ouzels, 69 pairs of curlew and good numbers of white hares as well as several species of birds of prey.

“Sphagnum recolonises large areas and forms carbon-capturing peat”

The work of maintaining habitat for specialist moorland birds continues through grazing regimes. In the 1980s headage payments led to overgrazing and a lot of heather was destroyed. Today, the number of sheep on Peak District moorlands has been reduced by two thirds, but it is a delicate balance and Geoff feels it may have gone too far the other way. He said: “The reduction in sheep is a concern, as grazing helped create natural firebreaks and good nesting areas for rare birds.” The ancient stone walls that criss-cross the Peak

District are to keep the sheep in, and on his own moor Geoff employs a stonewaller who is restoring these important parts of Derbyshire's rural heritage.



Deschampsia is a perfect pioneer plant, providing a platform for the heather (inset).

As well as grazing, the other key management technique is controlled burning or muirburn, which rejuvenates the heather and other plants, including peat-forming Sphagnum moss. Geoff said: “In my experience, Sphagnum only spores after fire, allowing it to recolonise large areas and eventually form carbon-capturing peat.” By burning between October and April when the earth is damp and cold, grouse moor managers avoid fire getting into the underlying peat or soil and destroying the heather they are trying to preserve. About 30 years ago, Geoff developed a variation of this method known as ‘cool burn’, which enabled burning earlier in the year when it's wetter and so safer. Cool burn involves cutting a fire break strip around a small patch of older heather and getting a line of fire to travel across without spreading beyond the edges. This technique results in regrowth of heather from root stock in the first year and is now used on most of the UK's grouse moors. He said: “To demonstrate how effective it is, I bury a Mars bar at ground level. The burn goes over in a matter of seconds, singeing off the heather without even burning the wrapper or melting the chocolate, so you can imagine that the peat and mosses underneath the heather remain unharmed.”

Wildlife Highlights



Curlew
Jack Snipe
Common Snipe
© Dave Kjaer



Ring Ouzel
Meadow Pipit
Whinchat



Short-eared Owl
Kestrel
Merlin
© David Mason



Mountain Hare
Brown Hare
© Scott Newey



Lapwing
Woodcock
© Dave Kjaer



Grey Partridge
Red Grouse
© Dave Kjaer

“I bury a Mars bar at ground level, the burn goes over in a matter of seconds”

The heather on Howden (above) is part of 5,000 acres restored by Geoff.

This form of burning is not only controllable; it also creates a series of firebreaks across the moor, which will be vital as the threat of wildfires grows. In addition, the ATVs that gamekeepers have specially adapted for managing cool burn can be employed in the event of a wildfire when normal fire engines are not capable of getting on to the moor or have to clock off at night due to safety regulations. For this reason Geoff is concerned the current reduction in a careful muirburn regime in the national park could lead to devastating fires in the future. He said: *“In 1993 four local grouse moors were designated SSSIs because of the wildlife produced by the management system. Natural England (NE) recognised the benefits it brought. Since then it seems NE and the National Parks Authority have moved away from grouse management and there is a danger that all the work will be undone, putting wildlife at risk.”* The 1992 Rio Convention on Biodiversity ratified the global importance of UK heather moorland. Its open vistas, stunning colours and unique wildlife are much loved the world over. In the future, Geoff hopes grouse managers like him will again be encouraged in their efforts to maintain this precious habitat and the threatened species that depend on it. In the meantime, he is looking forward to restoring more of the moorland plants and repairing the stone walls on his own moor. His advice to fellow conservationists: *“Like gardening, you have to like solving problems and be prepared to persevere!”*



One of the many stone walls being repaired on Geoff's grouse moor.

GWCT Research in Practice

Muirburn study

Dr Sián Whitehead
GWCT Uplands Scientist



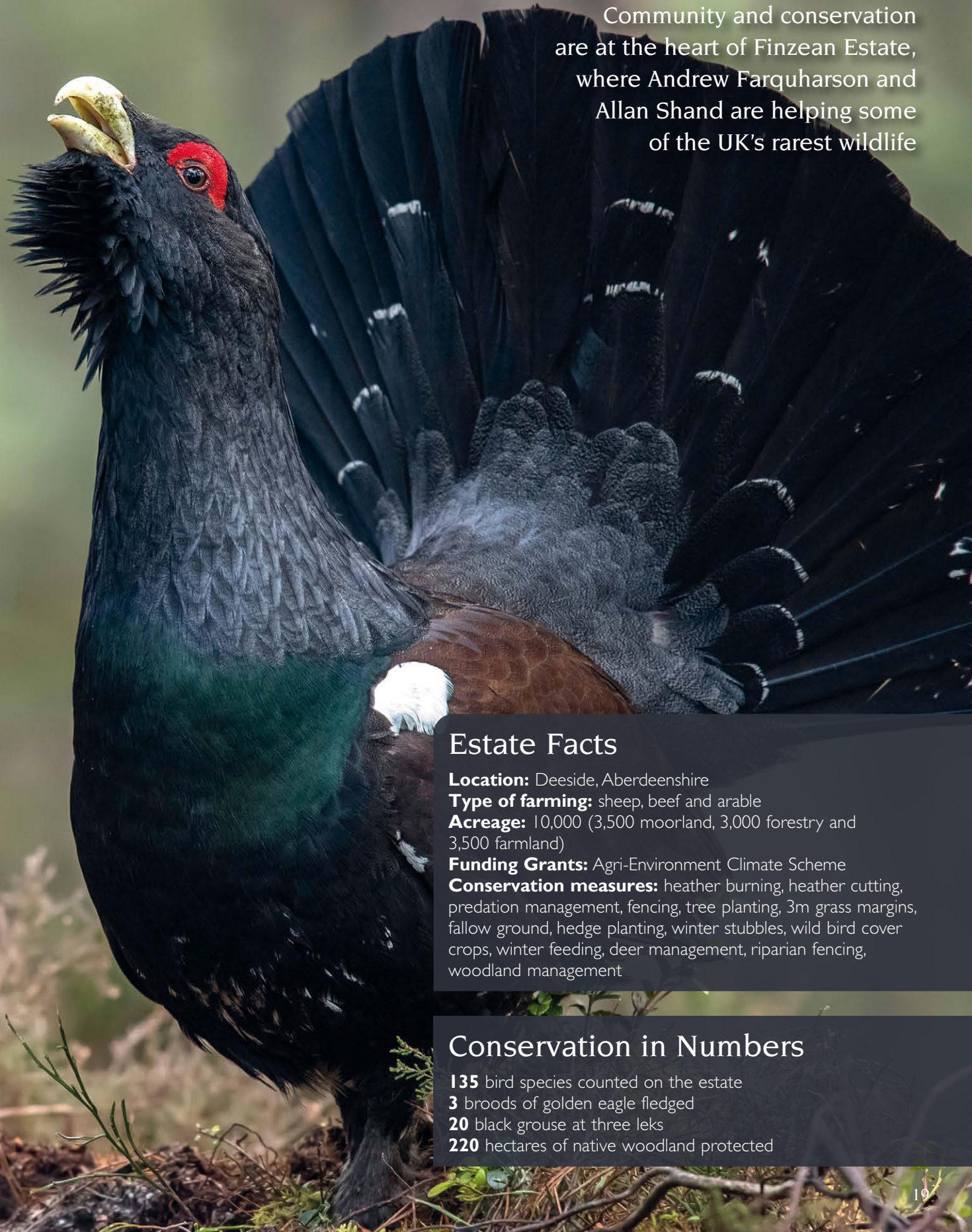
In contrast with wildfires, managed burning of heather, if done responsibly, doesn't burn the underlying peat and, rather than damaging blanket bog, may actually help to regenerate it. Results from a long-term burning experiment at Moorhouse National Nature Reserve, a high altitude, deep peat site in the North Pennines, showed that 10-year burn intervals favoured the main peat-building species of sphagnum mosses and cotton grass. In contrast, longer burn intervals (20 years) or no burning resulted in increases in heather cover, but no such increases in sphagnum or cotton grass. We explored how the results from these experimental trials at Moorhouse may be translated to a site where different intervals of prescribed burning have been used as part of ongoing active grouse moor management. Using aerial images, we identified burns from within five different age categories from which we collected information on plant species composition and abundance. We found that the heather cover removed by burning gradually rose to almost complete ground cover on areas burnt more than 17 years before. In contrast, the highest levels of sphagnum moss and cotton grass were found on areas burnt between three and ten years previously, and were very low more than 17 years after a burn. For more information about GWCT's moorland research, visit gwct.org.uk.



ATVs adapted for controlled burns can be used to fight wildfire.

Caper on the edge

Community and conservation are at the heart of Finzean Estate, where Andrew Farquharson and Allan Shand are helping some of the UK's rarest wildlife



Estate Facts

Location: Deeside, Aberdeenshire

Type of farming: sheep, beef and arable

Acreage: 10,000 (3,500 moorland, 3,000 forestry and 3,500 farmland)

Funding Grants: Agri-Environment Climate Scheme

Conservation measures: heather burning, heather cutting, predation management, fencing, tree planting, 3m grass margins, fallow ground, hedge planting, winter stubbles, wild bird cover crops, winter feeding, deer management, riparian fencing, woodland management

Conservation in Numbers

135 bird species counted on the estate

3 broods of golden eagle fledged

20 black grouse at three leks

220 hectares of native woodland protected



Almost all the farms in the glen are in Agri-Environment Climate Schemes.

