giving nature a home

Scotland

How to prevent nature and carbon going up in smoke: Licensing Muirburn

September 2021

Contents

Acknowledgements

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Muirburning by Laurie Campbell (rspb-images.com)

Introduction

Muirburn is the 'traditional' practice of burning vegetation (usually to promote new growth) and is mainly associated with managing land for grouse shooting, deer management or for sheep farming.

Over the years, muirburn has become subject to both statutory regulation and voluntary guidance. In the light of the current climate and nature emergencies, the impacts of muirburn on both biodiversity and carbon, and the systems for its regulation, have come under scrutiny. The nature and extent of benefits and impacts remain contested but have been extensively researched. Based on this research, RSPB Scotland has long called for change[1].

Recent official reviews[2] of the evidence have supported this position – and, in the light of these reviews, the Scottish Government has concluded that further regulation is necessary. The (then) Rural Affairs and Natural Environment Minister, Mairi Gougeon MSP, said in a statement to Parliament on Thursday 26 November 2020, that:

> "In future Muirburn will only be permitted under licence from NatureScot, regardless of the time of year it is undertaken. And there will be a statutory ban on burning on peatland, except under licence for strictly limited purposes such as habitat restoration."[3]

This report seeks to examine the current regulatory framework, its history and effectiveness – based on both the recent scientific reviews and observational evidence. Using that context, it examines how the framework needs to evolve to deliver the commitment made above, both in itself and in a manner that is consistent with the Government's wider policies to address the climate and nature emergencies. This 'evolution' will require legislative change, improvements to implementation and enforcement arrangements – and consequential changes in land management practices and culture.

1 For example: https://community.rspb.org.uk/ourwork/b/scotland/posts/muirburn-scotland-s-uplands-going-up-in-smoke-in-the-climate-and-nature-emergencies

2 Werritty, A., Pakeman, R.J., Shedden, C., Smith, A., and Wilson, J.D. (2015). A Review of Sustainable Moorland Management. Report to the Scientific Advisory Committee of Scottish Natural Heritage. SNH, Battleby. Available at: https://www.nature.scot/sites/default/files/2017-11/Guidance-A-Review-of-Sustainable-Moorland-Management-A1765931.pdf; https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/; and https://www.theccc.org.uk/wp-content/uploads/2020/01/Land-use-Policies-for-a-Net-Zero-UK.pdf

3 https://www.gov.scot/publications/werritty/

Red grouse by Tom Marshall (rspb-images.com)

What is muirburn?

Since pre-history, people have used fire as a tool to manage our environment[4]. Fire has probably been a feature in the Scottish uplands for many hundreds, even thousands, of years.

There is evidence that fire may have been used to clear land since Neolithic times, but it was not until the late medieval period when burning started to become a common management practice[5]. This long history was summarised by McVean and Lockie (1969)[6] as:

> "The haphazard process, by which the grazing value of the original forest, scrub and moorland was temporarily improved, developed into the present-day system of rotational burning for both sheep and grouse. In a relatively short time, the practice has become so deeply ingrained as to be almost an article of faith, and any attempt at dispassionate reassessment is not well received."

Muirburn as habitat management for red grouse spread rapidly during the middle of the 19th century. Prior to this, burning was mainly carried out to improve grazing for sheep and red deer – a practice that continues today. Burns for sheep and deer management are often larger than those for grouse and have the aim of encouraging more palatable/nutritious vegetation.

The current method of strip burning was known to occur in the 19th century, however, it was not until an inquiry into grouse disease in 1911 that the practice started to become codified[7]. This management for red grouse aims to create a mosaic of new growth (heather is the main food for red grouse, greener/fleshier heather is more nutritious) whilst maintaining older stands of heather for cover/nesting sites. It is therefore one means by which grouse moor managers encourage higher densities of red grouse to enable a 'surplus' to be generated for shooting.

4 For example: https://academic.oup.com/bioscience/article/59/7/593/334816

5 https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/images/Review%20Impacts%20of%20Burning%20on%20Peatlands%2C%20June%202011%20Final.pdf

6 McVean, D.N. & Lockie, J.D. 1969. Ecology and Land Use in Upland Scotland. Edinburgh University Press. Edinburgh.

7 https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/images/Review%20Impacts%20of%20Burning%20on%20Peatlands%2C%20June%202011%20Final.pdf

Legal and policy context

Burning as a land management tool has always been considered a 'right' held by the land manager (albeit with those rights often divided/contested between landlord, commoners, crofters, tenants, etc). However, it has also always been a right to be exercised with responsibility – and one that could, and should, be regulated in the public interest.

Muirburn was first legally regulated, in Scotland, in 1424, when the Parliament of James I of Scotland, decreed [in translation – see box 1] "that no man burn muirs after the month of March until the corn is cut"[8]. The penalty for transgression was a fine of 40s, or 40-days imprisonment.

> Item it is statute at ne man mak murebirnyng efter the moneth of March quhill corne be schorne undir the pane of xl s. to be rasit to the lord of the land of the birnare.

Box 1: Original version of 1424 statute banning muirburn from the end of March "until the corn is cut"[9].

This was, in effect, the first introduction of a "close season" – presumably, given the dates, related to the protection of breeding wildlife/game/farm animals and/or growing crops. Moreover, it was a close season that also recognised latitudinal and altitudinal differences in ecology by linking its end date to the local harvest date.

Today, the legal basis for muirburn is the Hill Farming Act 1946, as amended[10]. In its original form[11], the 1946 Act provided little more than updated seasons, provisions for landlord-tenant relations, and neighbour notifications – as well as a power for the Government to adjust seasons. This 1946 Act was, of course, passed in the immediate post-World War II – as part of wider efforts to promote food production. It was a 'Hill Farming' Act despite one of the major uses of muirburn having been for the management of sport shooting. The sole provision related to environmental protection, or the public interest (other than the impact of the seasonal restrictions), was a requirement for "sufficient staff and equipment to control and regulate the burning operations so as to prevent damage to any woodlands on or adjoining" the area being burnt.

In the 21st century, the 1946 Act has been significantly amended, by the Climate Change (Scotland) Act 2009[12] and the Wildlife and Natural Environment (Scotland) Act 2011[13]. These changes primarily relate to the powers of the Government to alter seasons, the introduction of a power to issue licences for 'out of season' muirburn and improved procedures for the notification of, as appropriate, landlords, tenants, neighbours, etc.

In addition to these general provisions, muirburn is also subject to regulations that apply to specific places. This includes areas that are designated for their natural or cultural heritage (SSSIs, SPAs, ancient monuments, etc) – where specific provisions apply should muirburn have the potential to damage the interest to be protected. Similarly, muirburn is subject to provisions related to protected species and their nests or nest sites. Further specific provisions apply close to public roads while, in some cases, smoke from fires may be subject to general public nuisance law.

8 https://www.rps.ac.uk/trans/1424/22

9 https://www.rps.ac.uk/trans/1424/22

10 https://www.legislation.gov.uk/ukpga/Geo6/9-10/73/contents

11 https://www.legislation.gov.uk/ukpga/Geo6/9-10/73/crossheading/muirburn-scotland/enacted

12 https://www.legislation.gov.uk/asp/2009/12/part/5/chapter/2/crossheading/muirburn

13 https://www.legislation.gov.uk/asp/2011/6/part/4/crossheading/muirburn

Damage from an accidental wildfire on Rum

Neither the general or specific legislation includes consideration of matters that, today, are of concern, such as the impact of burning on the underlying soil (including peat/carbon), wider biodiversity, water quality/quantity, or the climate impacts.

The legislative framework is, however, supplemented by **voluntary**, good practice guidance in the Muirburn Code[14] which partly addresses these matters. The current version, produced by the Moorland Forum, and launched by (then) Cabinet Secretary Roseanna Cunningham, was first published on 22 September 2017, and updated on 20 May 2021.

The Code sets out the statutory obligations that "must" (or "must not") be undertaken – these relate mainly to the legal restrictions (seasons, fire safety, etc) and other statutory issues such as protected sites, species, ancient monuments, etc. This is accompanied by best practice guidance that "should" be followed. This guidance relates to matters such as peatlands, thin soils, landforms, waterbodies, etc. The Code is also referred to within the requirements of Good Agricultural and Environment Conditions that apply to agricultural subsidies[15].

14 https://www.nature.scot/doc/guidance-muirburn-code

15 https://account.ruralpayments.org/publicsite/futures/news-events/new-version-of-the-muirburn-code/

Environmental context

Few people now doubt the existence, seriousness, or causes of climate change. In Scotland, the Government has declared a "climate emergency", set new ambitious targets for emissions reductions and is seeking to show it is a "world leader".

The scale and urgency of the climate emergency, as well as its causes, were highlighted once again in the most recent IPPC report[16] – a report that the UN Secretary General António Guterres described as "a code red for humanity"[17]. The Scottish Government also recognises that the climate and ecological emergencies are inextricably linked[18]. This biodiversity crisis is illustrated by the fact that almost half of Scotland's species have declined in the last 50 years, and one in nine is at risk of extinction[19].

In the light of this inter-related climate and nature emergency, the impacts of muirburn on issues of public interest, including biodiversity, carbon, and water, have come under scrutiny. A few examples of the evidence related to these issues are set out below.

16 https://www.ipcc.ch/report/ar6/wg1/

17 https://www.bbc.co.uk/news/science-environment-58130705

18 For example: https://www.theyworkforyou.com/sp/?id=2019-05-09.23.0 and https://www.fightforscotlandsnature.scot/news/nicola-sturgeons-letter-underlines-commitment-to-nature-now-lets-see-a-scottish-environment-act/

19 https://www.scotlink.org/publication/state-of-nature/

Damage from an accidental wildfire on Rum

1 Biodiversity

Scotland's uplands are of global importance for biodiversity, including their vegetation, invertebrate and bird communities[20]. Large areas have been given legal protections for nature conservation under the European Habitats and/or Birds Directives – often underpinned by domestic designation as Sites of Special Scientific Interest[21]. In 2010, burning was cited by SNH (now NatureScot) as a primary reason for poor condition of upland sites designated for their conservation value, contributing to the reasons for "unfavourable" condition on 87% of "unfavourable" upland bog features in Scotland[21]. The 2010 "Condition of Designated Sites (Progress to March 2010)" report also indicated that "Inappropriate muirburn practice was highlighted as a negative factor on half of the upland heath features."[22]

In 2015, RSPB Scotland reviewed the pressures affecting conservation status of designated natural features on protected areas in Scotland. Using SNH site monitoring data, this demonstrated that:

- "201 assessed features (4%) are affected by burning across **all** designated sites.
- 71% merlin, 50% hen harrier, 44% dry heath and 27% of blanket bog features are impacted by burning.
- Considering unfavourable features alone, 100% of hen harrier and merlin features, 59% dry heath and 51% blanket bog features have burning listed as a pressure."[22]

The impact on merlins as a designated feature within protected areas is also reflected in a study of this species in the Lammermuirs. Here, the increased intensity of moorland management, including muirburn, was identified as a possible contributory factor in the long-term decline of breeding merlins on grouse moors[23]. A similar study, related to hen harriers in North-East Scotland, concluded that "illegal persecution and grouse-management practices are believed to be the main causes of [the dramatic] decline, which occurred despite ample suitable habitat and prey." Muirburn was a major part of those grouse-management practices, with the study noting that "Red-listed and Schedule 1 species' breeding sites are often burnt out" and that "the previous year's nest sites being burnt out in the non-breeding period"[24].

The above examples are not systematic but do highlight the impact on protected sites and some protected species. In England, a systematic review of the evidence on the effects of managed burning on upland peatland biodiversity showed that, whilst evidence gaps remained, 8 of 12 studies showed negative impacts of burning on flora and fauna[25].

20 Pearce-Higgins, J.W., Grant, M.C., Beale, C.M., Buchanan, G.M., Sim, I.M.W., 2009. International importance and drivers of change of upland bird populations. In: Bonn, A., Allott, T. (Eds.), Drivers of Environmental Change in Uplands. Routledge, Abingdon, pp. 209–227; Thompson, D.B.A., Macdonald, A.J., Marsden, J.H., Galbraith, C.A., 1995. Upland heather moorland in Great Britain: a review of international importance, vegetation change and some objectives for nature conservation. Biol. Conserv. 71, 163–178.