After their reintroduction in the nineteenth century capercaillie numbers grew to 20,000 in the 1970s, but now there are only 1,000 birds left in the UK and they are at risk of a second extinction. A small population still holds out on the 10,000-acre Finzean Estate in Royal Deeside, Aberdeenshire, thanks to decades of conservation efforts on the part of estate manager Andrew Farquharson and the dedication of gamekeeper Allan 'Hedge' Shand. As well as 3,000 acres of commercial forestry, Finzean has some of Scotland's most easterly Caledonian forest, the rare habitat favoured by the woodland grouse. Andrew said: "Thirty years ago we fenced off a large area on the edge of the ancient woodland to keep the deer out to allow young Scots pines and the heather to flourish for the benefit of the caper." Hedge also works with the local deer management group to achieve annual cull targets, which are designed to minimise damage to trees, heather and crops, while maintaining a healthy population of roe and red deer.



Andrew Farquharson and Allan 'Hedge' Shand are committed to looking after the wildlife on Finzean.

"A local birdwatcher has spotted 135 species"

But in spite of their efforts, the low number of caper and their increasing isolation means they are struggling to increase productivity. The estate gamebook entry from 1925 records 70 caper on Finzean Estate alone. Caper came off the quarry list in 2001 and they were not hunted for many years previously due to declining numbers, yet in 2017 only four birds were recorded at the annual lek count for the whole of Birse Parish, which includes parts of Birse, Finzean, Ballogie and Balfour estates. Andrew said: "We don't really know why the caper are still in decline. It could be warmer winters leading to a greater tick burden, heavier rainfall around chick-rearing stage, or predation by protected species may be a factor. We have pine marten, which are known to kill capercaillie." Restoring capercaillie is very difficult on the edge of its range. Its conservation should, of course, be encouraged wherever the species remains, but with limited funds, GWCT strategy is to concentrate management and research efforts on the remaining stronghold in Strathspey (see panel on page 22).

Other threatened species are doing better on the estate thanks to a combination of predator control and habitat management. Red-listed black grouse on the hill fringe are stable, with three leks of up to 20 birds, and mountain hares are plentiful on the moor. On the low ground, brown hare numbers have risen rapidly in recent years. A local birdwatcher has spotted 135 species on the estate, and Finzean has many breeding birds of prey including merlin, goshawks, red kites,



Caper on Finzean in 2014 and blaeberry (inset).

Capers' diet includes pine needles, birch buds, heather and blaeberry, so 10 years ago the estate undertook a huge programme of cutting or 'swiping' old rank heather to rejuvenate the ground cover and create light and space for the berries to break through. Blaeberry is a food for moth caterpillars, which in turn are an important source of protein for caper chicks. Small tracks and 10m square open spaces were cut in the long heather to allow chicks to dry out after wet weather. In addition, fox and crow control carried out by Hedge and his neighbouring keepers on a landscape scale protects eggs and chicks of all ground-nesting birds including capercaillie.

kestrels, sparrowhawks and buzzards. Their pride and joy is a resident pair of golden eagles, which have bred successfully for three out of the past four years since they arrived. Built in a Scots pine, the nest is carefully guarded. Andrew said: "We keep the site's location a secret to avoid disturbance. They built the nest up so much one year, the branch snapped, but happily they found another tree." Hedge, who has helped the RSPB ring the eaglets said: "It's interesting to see the remains of their prey at the nest. They have a plucking post for birds including grouse, and I also saw evidence of lambs, crows, a fox and even a badger."



Hedge helped the RSPB ring a brood of eaglets. The nest location is a closely guarded secret.

"Golden eagles have bred successfully for three out of the past four years"

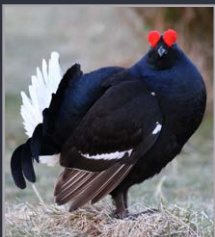
Having several revenue streams helps the estate maintain its conservation work even when times are challenging in one area. For example, in a good year, letting a few days of driven grouse shooting contributes significantly to the keeping costs. As part of looking after the moor, Hedge carries out controlled burns every February to regenerate the heather but also to create firebreaks to mitigate the increasing risk of a potentially catastrophic event. Andrew said: "As climate change causes drier conditions, controlled heather burning is going to be more and more important in terms of reducing the risk of wildfire and preventing carbon release. It's reckoned the emissions from the fire at Elgin last year were equivalent to the whole of the rest of Scotland during the period it burned." In spite of investment in moorland management, like in much of Scotland, red grouse numbers at Finzean have dropped in recent years and last season they were so low that there was not even a walked-up day. Andrew said: "The '70s and '80s saw average annual bags of 600 brace, but a downturn began in the 1990s. I think the warmer winters are having an effect. These days we only get snow for a couple of weeks and we have much more rain, whereas we used to have snow on the ground from November to March, which suppressed the tick. But these things go in cycles and we hope to have another driven day in the future."



The estate has expanded the area of native Caledonian pine forest.

Conservation work goes on in every part of the estate, including the farmland in the glen. Andrew manages 850 acres in hand and there are seven tenant farms, most of which are in Agri-Environment Climate Schemes (AECS). On the Home Farm, grass margins have been fenced off round a large number of fields, reducing pollution from pesticides and livestock entering the water courses, and fallow plots provide winter food and cover for birds and small mammals. All the farmers whose land borders the Feugh, a tributary of the Dee running through the glen, were involved in a project to fence the bank to reduce run off and stop cattle and sheep getting into the river. Water and gravel beds are much cleaner, and water voles have returned to the river thanks to a combination of habitat improvement and Hedge's efforts to trap the predatory American mink. Overwintered stubbles are another popular AECS option among the farmers. These, combined with the game crops and feeders managed by Hedge for the estate's small syndicate pheasant shoot, all provide important winter food for songbirds.

Wildlife Highlights



Black Grouse



Golden Eagle



Red Squirrel



Mountain Hare



Snipe



Ancient Scots Pine



Cutting the old rank heather in the forest has allowed the blaeberry to return.



Community projects on the estate include the popular village hall.

Income from farming and forestry, including agri-environment grants, accounts for about 30 per cent of estate revenue. There is some rental income from properties and the syndicate pheasant shoot, but the biggest contributor is the shop and café developed by Andrew's wife Kate and sister-in-law Catriona, which now brings in 50 per cent. The shop is a vital hub in a tightknit community where people come to pick up their papers and groceries or eat in the café where all the game harvested on the estate is on the menu. It follows a Farquharson family tradition of initiatives to support the community. In the 1970s house prices skyrocketed due to the oil boom in Aberdeen and locals were priced out. The result was young people forced to move away and the number of children at the primary school dwindling to below 20 children. Andrew's parents made available plots of land with planning permission at low cost to people raised in the area. Decades later there are several young families and the school has more than 60 pupils. Andrew said: "Many of us in the village grew up together. Most days I see people I went to primary school with, many of whom still work on the land." Other local projects supported by Andrew and his older brother Donald include a recently renovated village hall, which is in constant use, a footpath linking the shop to the village, and even a graveyard. Andrew said: "Our church had no graveyard, so we gave a plot of land, the local farmers helped create the path, and many others volunteered to clear it."

The cafe provides a vital hub in a tightknit community.



Thanks to these initiatives, Finzean scores well on social, economic and cultural sections of the Wildlife Estates Scotland (WES) accreditation, which it has achieved every year since 2014. Supported by the Scottish Government and SNH, WES assesses the integration of wildlife conservation with local economy and community through an accreditation system verified by an external inspector: Andrew believes the scheme holds the key to solving the issues facing driven grouse management. He said: "Rather than the idea of licensing grouse moors and taking away the right to run a moor, government should make WES compulsory for estates. That way you would preserve the conservation benefits of driven grouse management and drive up standards." Looking ahead, he believes it is essential that future agri-environment schemes take more heed of the land managers' practical understanding and are more flexible and better funded. He said: "We are currently reviewing the estate and looking for ways to pass Finzean to the next generation in a form that will build on the conservation successes we have already achieved without being a financial burden."

GWCT Research in Practice



Capercaillie Monitoring

Dr Kathy Fletcher
Senior Uplands Research Assistant

Capercaillie have severely declined since the 1970s. Low productivity is the principal cause, so measuring annual breeding success is a valuable tool to assess management strategies. The GWCT has undertaken capercaillie brood surveys in Scotland since 1990. These surveys are currently focused on estates in the Badenoch and Strathspey District, where 83% of the UK population are now thought to reside, and do not include outlying populations such as Birse Parish.

The surveys show that even in good years half the females rear no young and we do not know whether their eggs may have been eaten by pine martens, which are increasing in the forests, or their chicks may have succumbed to biting sheep ticks. Management to reduce generalist predators such as crows and foxes is undertaken on some privately owned estates to help capercaillie, but in most forests rewilding now prevails and habitat expansion is the priority. Amongst ecologists and land managers there is a dichotomy of opinion between those who question whether the impacts of predators and sheep ticks are preventing capercaillie recovery, and those who believe action to improve and expand habitat is enough on its own. The GWCT would like to carry out research into the impact of pine marten (and ticks) on caper productivity, but the former are protected and it is unlikely that a licence would be granted to allow removal of these predators from a study area. Meanwhile, lek surveys suggest numbers of capercaillie are declining and a second extinction looks increasingly likely.