21 https://www.nature.scot/sites/default/files/2018-10/Condition%20of%20designated%20sites.pdf

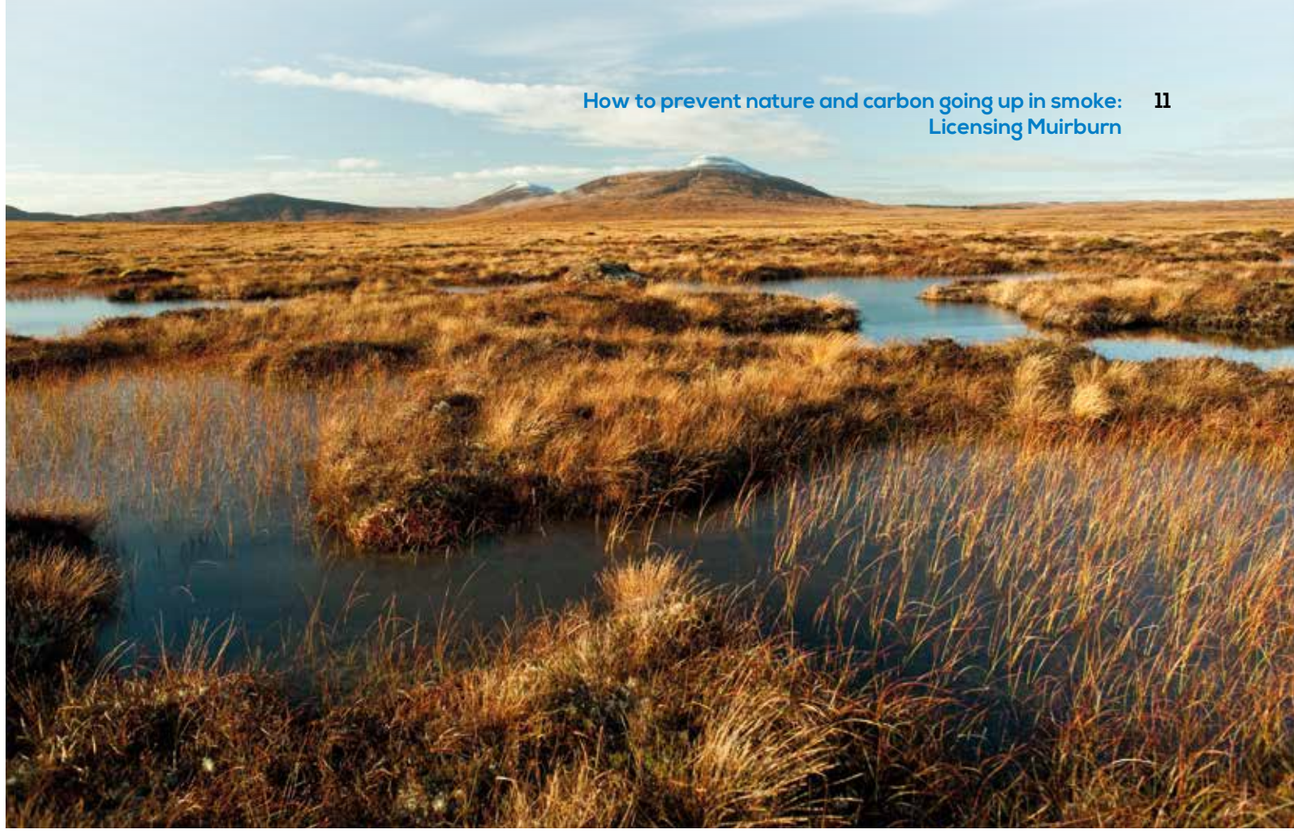
22 https://www.rspb.org.uk/globalassets/downloads/documents/positions/safeguarding-sites/pressures-affecting-conservation-status-of-designated-natural-features-in-scotland.pdf

23 Heavisides, A., Barker, A. and Poxton, I. (2017). Population and breeding biology of merlins in the Lammermuir Hills. British Birds 110: 138-154. (https://britishbirds.co.uk/content/population-and-breeding-biology-merlins-lammermuir-hills)

24 Rebecca, G et al (2016). The past, current and potential status of breeding Hen Harriers in North-east Scotland. British Birds 109: 77-95. (https://britishbirds.co.uk/content/past-current-and-potential-status-breeding-hen-harriers-north-east-scotland)

25 Glaves, D., Morecroft, M., Fitzgibbon, C., Owen, M., Phillips, S. & Leppitt, P. 2013. The effects of managed burning on upland peatland, biodiversity, carbon and water. Natural England Evidence Review, No. 004. http://publications.naturalengland.org.uk/publication/5978072

Heather by Andy Hay (rspb-images.com)



RSPB Forsinard Flows by Eleanor Bentall (rspb-images.com)

2 Peat and carbon

Scotland's uplands comprise a mix of open habitats, including large areas of blanket bog and Northern Atlantic wet heath (both listed as Annex 1 habitats on the EC Habitats Directive). Many of the best areas are protected as Special Areas of Conservation (SAC).

Fire has been, and is, routinely used across such areas, by land managers, to generate a mosaic of young and old heather to increase grouse numbers for shooting. Farmers, crofters, and deer managers also use fire to improve the quality of grazing. The repeated use of fire on upland bogs and heaths has increased heather cover with peat-forming vegetation replaced by heather in many areas[26]. Scotland's Muirburn Code[27] therefore notes that burning "should not take place on peatland except as part of a habitat restoration plan, approved by NatureScot".

Yet, despite the sensitivity of peatland habitats being recognised in the Muirburn Code, peatland vegetation is still widely burnt each year, including on protected sites. A recent study found that 28% of 1-km burnt squares were classified as overlying deep peat in Scotland, and that burning was widespread across protected areas with burning detected in 55% of SACs and 63% of SPAs. The same study suggested that the annual number of burns increased by 11% per annum between 2001-2011 as grouse moor management has intensified[28]. Recent analysis, for the Scottish Government, confirms that "active burning in 2018 was … present for 79% of holdings (87% of area)" and that "there have been changes in the intensity of management between the [Douglas et al] analysis and 2018 with both increases and decreases"[29].

26 IUCN UK Peatland Programme (2020) Position Statement – Burning and peatlands – https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2020-04/IUCN%20UK%20PP%20Burning%20and%20Peatlands%20Position%20Paper%202020%20Update.pdf

27 The Muirburn Code – Management of Moorland by Burning and Cutting. 2017: https://www.nature.scot/doc/guidance-muirburn-code

28 Douglas et al. 2015. Vegetation burning for game management in the UK uplands is increasing and overlaps spatially with soil carbon and protected areas. Biological Conservation 191, 243-250; also at: https://muirburncode.org.uk/wp-content/uploads/2016/08/Douglas-et-al-Burning-for-Game-Management-2015-1.pdf

29 Matthews, K.B., Fielding, D., Miller, D.G., Gandossi, G., Newey, S., Thomson, S. (2020) Mapping the areas of moorland that are actively managed for grouse and the intensity of current management regimes. Part 3 – Research to assess socioeconomic and biodiversity impacts of driven grouse moors and to understand the rights of gamekeepers. Commissioned report for Scottish Government, pp-47, URL: https://sefari.scot/document/part-3-mapping-the-areas-and-management-intensity-of-moorland-actively-managed-for-grouse

In 2010, IUCN reported that "in recent years, concern over the nature of peatland carbon stores have prompted a series of works looking at the impact of burning on carbon stores and fluxes"[30] and, despite a range of studies (lab/field, long-term, short-term), there is still much that is not known. However, clearly, burning off the vegetation releases carbon, but the vegetation that grows back has the potential to re-absorb that carbon as it grows. A recent review suggested that the evidence for a net loss of carbon dioxide is unclear[31]. This uncertainty is, however, dependent on the recovery of the vegetation – and, as shown above, repeated burning and the recent intensification of management often leads to a deterioration of habitat quality. This is because burnt habitats can become 'locked into' a cycle of burn-recovery-burn-recovery and if the burn also impacts on the underlying soil (peat) and associated carbon cycling processes, then a burn (or a history of burns) can have a more profound (but invisible) impact.

Notwithstanding this uncertainty, there is a more serious concern about the impact of management on the security of the "carbon store" within our peatlands. Scotland's peatlands store about 25 times more carbon than all the forests of the UK[32] – they are therefore, in carbon terms, our very own Amazon Rainforest. If that carbon were to escape it would be the equivalent of 140 years' worth of Scotland's current total emissions. When in good condition, peatlands form new peat and lock up more carbon from the atmosphere, perhaps as much as three tonnes a year for every hectare. But four-fifths of our peatlands are classed as degraded, meaning that they are leaking carbon into the atmosphere instead of locking it up.

A recent study by Aberdeen University and the James Hutton Institute summarised this with the following conclusions:

- "In Scotland, peatlands cover more than 20% of the surface (more than 90% of which is blanket bog) and store more than 2500Mt of carbon"
- In 2050, more than half of the carbon currently stored in Scottish blanket bogs will be at risk of loss. This [would equate to] 4.4–6.6 times the amount of carbon emitted in 2016 from all the sectors in Scotland."[33]

Scotland's climate change targets are now for 'net zero' emissions by 2045. Thus, the risk to the carbon stored in peatlands and whether this remains 'locked up' (and increases as more peat develops) or is released is crucial. Thus, the credibility of all the Government's efforts on emissions reductions will depend to a great extent on the quality, and ongoing management, of our peatland habitats. That habitat quality is, in turn, heavily dependent on management, including by the nature and extent (or absence) of burning.

This credibility is currently also undermined by the apparent policy contradiction whereby the Scottish Government is investing £250m over ten years to restore peatlands[34]; while it remains legal to burn and accelerate the deterioration of other such areas (or, indeed, possibly, to burn areas that have been restored using taxpayers' money).

30 https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/images/Review%20Impacts%20of%20Burning%20on%20Peatlands%2C%20June%202011%20Final.pdf

31 https://www.climatexchange.org.uk/media/2063/muirburn__peatland_and_peat_soils_-_an_evidence_assessment.pdf

32 https://www.nature.scot/sites/default/files/2019-04/Peatland%20Action%20-%20COMMS%20-%20Materials%20-%20LEAFLET%20-%20Carbon%20Facts%20and%20Figures%20leaflet%20screen%20-%20with%20full%20reference%20list%20-%202019%20UPDATE.pdf

33 Ferretto et al (2019) Potential carbon loss from Scottish peatlands under climate change; available at https://link.springer.com/article/10.1007/s10113-019-01550-3

34 https://www.gov.scot/news/funding-to-restore-scotlands-iconic-peatlands/

3 Water

The intensive management of upland habitats, especially burning and associated drainage, can impact the hydrology of the area – affecting both water flows and water quality.

Campaigners have linked flood events directly to grouse moor management[35]. While such direct linkage is contested, it is clear from research that "prescribed vegetation burning has important effects on blanket peatland hydrology at a range of spatial scales"[36]. These effects include changes to water table levels, water table variability, flow rates and storm lag times. By contrast, where grips (or drainage channels) have been blocked, there is some evidence that this slows water release into the catchment and, depending on where this occurs, it can mitigate flooding further downstream[37].

Draining and burning management of peat moorlands can also result in water quality issues. Intensive management leads to the loss of peat forming plant species such as Sphagnum mosses. Where the peat surface is exposed, such as through excessively hot burns, desiccation and erosion can result, with associated water sediment and colouration problems. The cost of removal of peat colouration from water for domestic use is currently borne by water companies and, ultimately, consumers and taxpayers[38].

The IUCN UK Peatland project note that peatland restoration (including the cessation of burning):

> "offers a potentially cheaper and more sustainable option to improve the quality of raw water arising from peaty catchments, avoiding costly treatments and use of chemicals;" and, when "combined with appropriate ongoing habitat management, may also contribute to regulation of flooding"[39].

35 https://www.theguardian.com/commentisfree/2015/dec/29/deluge-farmers-flood-grouse-moor-drain-land

36 Holden, J., S. M. Palmer, K. Johnston, C. Wearing, B. Irvine, and L. E. Brown (2015), Impact of prescribed burning on blanket peat hydrology, Water Resour. Res., 51, available at: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2014WR016782

37 Orr, H. and Donovan, W., Climate change, upland management and flood protection. Presentation to Moors for the Future conference (Climate Change and Upland Management, 2007); quoted in Natural England (2009) Environmental impacts of land management (NERR030) available at: http://publications.naturalengland.org.uk/publication/30026

38 Natural England (2009) Environmental impacts of land management (NERR030) available at: http://publications.naturalengland.org.uk/publication/30026

39 https://www.iucn-uk-peatlandprogramme.org/about-peatlands/peatland-benefits/water-quality

Sphagnum moss by Paul Turner (rspb-images.com)

Damage from extinguished accidental wildfire on Rum

4 Wildfires

Wildfires are an increasing environmental issue, given the impacts on vegetation/habitats and carbon emissions[40]. However, they can also be a more serious human concern with risks to property and life, as well as being a drain on the time and resources of the emergency services[41]. Moreover, the latest Scottish Fire and Rescue Service strategy on wildfires notes "the increased risk of wildfire and changing climate in Scotland"[42] and, in England, the incidence of wildfire is increasing[43].