Rewinding history

With a clever combination of drain blocking, and grazing, James Mawle has reversed the fortunes of the river on his family farm

Farm Facts

Location: North Yorkshire

Type of farming: beef, sheep

Acreage: 5,000 (3,000 moorland including blanket bog, 2,000 below including woodland and improved in-bye land, wetland, rough pasture and 200 acres of arable)

Funding Grants: HLS

Conservation measures: extensive grazing, cutting, muirburn, heather and sphagnum seeding, grip blocking, tree planting, predation management, traditional hay meadows and river rewinding

Conservation in Numbers

200km of grips blocked

200 acres reseeded with heather

50% planned increase in length of river

300% planned increase in holding capacity of the river

An ash tree pulled into the river helps slow the flow and create new gravel beds.



Coverhead Farmhouse in the middle of the estate, which comprises 3,000 acres of moor and 2,000 of in-bye land including woodland and hay meadows.



James Mawle next to one of the 200km of grips blocked at Coverhead.

The English uplands are the source of a large proportion of the nation's drinking water. James Mawle's family farm Coverhead, in North Yorkshire, contributes to that vital supply and has demonstrated how good grouse management balanced with farming can help to deliver clean water and mitigate the risk of flooding in towns downstream.

By holding back rainfall on the hills, the flood peak, which is the large body of water that does the damage, can be reduced. Good water management also improves the moor's capacity for capturing carbon. Carbon-storing peat is formed when vegetation decays in a wet environment, but when peat dries out, it triggers bacterial processes that release CO₂ as a greenhouse gas. This dry peat is prone to erosion, with rains washing it into the rivers and colouring them brown. Once it has tainted the rivers, the Dissolved Organic Carbon (DOC) is difficult and expensive for water companies to remove, but keeping the peat wet can help avoid this process.

Many of the benefits of rewetting moorland can be achieved by blocking up the open ditches or 'grips', which were dug after World War II to increase agricultural production. Government funding to encourage farmers to drain the peat in this way continued until the 1980s. Grouse moor managers are often blamed for draining the uplands, but the boom in grouse shooting between 1880 and 1940 proves large numbers of birds were present without any drainage. James said: "Anyone who tells you these moors were drained for grouse is not clear on their facts. There is no advantage in drying out the ground and if grouse chicks fall into a grip they are lost."

These days, ironically, it is moorland managers like James who are blocking the grips up to preserve the peat and hold water on the hill. In the North Pennines AONB alone, 4,370 kilometres of drainage ditches have been blocked. He said: "I have never been a fan of the grips; livestock get stuck in them

and they make it difficult to travel across the moor. Once I discovered their impact on carbon release and flooding, blocking them up became the obvious thing to do."

"Anyone who says moors were drained for grouse is not clear on their facts"

The effect of grip blocking at Coverhead has been dramatic, transforming the River Cover, which runs through the farm. Previously, when it rained, the water would pour off the hill causing a spate. Now it runs down much more gradually, resulting in lower peak flows and higher minimum flows. James said: "I have seen a three-foot bore of water and rocks come down this river; it was quite scary. Before we blocked the grips, the river was either a raging torrent or a dry boulder field. It still rises and falls but it is a lot more measured with a decent minimum flow in the dry times. It is also much clearer, with far less brown staining."

When the grips were still in operation the river was trapped in what could be described as a self-harming state. Sudden heavy floods would dislodge stones and boulders, which would



Drains or grips can cause erosion, which colours the drinking water.

become part of the torrent gouging out the riverbed as they moved. Anything smaller than a cricket ball was washed away, leaving the larger rocks sitting loosely against each other. Even a moderate spate would cause them to roll, becoming a meat grinder for aquatic insects. After the grips were blocked, these large boulders moved less, and smaller stones infilled between them. Sand and silt then built up around the smaller stones, effectively ‘concreting’ them in place.

Once they stopped moving, the boulders gradually became covered in moss and river weed, increasing friction in the riverbed and further slowing down the water flow. Where there was almost no fly life, now caddis larvae can be found under every large stone. James said: *“It’s as if the rocks have been switched from bad to good.”*

Although rewetting the moor has lots of benefits, too much water round the roots can stress the heather and reduce its



Highland cattle help the heather to grow on rewetted areas of moorland.

vigour. But James believes this can be mitigated and is not a reason to avoid grip blocking. In recent times, grip blocking has often been accompanied by a drastic reduction in grazing for conservation reasons, which may be counterproductive. If the heather is stressed by rewetting and then swamped by fast-growing grass unchecked by grazing, it can become overwhelmed. At Coverhead the heather is doing well on the rewetted ground thanks to careful manipulation of the grazing regime. James said: *“We are very fortunate in that all the grazing and sporting rights are in hand, allowing a holistic approach to be taken. Between June and December each year Highland cattle graze parts of the moorland that we have re-seeded with heather. Their moderate weight and big hooves mean they do minimal damage to the ground, and their large rumens enable them to thrive on huge quantities of poor-quality forage. In addition, unlike sheep, they graze non-selectively, removing large amounts of grass and rushes and allowing the light and air to get to the young heather plants.”*

“It’s as if the rocks have been switched from bad to good”

Peat-forming sphagnum moss also seems to benefit from cattle on the moor; with a very strong recovery seen in grazed areas. Sphagnum is a moisture-loving plant, so it has been helped by the rewetting of the moor, and a good covering is a sign that the peat below is sufficiently saturated and stable. It can happily grow alongside heather and, in some cases, a surprising symbiosis can occur. The heather stops trying to root into the peat and instead starts growing hydroponically in the sphagnum. When heather does this, its vigour and nutritional value increases and the grouse benefit in turn. James said: *“It is a virtuous cycle with the cattle benefiting the blanket bog, which in turn supports the grouse. Farming, conservation and shooting help sustain each other. A win-win outcome.”*

Though the river is hugely improved, James believes there is still much work to be done. Forty years of spates caused by draining the moors has washed out three feet of river bed. As a result, the river now runs in a much bigger channel and in spate the water no longer breaks the banks and dissipates its destructive power onto the flood plain. The Cover has also been affected by a long history of straightening for a range of reasons. Each time the river was straightened it became shorter, steeper and more powerful, losing about a third of its natural length through the farm over the years.

Wildlife Highlights



Sphagnum

© Laurie Campbell



Golden Plover

© David Mason



Merlin



Curlew

© David Mason



Bilberry



Sea Trout



Unlike sheep cattle can reach the nutritious stems of grasses.



Thanks to the slower flow, caddis fly can now be found under the rocks.

Together with the Yorkshire Dales Rivers Trust and Leeds University, Coverhead aims to restore the meanders and reconnect the river with its flood plain. He said: *"The project has the potential to increase the length of the river by 50% and because the gradient will be gentler, the water will run slower, meaning we could double or even triple the volume of our river."*

James hopes that the combination of river rewinding and grip blocking will eventually allow fish to return, adding an additional revenue stream to the integrated approach, which is vital for the long-term viability of the moorland and river restoration. He said: *"When we came here in 1982 the old keeper could remember salmon under the bridge, but there weren't any spawning gravels. Now you can see vegetation returning to the edges and smaller stones settling in the bed. The sea trout have returned and I'd love to see salmon back too."*

GWCT Research in Practice

Grip blocking

Dr Adam Smith
GWCT Director of Policy Scotland



As a policy, the GWCT recognises the potential long-term environmental value of rewetting areas of deep peat and restoring degraded bog habitat in pursuit of carbon and water storage. But we are aware of the challenges such as increased greenhouse gas emissions in the short term as soils re-wet. Our current research interest lies in understanding how plant and moss communities change as burning patterns and water levels are altered. We are also concerned to understand the response of ground-nesting bird species to increasingly wet ground conditions.

At Auchnerran, the Trust's demonstration farm on Deeside, we have an opportunity to study some of these effects as we block around 2,000 metres of peatland drains from the 1970s over the next few years under an agri-environment scheme. We are looking into what resources are available from bodies such as the Cairngorms National Park Authority to inform this activity and we will report on the success and ease of integration with the existing land use so that others can learn from this experience.

Burning ban bad for blanket bog

In addition to grip blocking, James Mawle believes heather burning on blanket bog has enhanced the moor's capacity to absorb water by increasing the area of sponge-like sphagnum mosses. Muirburn is used to clear areas of rank grass and woody heather, which suppress sphagnum growth, he said: *"Sphagnum doesn't like being overshadowed. If you left heather on Coverhead for 50 years you would get a full canopy with no sphagnum underneath. Burning, grazing and cutting are all important ways of recycling nutrients, allowing peat-forming plants to regenerate and they should all have their place. None are perfect; both cattle and cutting also create emissions and sphagnum hummocks can be destroyed by cutters."*

James is concerned that the effective ban on heather burning on deep peat will inhibit his moorland restoration and increase the risk of wildfire, due to the inevitable accumulation of combustible matter: Unlike managed winter burns, wildfires burn much hotter and into the peat, releasing huge amounts of stored carbon and reducing the moor's ability to hold water. He said: *"Research has shown that peat can form at up to 1mm per year in optimum conditions and it can still grow under a managed burning regime, albeit at a slightly slower rate. In contrast, a wildfire can easily destroy 300mm of peat (300 to 1,000 year's-worth). Is it worth risking that devastation for a little extra annual accumulation? Surely, preserving existing peat deposits must be the priority, hence our policy at Coverhead of grip blocking and cool burning."*

At the beginning of 2019 Natural England (NE) advisors expressed their satisfaction with the conservation work at Coverhead including the cool burn regime. They acknowledged both improvements in the blanket bog and an increase in sphagnum moss. In spite of this, NE demanded an end to all burning as a condition to any new agreement. James thinks applying this kind of universal restriction is counterproductive. He said: *"Environmental scheme payments have been an important source of revenue for the farm, but this new policy will make a large wildfire almost inevitable. We need to move to a payment-by-results system where land managers are given clear instructions as to what the scientists want (e.g. more abundant sphagnum cover, peat formation and water retention) and then left to work out how best to achieve it. The people on the ground who understand their particular situation are best placed to deliver these goals. Why hamstring them by denying them the right tools to get the job done?"*

Burning means a better mix of sphagnum, grass and heather.



Black magic

An early adopter of Countryside Stewardship, Neville Gill cares for one of the last strongholds of black grouse on his family's North Pennines moor



Farm Facts

Location: Northumberland

Type of farming: sheep

Acreage: 1,050 (750 moor; 200 rough pasture, 50 grazing and 50 woodland)

Area in conservation measures: 100%

Funding Grants: Higher Tier

Conservation measures: tree planting, woodland creation, heather burning, bracken clearance, heather cutting, woodland thinning, replanting and infilling, skylighting, predation management, low-pressure grazing, low input grassland, fencing, stonewall restoration and maintenance

Conservation in Numbers

2,000 trees planted by hand for black grouse in 2019

10,000 trees planted since 1999

13.6km of grips now blocked

230 sheep grazing in summer down from 500



Sunrise over the Old Shepherd's Hut at Williamston. The many public goods produced by the estate include stone wall and buildings restoration.

As we came over the brow of the hill, a covey of 10 black grouse got up perfectly on cue, and within a couple of hours we saw 18 blackcock and three grey hens. *"I didn't want to guarantee it, so that was very pleasing,"* said Neville Gill, owner and manager of 1,000-acre Williamston Estate in Northumberland. Once widespread in England, black grouse could be found on lowland heath as far south as Hampshire, but in 1998 there were only 773 displaying males left. These days they are confined to the uplands where 96% of the remaining English population live on the edges of moors kept for red grouse. So why has this red-listed species held on at Williamston?

Black grouse are associated with the moorland fringe, but they also eat the heather, grasses and berries that make up the habitat maintained for red grouse. Williamston has been in Neville's family for 300 years, and records of its 750 acres of moor being managed for grouse date back to the 1850s. Since then, there have been many changes in uplands policy. After the war, the family's interest in grouse shooting meant it resisted incentives to cover the hill in conifer plantations. In the late 1940s, pressure to increase livestock production meant damaging drainage 'grips' were dug, but over the past 15 years, 13.6km of ditches on the estate have been filled. The majority of these have been blocked under an agri-environment scheme, rewetting the blanket bog to benefit sphagnum moss and other peat-forming plants.



Neville Gill among the trees he hand-planted for black grouse.

Similarly, Neville reduced the number of sheep from 500 to 230 and keeps them off the hill in winter to allow the moor to recover from over-grazing as part of his Countryside Stewardship agreement. Grazing restrictions allow vegetation to grow, providing more refuge from predators, a wider range of plants for adult black grouse to eat, and more insects to feed their chicks. It has also meant less disturbance for lapwing on in-by land in the valley bottom. He said: *"Before we took the farming in hand and halved the sheep we never saw a lapwing, but last year we had several successful nests."* The grazing is let to a neighbour and the sheep still play an important part in preventing the moor turning to scrub.

As well as the move to light-touch agriculture, for the past 30 years, Neville has controlled large areas of encroaching bracken with the herbicide Asulox before fencing off and sowing sections with heather seed. In addition, he has cut patches of tall, rank

heather, which dominates other plants, and on the slopes, where machinery can't be used, burning is an essential tool. The benefits of burning are quickly revealed, with heather and bilberry showing signs of regrowth by July the same year.

Most of the burning takes place on areas of dry heathland with a small amount on blanket bog. Natural England (NE) recently restricted burning on blanket bog because it might damage peat forming plants, but Neville currently has an exemption for restoration purposes. At Williamston, the blanket bog on the flat plateau is rich in flora with 11 species

After a controlled 'cool burn' in winter on a small area of shallow peat, heather and bilberry show signs of regrowth by July the same year.



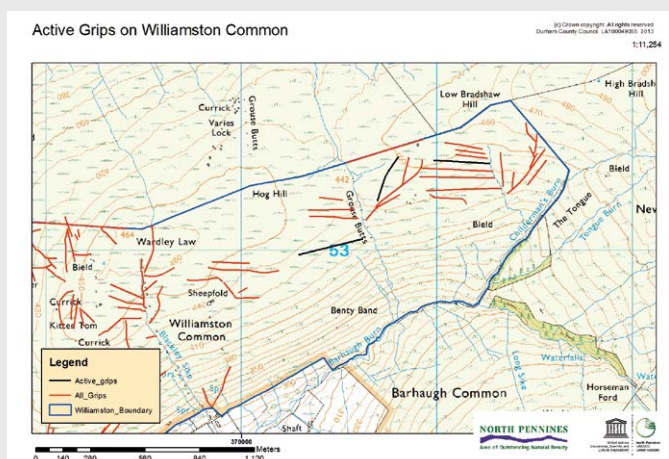
including Cladonia lichens, cloudberry, cranberry, crowberry, cotton grasses and sphagnum. However, some of the bog further down is dominated by heather, so as part of an approved programme, controlled burning is being used to remove the dense cover before reintroducing peat-forming sphagnum and cotton grass. Heather burning can only take place between October and April and consumes the canopy, leaving the peat untouched. Neville said: "Finding a window for burning is much harder than people may think, especially in this part of the world. Last year, we couldn't do any at all because it was too wet, but it's different for each moor." These so-called 'cool burns' also reduce wildfire risk by creating firebreaks and reducing the 'fuel load' of combustible material on the moor. Recent dry summers have increased the likelihood of wildfires, which can destroy the peat. Neville said: "We were terrified last year. We have a head of heather that sticks out into the valley. If we had a wildfire, it would travel for miles over the next door moor."

"Black grouse depend on having the right conditions on a landscape scale"

Williamston is designated an SSSI, Special Area of Conservation (SAC) and Special Protection Area (SPA) and Neville's restoration work has seen the moor's status move from 'unfavourable/no change' in 2000 to 'unfavourable/recovering' today. Black grouse are among a range of threatened birds to benefit including waders such as curlew, lapwing, and golden plover, and raptors such as short-eared owl, merlin and hobby. He said: "We see many birds of prey on the moor and would never tolerate the killing of any protected species." Legal predation management, carried out by part-time keeper and farm manager Ben Staley, is essential for the survival of both adult and fledging black grouse. Breeding success depends on the fact that Williamston is surrounded by much larger

grouse moors such as Whitfield and Knarsdale, with fox control coordinated across boundaries. Female black grouse can travel large distances and their survival depends on the right conditions being present on a landscape scale. Time invested in fox, corvid and grey squirrel control, which is paid for by the shoot, also helps to protect other ground-nesting birds and a growing red squirrel population, several of which are daily visitors to the Gills' garden feeders.

A vital ingredient of successful black grouse conservation has been the implementation of agri-environment options. Having been an early adopter of the original Countryside Stewardship in 1992, Neville has extensive experience of such agreements and has become an expert in making them workable. "We have a good relationship with Natural England and my long-standing advisor Claire Furness is key, but NE often use me as a guinea pig, so are used to me giving constructive criticism." His recent application for the five-year Higher Tier scheme took a year to complete, was 200 pages long and included a 30-year long-term plan for the moor. He said: "It goes through field by field and its all important stuff, but to some farmers it may well be daunting."



The red lines on the map show where the grips have been blocked.

Another concern is lack of flexibility and broad-brush prescriptions, which in some cases don't cater for the reality on the ground. A good example is the copse planted for black grouse last year. According to the rulebook, the tree guards had to be 1.5m solid tubes. These are fine for lowland plantations, but on the hill they get blown over, so Neville argued for 1.2m mesh tubes, which allow the wind to pass through. However, he believes the most serious impediment to uptake of the schemes is lateness of payment. A year into the agreement the estate still hasn't received a penny, despite having carried out the work.

Wildlife Highlights



Merlin

© Mike Groves



Lapwing

© David Mason



Hobby

© Andy Morffew



Red Squirrel

© Laurie Campbell



Curlew

© Laurie Campbell



Sphagnum Moss

He said: "Bureaucracy is holding up the system and a lot of land managers are suffering. Cash flow is vital; if you suddenly turn off a revenue stream you will cripple the whole enterprise."