An SNH-commissioned review in 2015 included evidence "that over 50% of wildfires with known causes may themselves be caused by loss of control of prescribed burns [that is, muirburn].[44]" In parallel, it also reported arguments that prescribed burning limits the ecological impacts and economic costs of wildfire. These latter arguments are based on the view that well-managed muirburn reduces fuel load (an attempt to reduce the intensity of any wildfire that does occur) and can ensure the maintenance of firebreaks. As a result, the final report of the Scottish Government's Grouse Moor Management Group ("Werritty review") concluded that:

> "The relationships between muirburn and wildfires are also poorly understood and the subject of current scrutiny.[45]"

That said, there is a certain paradox in promoting the use of muirburn to prevent wildfires when it is itself one of the most common cause of those fires. This cause of wildfires was underlined, in 2020, when the Coronavirus (Scotland) Act 2020 suspended muirburn in April of that year as a "measures to alleviate pressures on public services" (in that case the emergency services)[46].

In addition, the RSPB has concluded (based on its practical experience of the spread and impact of recent fires on or near some its reserves) that the fuel load is best managed (reduced) on peatlands by restoring peatland hydrology and ecology through raising water levels (re-wetting) and transplanting peat-forming bog mosses back onto the bog surface, both of which make the bog surface wetter and better protect the underlying carbon-rich peat[47].

40 https://www.wwf.org.uk/sites/default/files/2019-11/Carbon%20loss%20and%20economic%20impacts%20of%20a%20peatland%20wildfire%20in%20north-east%20Sutherland.pdf

41 https://www.firescotland.gov.uk/your-safety/wildfires.aspx

42 https://www.firescotland.gov.uk/media/2279175/sfrs_wildfire_strategy_v1.pdf

43 Glaves et al. 2020. The causes and prevention of wildfire on heathlands and peatlands in England. Natural England Evidence Review NEER014. Peterborough

44 https://www.nature.scot/sites/default/files/2017-11/Guidance-A-Review-of-Sustainable-Moorland-Management-A1765931.pdf

45 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/

46 https://www.gov.scot/binaries/content/documents/govscot/publications/foi-eir-release/2020/09/foi-202000079439/documents/foi-202000079439---information-released-a/foi-202000079439---information-released-a/govscot%3Adocument/FoI-202000079439%2B-%2BInformation%2Breleased%2B%2528a%2529.pdf

47 https://www.rspb.org.uk/globalassets/downloads/documents/birds-and-wildlife/gamebird-shooting-review/protecting-peatland-habitats.pdf

Much of the evidence referenced above, on the impacts of muirburn on biodiversity, on carbon emissions, on water quality and flows, and on wildfires, has been extensively reviewed – for SNH's (as was) Scientific Advisory Committee in 2015[48] and by the Scottish Government's Grouse Moor Management Group ("Werritty review")[49]. The recommendations of the latter, as well as the Scottish Government's response, are reproduced in Annex 1. These Scottish reviews are consistent with a similar in-depth review of the evidence undertaken by Natural England[50].

In January 2020, the Climate Change Committee called for a "ban [on] damaging practices such as rotational burning on peatland" as "it is highly damaging to the peat, and to the range of environmental benefits that well-functioning peat can deliver (e.g., water quality, biodiversity and carbon sequestration). A voluntary cessation of this activity by landowners has not produced the desired outcome so the practice should be banned across the UK with immediate effect."[51]

In response to this evidence, and specifically the "Werritty review", the (then) Rural Affairs and Natural Environment Minister, Mairi Gougeon MSP, announced in November 2020, that:

> "In future Muirburn will only be permitted under licence from NatureScot, regardless of the time of year it is undertaken. And there will be a statutory ban on burning on peatland, except under licence for strictly limited purposes such as habitat restoration.[52]"

This remains Scottish Government policy, as does the formal response to the Werritty review (see Annex 1). However, at present, there is no clear timetable for the introduction of such licencing and little indication of the nature of the likely scheme. It is understood, however, that NatureScot are undertaking initial preparations. In August, the Scottish Government and the Scottish Green Party published a draft shared policy programme[53], subsequently approved by both parties, that included the commitment to:

> "We will support the transition to more economically and environmentally productive uses of land where appropriate and deliver the recommendations of the Grouse Moor Management Review Group as a **matter of urgency**, including the licensing of grouse moors.
>
> "Licensing or further regulation will cover the key areas identified in the review, **including muirburn**, wildlife control, the use of medicated grit and wildlife crime. Licensing will be supported by clear penalties to encourage compliance, as well as additional effort to detect wildlife crime."

The Programme for Government 2021-2 published on 7 September gives a commitment to deliver the recommendations of the Grouse Moor Review Group. It explicitly mentions that "licensing will cover the key areas identified in the review, including muirburn,…" Chapter 4 page 90.

48 Werritty, A., Pakeman, R.J., Shedden, C., Smith, A., and Wilson, J.D. (2015). A Review of Sustainable Moorland Management. Report to the Scientific Advisory Committee of Scottish Natural Heritage. SNH, Battleby. Available at: https://www.nature.scot/sites/default/files/2017-11/Guidance-A-Review-of-Sustainable-Moorland-Management-A1765931.pdf

49 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/

50 Glaves, D.J., Morecroft, M., Fitzgibbon, C., Lepitt, P, Owen, M. & Phillips, S. 2013. Natural England Review of Upland Evidence 2012 - The effects of managed burning on upland peatland biodiversity, carbon and water. Natural England Evidence Review, Number 004; available at http://publications.naturalengland.org.uk/publication/5978072

51 https://www.theccc.org.uk/wp-content/uploads/2020/01/Land-use-Policies-for-a-Net-Zero-UK.pdf

52 https://www.gov.scot/publications/werritty/

53 https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/documents/

Some current practices

In the light of the ongoing debate, and the ongoing evidence of impacts, RSPB Scotland has continued to highlight this issue – and has sought further evidence of current practice[54]. This relatively low-key call for examples has resulted in many cases being brought to our attention – where appropriate, that is, if regulatory issues are engaged, we have of course passed such cases to the appropriate authorities, such as NatureScot or the Scottish Government's Rural Payments and Investigations Division.