"I'm just the custodian and I aim to pass it on in better shape than I found it"

Although the process of applying for the new Higher Tier agreement is complex and its practical application often challenging, Neville would still encourage other land managers to apply for it. The scheme will help ensure the long-term ecological health of the estate and ensures it can continue as a going concern. This is particularly important on remote upland farms like Williamston, where agri-environment schemes make up a large proportion of the revenue. In total, agri-environment schemes and Basic Payments comprise 36% of income, with another 41% coming from holiday lets. Shooting brings in 23%, but only breaks even. Neville is keen to stress the interdependence of all these elements, which are essential for successful conservation. He said: "Historically Williamston sustained four farmsteads; now it is farmed by one person, part time for wildlife. The farming and shooting employ the farm manager/gamekeeper, who creates the right habitat, which in turn attracts tourists to the accommodation. Take one away and the rest will struggle. Were grouse shooting to become legislated out of existence, we'd be forced to graze all year round. The black grouse and all the other birds would sadly disappear." This model delivers a range of additional public goods, including carbon capture through peat management, reducing wildfire and flood risk, and maintaining heritage farm buildings and stone walls.



Neville's great grandfather (seated centre) after a day's shooting on Williamston.

Looking to the future, Neville hopes the three hectares of moor on which he recently planted a mix of 1,500 birch, hawthorn, rowan, willow and alder will provide winter food and cover for black grouse. The plantation is tucked under the hill next to a burn for protection, and he planted all of the trees by hand. He said: "We were applying for the new agreement and I said to NE why don't we do something for black game? So I came up with a planting plan that was quite natural, following the



Shorter mesh tubes are more likely to withstand winds on the hill.

curves of the hill and not too densely packed to create the kind of scrubby woodland they love."

Neville's passion for conservation in general and black grouse in particular is clear, and his strong sense of stewardship and willingness to go the extra mile underlies his success. He said: "As far as I'm concerned I'm just the temporary custodian of this place. For 300 years every generation's done their bit and my aim is to pass it on in better shape than I found it."

GWCT Research in Practice

Black grouse recovery

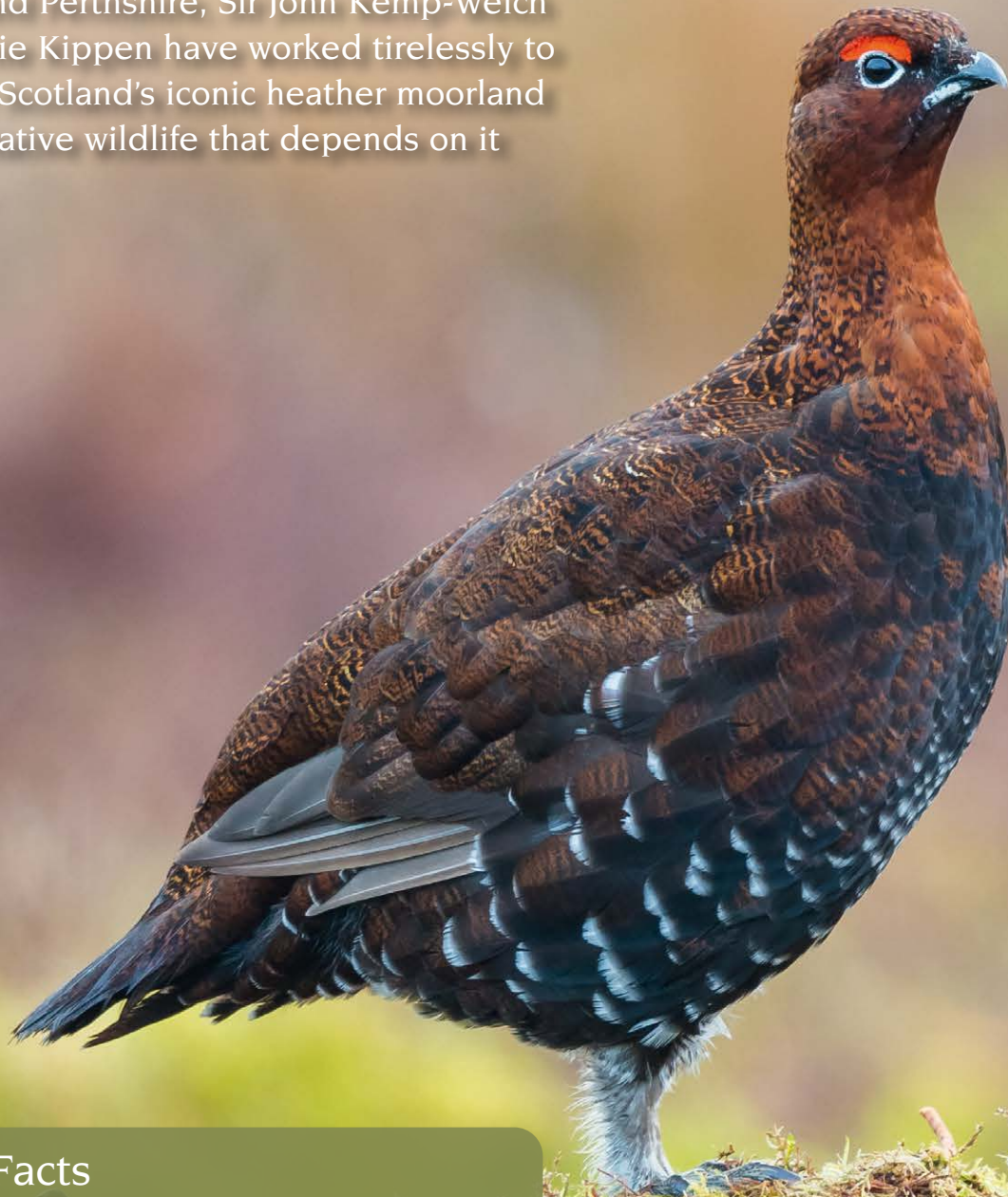


Dr Phil Warren
GWCT Senior Scientist

In England, black grouse are now restricted to the Pennines. Here, following the instigation of conservation measures at a landscape scale joint-led by the GWCT, including grazing reductions on the moor fringes and creating pockets of scrub woodlands, numbers recovered from 773 males in 1998 to 1,437 in 2014. Despite these encouraging increases, black grouse remain severely vulnerable due to their small population and restricted range. Our research has shown that adult survival is generally high, except in harsh winters when food sources are covered by snow, but population growth is limited by poor breeding productivity. This is linked to high rainfall when chicks hatch in June, lack of insects, and chick predation by stoats. To increase numbers and range, we need to maintain high survival rates by providing pockets of native woodland as emergency food sources as well as doing further research into increasing insect availability for chicks. Range expansion may be limited by too few new recruits, but also by the fact that males don't move far from their leks. In recent years, we have shown that translocation of birds into suitable habitats on the fringe can help increase range as part of a package of measures.

Famous grouse

In Highland Perthshire, Sir John Kemp-Welch and Ronnie Kippen have worked tirelessly to conserve Scotland's iconic heather moorland and the native wildlife that depends on it



Estate Facts

Location: Perthshire

Type of farming: sheep

Acreage: 5,000

Funding Grants: SRDP Moorland Management Scheme

Conservation measures: fencing, extensive grazing, muirburn, predator control, tree planting, cover crops

Conservation in Numbers

3 average number of curlew chicks fledged

8 new black grouse leks

1,000 acres of bracken cleared

14 miles of fencing installed



Conservation work on Garrows and neighbouring estates ensures suitable and varied habitat for a range of wildlife on a landscape scale.

The picturesque 5,000-acre Garrows Estate near Loch Tay in the Perthshire Highlands is a magnet for bird photographers. Ronnie Kippen, who retired as headkeeper in 2018 after almost 40 years, remains employed by the estate. He said: “A photographer recently stopped me to say he’d just seen a golden eagle sitting on the cairn; it’s fantastic! I told him to tell his friends that he was in the heart of driven grouse country and was able to photograph an eagle!”

But there wasn’t always the abundance of wildlife that thrives on Garrows today. Gamebooks dating back to 1887 show that historically there were good numbers of grouse. When the current owner Sir John Kemp-Welch’s family bought it in 1929, the population was healthy, as it was in the 1960s and 1970s. However, a decline began in the early 1990s and by 2009, numbers had dropped dangerously low to less than 10% of previous figures.



Ronnie Kippen describes the change in bird numbers as ‘night and day’.

“Native plants which hadn’t been seen for decades began to reappear”

Determined to reverse the decline, the estate took several radical measures to try to improve the habitat, including dramatically reducing the number of sheep. Like most Scottish farms in the post-war period, the push for greater agricultural output had upped the size of the flock and allowed them to inhabit every area of the estate, which resulted in overgrazing, particularly of the moorland. Sir John asked GWCT advisor Adam Smith to suggest a plan for habitat improvement. He said: “Over many years, we have received excellent advice from Peter Hudson, Dick Potts and Adam Smith of the GWCT and none of the actions to improve habitats would have happened without their guidance.” As well as recommending a reduction in sheep numbers, Adam advocated taking the flock off the hill completely in the winter to allow the heather to recover and returning them to the moor in spring. The plan was carried out to the letter and the results were spectacular. Native plants that hadn’t been seen for decades began to reappear along with insect and birdlife.

Although heather cover improved, the grouse did not show the same recovery as other wildlife. The number of tick had greatly increased in the region and the impact on grouse, particularly the chicks, became a concern. As it was likely that sheep were one of the main carriers, Adam Smith recommended greater discipline in treating the flock with acaricide every six to eight weeks, and they were also treated for the tick-borne disease louping ill. Sir John said: “Our shepherd began to notice symptoms in some of the lambs and at that point we had sheep and grouse tested for the louping ill virus. The tests proved 84% positive and the vet said it was the worst case he’d seen. After better treatment, there was a great improvement in the flock’s general condition.”

By much reducing the disease in the sheep, the flock became part of the solution to the tick problem. Sir John said: “Currently good sheep management is about the only thing being done to counter the countryside rise in tick numbers. This is a real concern particularly in light of the increasing cases of Lyme disease, which is transmitted by the parasites and is a very unpleasant illness for humans.” In spite of successfully tackling the problem in the sheep, after several years, the grouse had still not recovered and Ronnie and Sir John began to suspect that a large increase in the number of deer, which also carry tick, might be part of the reason.

Deer numbers grew rapidly in Scotland after the war, likely due to warmer winters and the expansion of commercial woodland. Sir John said: *“During the war, virtually all the deer in the area were shot for food, and when I started stalking here in the 1950s it was quite rare to see a stag, but by the 1980s there had been a huge explosion in numbers.”* Sir John and Ronnie had always wanted to achieve a diversity of wildlife on the moor with a stable grouse population, a healthy herd of deer, plenty of mountain hares and a well-managed sheep flock, and in the 1970s this was broadly achieved. In later years, however, it became increasingly apparent that ticks were becoming more prevalent due to high deer numbers. Therefore, the estate looked at the possibility of turning the deer into tick mops as opposed to carriers by treating them with acaricide. Ronnie researched this technique, which is used successfully in Africa and America. He said: *“Unfortunately, our efforts were thwarted by the authorities who refused to give permission for a trial. If deer were seen as part of the solution to the tick problem there would be less likelihood of them being eradicated, as has happened in some parts of Scotland. In our efforts we went right to the top of the then Deer Commission to try to persuade them to take this approach, but to no avail.”*

“After three years, grouse numbers began to recover and this recovery has continued ever since”

By 2009, the grouse had reached their lowest level since 1887 and deer numbers remained high. Ronnie said: *“I shot a July stag in one of the corries and I stopped counting ticks after 300. They were just like chain mail on him. At that point I thought we are not going to beat this with the sheep treatment alone; we will have to do something about the deer.”* Three neighbours had already taken the decision to exclude deer and, in 2010, having exhausted all alternatives, it was decided to follow suit. Sir John said: *“When our grouse numbers hit an all-time low in 2009, we felt that action had to be taken, which led to the very difficult decision to fence out the deer.”*

After three years, grouse numbers began to recover as they have done on the three nearby moors, and this recovery has continued strongly since. There have also been benefits to waders and other wildlife. Ronnie said: *“Previously I would*

see a line of curlew chicks and the one at the end would start to stumble, and when I looked closer he would have 10-15 ticks round each eye. Well, that chick was as good as dead!” Excluding the deer and changing the sheep management has had the effect of further reducing grazing pressure on the moorland vegetation, allowing plants to return. Ronnie said: *“When I arrived here in 1980 the west side of the corries had been grazed very hard; now they have beautiful ridges of heather and blaeberry, and we have grouse where we did not previously have them. The GWCT’s Peter Hudson explained the importance of cotton grass in nourishing the hen grouse in preparation for the breeding season. In the past, having deer and sheep on the hill in winter meant there was virtually no cotton grass, whereas now if you lie in the corries it is so prolific, its white tips look like driven snow.”*



Like other native plants, mountain willow benefits from reduced grazing.



Heather burning maintains the unique habitat tourists come to see.

Wildlife Highlights



Oystercatcher



Curlew



Golden Eagle



Merlin



Cotton Grass



Mountain Hare

Two further important elements of grouse moor management have helped ensure both plant and bird species recovery. The first is heather burning, which involves lighting small, tightly controlled fires in the autumn, when possible, and spring. It rejuvenates rank heather; reduces the risk of wildfire and creates a mosaic of different heights of vegetation with taller heather to provide cover from predators and young growth as a nearby food source. The second is predation management, which increases the productivity of grouse, waders and other birds by protecting their eggs and young. As well as foxes, stoats and weasels, ground-nesting birds like curlew are highly vulnerable to avian predators including birds of prey and corvids. In the glen as a whole, one of the greatest threats comes from the growing population of jackdaws, which rob the nests of eggs in the breeding season. For this reason, they need to be controlled in the spring to give the waders a chance.



Sir John Kemp-Welch is committed to conservation.

“Covering Scotland’s moors in trees would be like destroying the Taj Mahal”

Another major predator of curlew and other waders are ravens, whose numbers have also increased in recent years. As part of a conservation project supported by Scottish Natural Heritage (SNH), in 2018, the local community was encouraged to apply for a licence to control a limited number of ravens to help the waders in the Strathbraan area. They asked local grouse keepers to carry out the control, which was targeted at the large flocks of juveniles, which congregate in the spring and can quickly strip a hill or field of eggs or chicks. This programme was carried out and the positive impact on waders and curlew in particular was instant. Ronnie explained: “Previously we used to see curlews with one or two chicks and thought that was the norm, but in the first year of the raven licence we went from averaging 1.5 chicks per pair to over three.” In spite of this success, after a campaign of intimidation, SNH asked the local community to withdraw its licence application and it is still waiting for guidance for the future from the licensing authority.

Conservation efforts on the moorland go hand-in-hand with the huge amount of work done to improve habitat on the lower ‘in-bye’ land at Garrows. Large areas of bracken, which harbours tick in the dead litter underneath, were almost completely cleared over a 35-year period. In addition, there was an investment in fencing. This made it possible to keep the sheep out of water courses, woodland and meadows in spring and summer allowing red-listed waders to nest on the grass undisturbed. Ronnie said: “When we fenced and changed the grazing, the difference in bird numbers was night and day. Having had almost none, we are now a nationally important area for curlews, oystercatchers and peewits.” Black grouse, which have all but disappeared from southern Scotland after the abandonment of grouse moors, have also gained from such changes on the lower ground. 25 years ago they had nearly vanished from Garrows, but after habitat measures recommended by the GWCT were put in place, there is now a healthy population. The fact that many of the nearby estates are also conservation minded has created the landscape-scale habitat required by black grouse and many other endangered species. Sir John said: “Lots of our neighbours and near neighbours have done and are doing valuable work for wildlife, from which we all benefit. Wild pheasants are another bird to benefit with a big rise from low numbers.”



Management for black grouse preserves birch trees and meadow on the glen.

“We are now a nationally important area for curlew”

Sir John and Ronnie are instinctive conservationists and thanks to many years of dedication, investment and hard work, Garrows exemplifies the strong recovery of habitats, wildlife and grouse that has occurred on well-managed moors in recent years. It is also an excellent example of how driven grouse shooting drives the enhancement of Scotland’s unique heather moorland and its biodiversity. Ronnie said: “It is grouse moor management, which is protecting this remaining historic landscape from over-grazing or forestry. Heather moorland is what the tourists come to Scotland to see. Abandoning it or covering it in trees would be like destroying the Taj Mahal.”

A Mecca for birders

Thanks to George Winn-Darley and his team of conservationists, the wonderful wildlife on Spaunton Moor is accessible to all



Farm Facts

Location: North York Moors

Type of farming: sheep

Acreage: 7,000

Designations: SSSI, SPA, SCA, National Park

Funding Grants: Higher Level Stewardship

Conservation measures: bracken control, reduced grazing pressure, fenced enclosures, heather brush spreading, small ponds, soakaways, leaky dams, riparian tree planting, fencing off water courses, increasing cotton grass, butterfly habitat creation, heather burning and cutting, predator control, species monitoring, track repairs and permissive pathways

Conservation in Numbers

2,500 acres of bracken cleared

500 average number of prescribed burns

9 hectares riparian native tree planting

75% of species of UK raptor and owl sighted



George Winn-Darley with a leaky dam made from bails of heather.

George Winn-Darley owns and manages Spaunton Moor in the North York Moors (NYM) National Park, where grouse management has preserved rare habitat and wildlife for generations. He said: *"I passionately believe that the proper implementation of integrated moorland management is the most successful conservation project in the world."* There is plenty of evidence to support his claim on Spaunton Moor, which is a Mecca for local birdwatchers with red-listed ring ouzels among the many attractions. Senior keeper George Thompson said: *"The ring ouzels arrive from Africa in April and nest along the old railway line, which runs through the estate. We count them every year and the chap who does it has found up to 16 breeding pairs in close proximity. Incredibly, he can tell which part of the moors the birds are from by their song. Bransdale ouzels have a different call to those from Rosedale."*

George Winn-Darley is constantly looking for ways to improve habitat and encourage wildlife. He recently undertook a project with the National Park Authority to plant stands of rowan trees so that the ring ouzels can stock up on the rich berries before their migration south. As ground-nesting birds, they are vulnerable to predation, so the predator control carried out by keepers Anthony Orr and James Diamond is key to their survival. So too is the management of the heather and other moorland plants. Since George took on the estate in 1986, an impressive 2,500 acres of bracken have been cleared and swathes of old rank heather rejuvenated through a programme of managed burning.