Beyond any regulatory issues, however, the examples appear to show a widespread unawareness or non-compliance with the (non-statutory) Muirburn Code. Of course, this is not a nationwide survey or any form of systematic sampling. It is not, therefore a "robust system of monitoring" that Werritty describes as absent[55]. It is, however, indicative and, given the number of cases revealed as a result of little 'search effort' should be viewed as concerning.

The issues raised include a range of matters addressed by the Muirburn Code, including:

1 **Extent and location**

2 **Scree: steep/rocky slopes, summits, etc.**

3 **Soil**

4 **Nest sites**

5 **Woodland and scrub.**

These issues, along with some of the examples that have been brought to our attention are discussed, in turn, below.

54 https://community.rspb.org.uk/ourwork/b/scotland/posts/muirburn-scotland-s-uplands-going-up-in-smoke-in-the-climate-and-nature-emergencies

55 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/ (page 6)

Picture 22: Muirburn right up the riverbank and the tree enclosure, Cairngorms

1 Extent and location

The Muirburn Code does not stipulate maximum extent for any burn. It is, however, written on the basis that the objective of muirburn (for so called 'heather moorland') is "to create a mix of patches of different age and structure" (page 20) and seeking to maintain "the heterogeneity of vegetation cover and structure" (page 3). It also states that "it is good practice to identify a network of patches that are not burnt or cut" (page 10).

Further, the grouse industry's own publicity about the benefits of muirburn focuses extensively on the targeted nature of the operations, and the small patches that are burnt, writing:

> "Burning targets tall, woody **patches** of heather to allow for new growth. Burning takes place in cycles of up to 20 years, with **small patches** burnt at different times then left to regenerate. This creates the **patchwork** hill sides we see around Scotland" [56].

Despite this emphasis, by the Code and by the industry, on 'patches', it is not uncommon to see large areas burnt – or, indeed, whole hillsides. Pictures 8, 9 and 10 illustrate examples of recent muirburn that appear to be excessive in extent, while picture 11 shows a fire underway that appears to encompass a whole hillside.

Of course, if poorly located, the extent of a burn is irrelevant; even small patches that are inappropriately located (e.g., adjacent to woodland or along burnsides) should not be burnt and the Muirburn Code (pages 7 and 9) advises against burning such areas. Such a case was documented, in October 2020, by Nick Kempe on his "Parkswatchscotland" blog where burning (albeit in small patches) took place adjacent to trees planted as part of a habitat regeneration project and alongside a watercourse[57].

56 https://www.giftofgrouse.com/2019/01/17/2717/

57 http://parkswatchscotland.co.uk/2020/10/21/muirburn-and-environmental-destruction-in-the-cairngorms-glen-callater-and-the-invercauld-estate/

Pictures 8, 9 and 10: Potentially excessive areas of past burning, Scottish Borders.

Picture 9

Picture 10

Picture 11: Muirburn of potentially excessive extent, Inverness-shire, 2021.

Pictures 5 and 6: Burning of steep, scree covered slopes, Perthshire, 2021

2 Scree: steep/rocky slopes, summits,etc.

The Muirburn codes advises against burning on scree, on steep/rocky slopes or over the summits of hills. This is because in these areas vegetation is likely to be sparse and short anyway (and thus burning providing no benefits) and/or as the vegetation will be an important stabilising feature.

> **"Summits, ridges and other areas very exposed to the wind… should not be burnt, as vegetation is kept short by high winds (wind-clipped); burning has no benefit and risks removing vegetation cover, leading to erosion."**
>
> Muirburn Code, page 8.

> **Slopes steeper than 1 in 2 (27°) should be avoided altogether.**
>
> **Avoid burning into scree slopes to avoid damaging lichen and destabilising the scree.**
>
> Muirburn Code, page 9.

Pictures 5 and 6 illustrate a common sight – the burning of a steep slope, with patches of rocky scree – that is clearly in breach of the good practice promoted by the Muirburn Code. This case was considered by the Scottish Government Rural Payments department who have stated: "The issue has been fully investigated under Cross Compliance Regulations and the appropriate action has been taken." Of course, it is unclear what the investigation revealed or what action was taken (it may be that the department is prohibited from saying so), but this illustrates that it was taken seriously.

Picture 4 (see under woodland, below) shows another example of a fire that continued across a scree slope. Picture 7 illustrates a clear example of burning over a summit.

Picture 6

Picture 7: Clear evidence of past burning across the summit of a hill, Scottish Borders

Picture 4: Large scale burn removing regenerating pinewood, Inverness-shire. This uncontrolled burn continued over the scree and crag.

3 Soil

The Muirburn Code clearly states that peatland should not be burnt (except in defined circumstances), including any areas of bare peat, peat hags, etc. It also highlights the concern that burning over thin soils can remove vegetation and expose the area to erosion.

Peat

Burning should not take place on peatland, except as … approved by NatureScot. Peat is an organic soil, which contains more than 60 per cent of organic matter and exceeds 50 centimetres in thickness.

Areas with peat hags, bare peat or erosion should not be burnt.

Thin soils (<5cm deep) over underlying rock.

These areas should not be burnt. If vegetation is removed, soil may be eroded by wind and water down to bare rock.

Muirburn Code, page 8

Pictures 13 and 14: Extensive muirburn in East Lothian with close-up showing underlying rock exposed to erosion.

Pictures 13 and 14 show a case of muirburn, in the Lammermuirs, East Lothian where burning has clearly taken place over thin soils and the underlying rock is now exposed to erosion. Similarly, pictures 15 and 16 illustrate muirburn in progress on land that local observers considered to be peatland.

Pictures 19 and 20 show the effect of muirburn on the abundant Sphagnum moss of this Strathspey location. The moss is discoloured and damaged and will take years to recover – it is slow growing in any case. The presence of Sphagnum indicates a high likelihood this is on a wet and peaty soil, albeit of unknown depth.

Picture 14

Picture 15: Muirburn in progress in area considered by local observers to be peatland

Picture 16: Muirburn in progress in area considered by local observers to be peatland.

Pictures 19 and 20: Muirburn aftermath with discoloured and damaged Sphagnum moss; the presence of Sphagnum indicates a high likelihood this is on peat soil, albeit of unknown depth.

Picture 19

4 Nest sites

The Muirburn Code accurately describes the legal status of breeding birds, as well as that of their nests or nest sites. It highlights that the breeding season does, especially in February and March, overlap with the breeding of many upland bird species such as raven and golden eagle – and advises caution, survey, and avoidance action.

You MUST NOT:

Disturb or destroy the nests, eggs, or young of breeding birds.

Upland birds may be nesting on the ground, crags or trees during the muirburn season. All bird species are protected under the Wildlife and Countryside Act 1981.

A walk over survey of the area, prior to burning or cutting, should be carried out to allow appropriate avoidance action to be taken, if required; this may include the establishment of buffer zones based on guidance about safe working distances. For example, areas within 1km of nesting golden eagles should be avoided, after the end of January.

Muirburn Code, pages 5 and 7.

Notwithstanding this advice, the studies on hen harriers and merlins (see page 8) refer to the regular burning of nests and/or regular nest sites. Pictures 1 and 2 illustrate examples of this practice – in these cases a golden eagle nest in Ross-shire and a peregrine nest in the Scottish Borders. Such cases are also regularly reported to RSPB Scotland – similar cases, in the last decade, include an osprey nesting tree in Inverness-shire, a white-tailed eagle nest in Lewis, and a golden eagle's crag in Perthshire.

Of course, it is possible that these cases arise because those involved in burning are unaware of the nests, or the fires spread beyond the intended area. Indeed, in one of the cases cited here, an investigation by police/NatureScot was told that the fire 'got out of control'. Lack of awareness or an inability to control the extent of fires are themselves, however, contrary to the good practice promoted by the Muirburn Code.

Picture 1: Golden eagle nest in Ross-shire, abandoned subsequent to adjacent muir/grass burning, 2021.

Picture 2: Peregrine nest in the Scottish Borders, showing egg and nest abandoned after muirburn reached within one metre.

Picture 3: Mature pines scorched and regeneration of pinewood burnt out, Inverness-shire 2019.

5 Woodland and scrub

The Muirburn Code stresses that woodland should not be burnt. It also highlights the biodiversity benefits of native trees and the value of retaining scattered tress. It is clear that juniper should not be burnt.

You MUST NOT:

Cause damage to any woodland.

Fire damages or destroys trees and scrub.

Areas with native oak, birch, aspen, Scots pine, or willow are of particular value and generally should only be burnt as part of a woodland management plan.

Juniper bushes should not be burnt, as the bushes will not re-sprout.

Retaining scattered trees and scrub can be important for birds such as Black Grouse.

Muirburn Code, pages 4 and 7.

Notwithstanding this advice, woodland is often damaged and/or the regeneration or re-establishment of woodland is reversed/prevented by muirburn. Pictures 3 and 4 illustrate two such cases affecting mature and regenerating pinewoods in Inverness-shire. In the latter case, the uncontrolled fire (only one individual was present to control the fire) continued across the scree and crag. This represents further actions contrary to the code (a lack of sufficient control and the burning on/over scree/rocks). Pictures 17 and 18 show similar damage to native pinewoods in Strathspey – showing scorching of a mature "Granny pine" and how muirburn can prevent regeneration. Picture 21 shows such damage to juniper scrub in Strathspey – either demonstrating deliberate breach of the Code's advice or lack of control leading to such damage.

Picture 4: Large scale burn removing regenerating pinewood, Inverness-shire. This uncontrolled burn continued over the scree and crag.

Picture 17 and 18: a mature "Granny pine" and regenerating pine scorched by muirburn carried out too close to native woodland; both Strathspey.

Picture 21: Juniper scrub in Strathspey damaged and killed by muirburn – whether intended or not.

Picture 23: Land that is burned and then grazed prevents natural tree and scrub regeneration, negative for those species which depend on such habitats.

Meanwhile, picture 12 shows the aftermath of a burn that appears to be perilously close to woodland edge and juniper scrub. Whether the fire in picture 12 stopped before these habitats were reached by good management or by chance is, of course, unknown but picture 14 (see above under 'soils') also appears to show the burning in this locale that has clearly extended into the scattered birch woodland.

A similar case affecting woodland was documented, in March 2021, by Nick Kempe on his "Parkswatchscotland" blog. This is a clear example of the removal of trees and juniper scrub (by a mix of cutting and burning) to expand/enhance moorland for red grouse. As described by Nick:

> "The positive side of intensive grouse moor management is that deer numbers tend to be kept very low. This allows woodland to regenerate naturally and here it's been expanding up the hillside. There is clearly enormous potential to create a montane scrub zone, a habitat almost entirely absent from Scotland and which the Cairngorms National Park Authority is keen to promote, by natural means. Scandalously, however, as quickly as "good areas", such as those in the photo above, develop, others are destroyed."[58]

Notwithstanding Werritty's conclusion that there is no "robust system of monitoring compliance" and that "it is not currently possible to assess the effectiveness of the Code"[59], **it is clear from the above examples that the Code is not followed universally**. While these examples do not represent any form of random/statistical sampling, they have been relatively easy to collect/collate after a low-key call for such cases. This suggests that **either there is quite widespread unawareness of the Code, or it is widely misunderstood or ignored**.

Picture 12: Burning perilously close to woodland edge and Juniper scrub, East Lothian.

Picture 14: Extensive muirburn in East Lothian with close-up showing underlying rock exposed to erosion.

Picture 24: A small pocket of plantation fenced off to protect from grazing.

58 http://parkswatchscotland.co.uk/2021/03/01/the-ongoing-destructive-impacts-of-grouse-moor-management-the-case-of-dinnet-moor/

59 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/

Discussion and proposals

RSPB Scotland warmly welcomed the Scottish Government's announcement of a new policy in December 2020 that:

> "In future Muirburn will only be permitted under licence from NatureScot, regardless of the time of year it is undertaken. And there will be a statutory ban on burning on peatland, except under licence for strictly limited purposes such as habitat restoration.[60]"

Such an approach and the need for it is demonstrated by the general scientific evidence, especially as summarised by SNH[61], the "Werritty report"[62], and the UK Climate Change Committee[63].

In 2019-20, the RSPB also undertook a UK-wide review of its gamebird shooting policies[64]. This was based on a thorough review of scientific evidence[65] including that related to muirburn. This review highlighted that:

> "Despite growing awareness of the scale of these impacts (e.g., Douglas et al. 2015), vegetation is still routinely burnt in the English and Scottish uplands, both by managed burning and wildfire, with recent work confirming that burning has recently intensified in parts of the Scottish uplands (Matthews et al. 2018, 2020)."