Current heather burning technique is very different to how it was in the 1970s when it fell to one man to carry out about 50 large fires per year. These days George and his three-man keeping team aim for 500 much smaller burns of 1/2-1 acre over the same sized area within the permitted burning season, which runs from October to April. Although it's a lot more time-consuming, there are many advantages to burning smaller areas including much more varied habitat for grouse and a host of other wildlife. George said: *"It's all about the 'edge effect'. The most desirable houses are often on the boundary between a town and country and it's the same for wildlife. By burning small patches you create more edges providing birds with open areas containing insect life for their chicks, next to longer heather, which offers a safe haven from avian predators."* Another rare bird to take advantage of the recovered ground is the nightjar. George Thompson said: *"We often find them when we are spot spraying bracken. One year we had four pairs within half a mile. They lay late in July on bare, heathery ground to coincide with the moths, which are at their peak at that time of year."*

"Figures were double what the merlin group managed to find, which was great news"

The North York Moors are virtually all dry heath with a shallow peat layer, so are unaffected by the recent restriction on burning on deep peat, but George Winn-Darley regards the curtailment as counterproductive and is concerned it will lead to further regulation. Having been on Defra's Best Practice Burning Group since 2002 and involved in heather moorland management across the north of England, he has extensive knowledge of heather burning on a range of different upland habitat. He believes controlled burning is vital because it lowers the risk of wildfire by creating firebreaks and reducing the amount of combustible material. As a member of the England and Wales Wildfire Forum, George works with fire brigades across the UK. He said: *"Defra now sees the primary reason to carry out prescribed burning in winter months is in order to manage fuel loads and create firebreaks for summer wildfires. That penny has completely dropped and fire brigades are saying to government, if you stop these keepers burning, you need to massively up our budget."*

A recent report by the National Park Authority claimed birds of prey were diminished in the NYM, but the team at Spaunton believe the opposite is true and have taken the positive step of keeping a daily log of raptor sightings. They hope, over time, it will show that birds of prey have, in fact, increased in range and number. Anthony Orr said: *"It doesn't take a lot of time; we just jot down what we've seen and where at the end of the day and tally it up each month. In the first year we noted the majority of British owl and raptor species."*

Birds of prey are attracted to Spaunton thanks to habitat management and plentiful food. As well as buzzard, kestrel, peregrine falcon, barn owl and sparrowhawk, ground-nesting merlin breed every year. These small raptors are among the UK's most endangered and, working with the local merlin study group, the keeping team has established areas of tall heather

Left: Rowan trees have been planted with ring ouzel in mind.

Birds of prey spotted on Spaunton Moor

(MAY 2018-MARCH 2019)

Hen harrier	Red kite
Merlin	Long-eared owl
Kestrel	Tawny owl
Short-eared owl	Little owl
Marsh harrier	Snowy owl
Osprey	Goshawk
Barn owl	Buzzard
Peregrine	Sparrowhawk



A vast area of moor once under bracken has been restored to heather.

on south-facing slopes, which are their favoured nesting sites. Merlin are among the species for which the moor is designated a SSSI and are a particular passion of George Thompson's. He said: "We are really proud of our merlins, which I'm now licensed to monitor." This year, George contacted the other estates to find out what numbers were like elsewhere. He said: "Because keepers were covering the whole of the NYM the figures were double what the merlin groups had managed to find. That's good news for the birds and we will work with the BTO and the merlin group to ensure that such records make it into official reports."



George shows the grazed myrtle and the better specimen behind the fence.

"We've noted the majority of British raptor species"

Biodiversity is also being boosted by a water management demonstration project in partnership with the Environment Agency. George Winn-Darley, who sits on the Yorkshire Derwent Catchment Board, is keen to trial ingenious ways of retaining water on the moor and preventing flooding and sedimentation downstream. He has planted a large band of trees along the river on the moorland fringe to stop flooding further downstream and fenced them off to create a new scrub habitat protected from sheep grazing. He said: "Before we fenced, the sheep were crossing the river and running into the Forestry Commission woodland because their fence was broken, and our grazier was unhappy because he was losing sheep. By fencing off we turned a load of crosses into ticks."

Other measures installed as part of the 'Slow the Flow' project include 'leaky dams' made from logs and bails of heather placed in streams and ditches on the moor slopes. These allow water to pass underneath them, but silt gradually builds up behind, forming pools and preventing erosion and its damaging impact on the river system. In times of high rainfall the dams spread the water onto the surrounding ground, slowing its path to the river. On the top of the moor a series of ponds and soak away ditches help capture rainfall. George explained: "Grouse moors are often blamed for draining the uplands, but almost none of the North York Moors were drained and they have always supported a thriving population of grouse. It is so dry on this moor; we want to retain as much moisture as possible."

This kind of practical, adaptive conservation is also carried out on the moorland fringe. Spaunton holds the

Wildlife Highlights



Hare



Nightjar



Ring Ouzel



Adder



Pearl-bordered Fritillary



Juniper



Above: Anthony Orr, George Thompson and James Diamond.
Right: The dog violet is an essential part of butterfly ecology.

only population of threatened pearl-bordered fritillaries in the whole of the east of the UK and, working with Butterfly Conservation's Dave Wainwright, George and his team have been growing the colony on Appleton Common and expanding its range. This has been done partly by encouraging dog violets whose leaves form the diet of the caterpillar. The dog violet prefers partial shade, so glades have been cleared and trees cut back. Cutting circular patches in the bracken on south-facing slopes provides leaf litter, which protects the violets during the winter and forms a sheltered sun trap for the butterflies to congregate and lay their eggs in spring. By clearing large 30m-wide rides, the keeping team has connected the colonies. Annual counts are done by amateur naturalist and world expert on bracken Dr Roderick Robinson and show a healthy increase in recent years.



days each year when a grouse shoot takes place. He said: "We have sunk all the shooting butts in so you can't see them from the tracks and are gradually moving them further away."

"You can perform a service by providing a pathway"

George recognises the importance of getting people out onto the moor and has already created a pathway for wheelchair users and is widening existing tracks so mobility scooters have more space to pass. However, looking ahead he is concerned that attempts to license grouse moors risk doing away with a management system that delivers multiple public benefits such as these, many of which are carried out at no cost to the taxpayer. He said: "It doesn't make sense. It isn't the grouse moor management you want to stop; it's the poor practice sometimes associated with it." He believes government and wildlife groups would do better to work with land managers to raise standards and together achieve the kind of success stories that abound on Spaunton Moor.

GWCT Research in Practice



Merlin on moors

Dr Sonja Ludwig, Uplands Research

Merlin nest predominantly on the ground, where they are more vulnerable to mammalian predators, and are thus likely to benefit from the predator management carried out on grouse moors, especially fox control. Higher breeding success of meadow pipits where predators are controlled may also help to increase food availability for merlin. However, meadow pipit abundance declines with increases in heather cover and heather burning, which may offset any benefits to their breeding success on some grouse moors. High intensity of heather burning can also reduce the availability of old heather stands preferred for nesting.

On Langholm Moor, the proportion of successful merlin breeding attempts was two to three times higher when the moor was managed by full-time gamekeepers, which was most likely associated with the reduced risk of nest predation. When keeping was restored during the Langholm Moor Demonstration Project (2008-2017), merlin abundance increased from one pair in 2008 to 10 pairs in 2015.

As heather moorland is the preferred breeding habitat for merlin in the UK, grouse moors have the potential to contribute to merlin conservation at a landscape scale. In contrast to some larger raptors, merlin pose no threat to grouse shooting interests and incidents of persecution are rare.



The estate has created paths for wheelchairs, car parks and tracks for cyclists.

So that members of the public can enjoy the butterflies George has created permissive paths through the common and on the moor he has installed tracks and parking spaces for walkers and cyclists. He said: "Most people prefer linear routes and tend to follow what we term 'desire lines' between destinations such as pubs, heritage sites or car parks. If you can work out where these might be you can keep wildlife disturbance to a minimum and perform a service by providing a pathway." This is particularly important to ensure safety on the 10 or so

Community conservation

A ground breaking project to restore nature to a beautiful Nidderdale estate is engaging locals from stone wallers to pub landlords

Steve Ledger with his belted Galloways.



Estate manager Roy Burrows.



Lee Dinsdale, who works for Barker and Bland.



Dawn Burrows and Tom Mann.



John and Holly Whitaker with their son Jackson.

Farm Facts

- Location:** Nidderdale
- Type of farming:** beef and sheep
- Acreage:** 1,500 (including 500 acres of moor)
- Funding Grants:** Countryside Stewardship Higher Tier and Capital Grants
- Conservation measures:** pond digging, hay meadows, nectar mixes, wild bird seed mixes, stone walling, native cattle, sowing supplementary herbs, reseeding heather; bird boxes, predator control, tree planting, hedge planting, heather burning and cutting, drain blocking

Conservation in Numbers

- 65,000** trees planted
- 1,200m** stone walls repaired
- 54** hectares of new woodland
- 60** bird boxes installed



Stone waller Keith Ronson and team.



“The key is to find good people to work with who share your passion”

When Roy Burrows became manager at the 1,500-acre Summerstone Estate three years ago, it had been grazed intensively, the woodland largely unmanaged, and there was little wildlife on the ground. Roy and the estate’s new owners, Steve and Karen Halsall, shared a vision for transforming this lovely corner of the Dales into a wildlife haven including planting 65,000 trees, sowing wildflowers, reseeded hay meadows and restoring heather moorland. Roy said: *“Steve is very enthusiastic and we have the same goals. He sees things in the long term and wants to invest in conservation for the future.”*

Roy and Steve could not have achieved what they have so quickly without a great team. Roy said: *“I’m new to managing a project on this scale. The key is to take expert advice and find good people to work with who share your passion.”* One of those is Roy’s wife, Dawn, who works in the estate office and on the land. The day I visited Summerstone she was replanting new trees that had been blown over with Tom Mann, who is employed full-time to assist with all aspects of estate management. She said: *“I love the outdoors and so I’m lucky to be able to play a part in restoring this stunning landscape.”*

In addition to the new woodland, a key element has been a radical change in the approach to livestock. Previously, large numbers of sheep had grazed most areas of the estate, leaving little habitat for insects or birds. Now water courses and woodland have been fenced off, sheep are kept off the ground at key times of year, and a much smaller flock of native Swaledales do a great job of keeping the sward at the right height to attract ground-nesting waders including curlew, oystercatcher, redshank and lapwing. The results were immediate, with endangered lapwings successfully breeding in fields where in the past their nests were disturbed or trampled. In addition to habitat improvement, Roy controls foxes, crows, magpies and jackdaws, which eat eggs and chicks. He said: *“Predator control is essential during the breeding season to lift the pressure on songbirds and waders. It is a key part of the conservation effort.”*

To complement the sheep, the estate is establishing a herd of belted Galloways. These rare breed cattle can restore previously intensively grazed areas by eating the less palatable dominant grasses, leaving the tussocky pasture beloved by waders. Their hoofprints fill with water, creating breeding grounds for insects and their cowpats are full of worms, which are food for birds in winter. Steve Ledger, who manages the herd, explained: *“If you had commercial cattle here they would churn up the fields and require extra feed to supplement their diet. For the belties the main costs are standard vets bills, so we are sowing traditional herbal remedies like chicory and yellow rattle back into the sward to keep them healthy and give the meat a special taste.”* The conservation grazing performed by the sheep and cattle is part of the estate’s Countryside Stewardship (CS) agreement. Under the scheme it receives Capital Grants for fencing, tree planting and stone walling, as well as annual payments for income forgone on those areas farmed less intensively. Tim Firbank of seed company Oakbank Game & Conservation advises on restoring hay meadows, enhancing grassland and planting plots of wildflowers and wild bird seed under the stewardship options. He said: *“Working with Roy and Steve to increase the diversity of habitats at Summerstone has been extremely rewarding. The grassland was*



1,200m of walls are being repaired and 64,000 trees planted.



Blocking drains on the moor will help re-establish peat-forming plants.

a monoculture when the new owners took over, but by careful management of the sward height and slot seeding, we introduced better quality grasses and herbs.”

“I’m proud of what we do and we should share our success with others”

The new grazing regime provides plenty of long grass for voles, which are the main food source for barn owls. As a self-confessed bird lover, last year, Roy approached the Nidderdale Birdwatching Group to supply five barn owl boxes for the estate, and this year he has three pairs nesting. The Bird Group has since been invited on tours of the estate by the Nidderdale Regional Moorland Group of local gamekeepers. Roy said: “I’m proud of what we do and we should share our success with others, which is what the bird safaris are about. If you go to other parts of the country without gamekeeping like the Lake District, Wales or Dartmoor, they’ve lost all their rare birds due to habitat loss and predators, and there’s not much to see apart from ravens and crows.” Roy has installed 50 smaller boxes for birds, three for bats and three for kestrels, all supplied by Nidderdale Birdwatchers, and five pairs of red-listed pied flycatchers have already taken up residence.

As well as full-time staff, Roy has engaged consultants to give expert guidance. Simon Marrington of Tilhill Forestry has overseen what is one of the largest tree-planting projects of its kind in the UK. Summerstone is effectively ‘rewilding’ a large part of the estate (54 hectares), but rather than covering the moorland in trees, they have planted a continuous band of mixed woodland along the slopes to create a series of wildlife corridors. Simon put together the CS grant application and, in consultation with Roy, designed a plantation plan that didn’t impinge on the farming and took the pheasant shoot into account. Simon explained: “Improving the shoot was part of what drove the planting, and we wanted the new woodlands to look natural, so we planted in different densities, feathered the edges and avoided square blocks of trees. The species are typical of upland oak woodland, which is native to the area and includes birch, rowan, hazel for ground cover, with some conifer and holly to give warmth for the birds and evergreen colour.” The Forestry Commission and the estate both consulted the Nidderdale Area of Outstanding Natural Beauty (AONB) about the planting plans. Paul Burgess, AONB manager, said: “Reducing the

adverse impact of geometric plantations in one of the AONB’s most famous landscapes has been a long-standing aim, and it’s pleasing to see that it is starting to happen.”



Nest boxes supplied by Nidderdale Bird Group house pied flycatchers.

“Heather burning, cutting and grip blocking are increasing moorland peat”

There has been plenty of clearing and mending to do. A good deal of old fencing has been removed and craftsmen contracted to restore 1,200m of stone walls. Up on the moor, tracks are being repaired, which can be used by walkers and enable access to conserve the moorland plants. There are currently only 300 acres of heather on 500 acres of moor, the rest being comparatively species-poor grassland and bracken, which Roy has started to clear and reseed with heather, berries and grasses. Simon Bland of Bland and Barker has been advising on rewetting to restore sphagnum moss and other peat-forming plants as part of the CS agreement. Like many other grouse moors, Summerstone has filled in the drains that were dug after the Second World War to increase agricultural production but which caused drying out of the peat, erosion and contributed to flooding. Simon said: “It’s fantastic what’s been achieved here. Using a range of management techniques, including heather burning, cutting and grip blocking, we are actually increasing peat and with it the moor’s capacity to store

Wildlife Highlights



Curlew

© Dave Kjaer



Oystercatcher

© Peter Thompson



Pied Flycatcher

© Pauline E.



Barn Owl



Kestrel

© Peter Thompson



Lapwing

carbon and prevent flooding. It will also increase specialist upland insects and wild birds including curlew and golden plover. Heather moorland is one of the world's rarest habitats and the UK has the majority of it, so we need to look after it."

The network of people supporting the project goes beyond those employed directly by the estate. Local businesses and community play an important part. In the winter, hotels and pubs accommodate visitors coming to shoot, which in turn provides an essential source of income when the tourist season finishes. John Whitaker, who runs The Crown with his wife Holly, his father Malcolm and mother Caroline, said: "Last year was a poor year for grouse. Lots of shoots were cancelled and we missed out on around £50k worth of business. We are a close community and everyone has a connection with the moors, from retired folk to kids who love going out beating. A shoot is a social gathering and people meet up in the pub at the end of a day out on the hill." Further down the valley in Pateley Bridge, Paul Kendall owns Kendalls Butchers shop, which has been in the family for three generations. He supplies the estate with game pies for the beaters' lunches and buys grouse and pheasants in the season to sell in the shop. He said: "Shooting is a very important aspect of our heritage in this part of Yorkshire, and in these remote areas it's one of the main forms of employment. It is so much part of the life of the community; if it were ever to go I think the town would struggle."



(Above) The AONB is supportive of the sympathetic restoration of the landscape. (Right) Paul Kendall supplies the shoot with pies and sells game in season.

“Conservation depends on integrating shooting, farming and tourism”

As well as the dedication of everyone working on the estate and support from the local community, the future of conservation at Summerstone depends on integrating a range of revenue streams from farming to shooting, to tourism. Take one away and the capacity to provide both employment and an attractive countryside rich in biodiversity is drastically reduced. It will, however, take time for the estate to break even, and it will depend on long-term financial investment. The good news is there is no doubting Steve and his wife Karen's commitment to the project. At present they are considering plans to create accommodation so visitors can stay and enjoy the returning wildlife and restored landscape. Steve said: "I am intensely proud of what everyone involved has achieved in a comparatively short time and look forward to making more progress in the coming years. It is my and Karen's intention to pass the estate to our boys in a healthier condition at a point where it can sustain itself. Summerstone is a truly special place and we are committed to securing its future."



Boxes for barn owls (right) have seen the birds breeding for the first time.

GWCT Research in Practice

Grouse and communities

Professor Nick Sotherton
GWCT Director of Research



A report commissioned in 2015 indicated that grouse moor owners in England spend £52.5 million every year on moorland management. It also indicated that businesses associated with grouse shooting benefit by £15.2 million every year. These include game dealers, accommodation providers, equipment suppliers, catering establishments and transport operators. Many of them are in economically Less Favoured Areas (LFAs) in remote rural locations which depend on grouse shooting as the main economic driver outside the tourist season. Grouse moors in England support 1,520 Full Time Equivalent jobs. 700 of these are directly involved with grouse moor management and a further 820 jobs are in related services and industries.

There are many studies, which demonstrate the benefits to moorland biodiversity from grouse management and research continues in this field. Alongside this, more research is needed into the wider contribution, not just to the rural economy but to social cohesion and the non-financial support provided by the activity. For this reason, the GWCT is proposing a research project quantifying the social benefits of grouse shooting to our remote upland communities.



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