Given this extensive evidence, including the bad practice illustrated in this report, it is clear that the status quo is untenable. The introduction of a licencing scheme, and a ban on burning peatland, is the most appropriate next step in the evolution of muirburn regulation. However, while this 'headline policy' is welcome and should be progressed as soon as possible, its introduction will need consideration of a number of questions of detail, including:

- How should a licencing scheme operate, what should (and should not) be permitted, and what, if any, conditions should be attached to a 'licence to make muirburn'?
- Who should administer, monitor, and enforce the licencing scheme, and how should that administration, monitoring, and enforcement be resourced?
- What is the definition of peatland over which no licences should be granted?

60 https://www.gov.scot/publications/werritty/

61 Werritty, A., Pakeman, R.J., Shedden, C., Smith, A., and Wilson, J.D. (2015). A Review of Sustainable Moorland Management. Report to the Scientific Advisory Committee of Scottish Natural Heritage. SNH, Battleby. Available at: https://www.nature.scot/sites/default/files/2017-11/Guidance-A-Review-of-Sustainable-Moorland-Management-A1765931.pdf

62 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/

63 https://www.theccc.org.uk/wp-content/uploads/2020/01/Land-use-Policies-for-a-Net-Zero-UK.pdf

64 https://www.rspb.org.uk/our-work/policy-insight/gamebird-review/gamebird-shooting-impacts/

65 https://www.rspb.org.uk/globalassets/downloads/documents/birds-and-wildlife/gamebird-shooting-review/grouse_moor_evidence_review_final.pdf

1 A licencing scheme

RSPB Scotland has previously produced detailed proposals for how a scheme to licence grouse shooting might be implemented[66]. A scheme for licensing of muirburn would be similar based on amending the Hill Farming Act 1946 to prohibit muirburn except under licence, in the same way that section 23C of that Act currently permits the licensing of "out of season" muirburn[67]. The detailed provisions would need, at a minimum, to specify:

- Who may apply for such a licence (landowner, tenant, agents, etc).
- Who would issue such a licence (Scottish Ministers, NatureScot, or the former delegated to the latter would be most likely).
- How licences should specify the location, timing, frequency, etc of muirburn.
- A statutory prohibition on the issuing of a licence for muirburn on peatland, including a definition of peatland (see below).
- How conditions might be applied to such licences.
- What offences and penalties would apply to any muirburn without a licence or in a manner inconsistent with the conditions applied to a licence.

In addition to the above legislative framework, the Scottish Government and/or NatureScot should develop policies or guidance on what form(s) of muirburn is, while balancing protection of the public interest with private rights/wishes, sufficiently acceptable to be permitted. Such policies/guidance would, in effect, be implemented by future decisions related to the issuing (or not) of the new muirburn licences, as well as the specifications of, and conditions applied to, such muirburn.

In the short-term, along with the statutory ban on burning of peatlands, RSPB Scotland considers that the most appropriate approach would be to adopt/ adapt the existing Muirburn Code to represent a description of "good muirburn" that may be permitted by the licencing scheme. In practice, this would mean that the conditions of any licence would replicate what is already described as 'best practice' but, as we have shown in the report, is not necessarily widely applied. For peatlands, the current guidance would effectively be turned into a statutory ban (and enhanced if the definition is improved – see below). In relation to other aspects of the Code, the "shoulds" would, effectively, be turned into "musts", although the flexibility of the scheme would allow the Scottish Government/NatureScot to permit such activities if evidence supported the application of such an exception.

In the longer term, the Code is already subject to ongoing monitoring and review – although as noted below, this is extremely limited and there is very little enforcement. The introduction of a more robust system of monitoring (both of compliance and impact on issues of public interest) and enforcement will be necessary to ensure that 'actual practice' equates to the Code's 'good practice'.

Thereafter, the results of this monitoring should inform future reviews and, if appropriate, more detailed specifications/restrictions might be introduced in future revised versions of the Code.

66 RSPB Scotland's 2021 report: Grouse moor licensing in Scotland: How might this be delivered by the Scottish Government?

67 Alternatively, sections 22 to 27A of the 1946 Act might be repealed completely, and totally new regime for Muirburn introduced in a new Act. Whichever approach is adopted, the detailed provisions outlined here would be necessary.

2 Administration and enforcement

An important aspect of any licensing scheme is the operation of its administration. The ease of administration for both the licensee and the licencing authority contributes greatly to its reputation. However, this must not be an overriding consideration – to retain credibility the scheme must also be robustly applied, with adequate reporting and full transparency to Parliament and the public, and enforcement action taken swiftly where necessary.

Balancing those, often conflicting, demands has always been a challenge for public bodies but it is one that experienced regulators have met increasingly successfully in recent years. In part, this has been assisted by the kind of strategy and risk-based approach to inspections and enforcement adopted, for instance, by the Scottish Environment Protection Agency[68]. Elements of this approach, including the higher levels of scrutiny at the "criminal/chancer" end of their compliance spectrum, should be adopted in implementing this new licencing scheme. Thus, it should be expected that the licencing authority for muirburn should devise an administrative system that focuses monitoring, inspection checks, and enforcement on those areas where burning is most intensive and/or the risks to biodiversity or carbon are greatest.

Increasing use of online tools to administer the applications and issuing of licences has also improved the processes for all parties – so long as the system is able to function for applicants with limited or poor broadband connections. Experience from NatureScot's developing online platform for licence applications[69] as well as the Scottish Government's Rural Payments system (especially in relation to mapping/ land registration) should be used in developing a new system. Forestry and Land Scotland's use of GIS to co-ordinate its deer management work also provides important experience.

The importance of monitoring cannot be over-emphasised. The "Werritty review" noted, with regard to the current voluntary system of 'self-regulation' under the Muirburn Code that:

> "In the absence of a robust system of monitoring compliance, plus the relatively few instances under the **Code** of the withholding of RPID payments under cross compliance, it is not currently possible to assess the **Code's** effectiveness."[70]

It will be important for the credibility of the new licencing scheme to ensure that it is well monitored and that, if/where any breaches occur, appropriate enforcement action is taken. This will clearly depend on the offences/penalties aspects of the new legislation, but these should be supported by a robust and well-resourced enforcement policy. In the development of these approaches, as well as criminal sanctions/remedies, the Scottish Government should consider the development of administrative fines that might be imposed by Scottish Ministers and/or NatureScot.

68 https://www.sepa.org.uk/media/219427/one-planet-prosperity-our-regulatory-strategy.pdf

69 https://www.nature.scot/professional-advice/protected-areas-and-species/licensing/online-licensing-system

70 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/

Grouse (Desmond Dugan) Nick Naylor and Cara (dog)

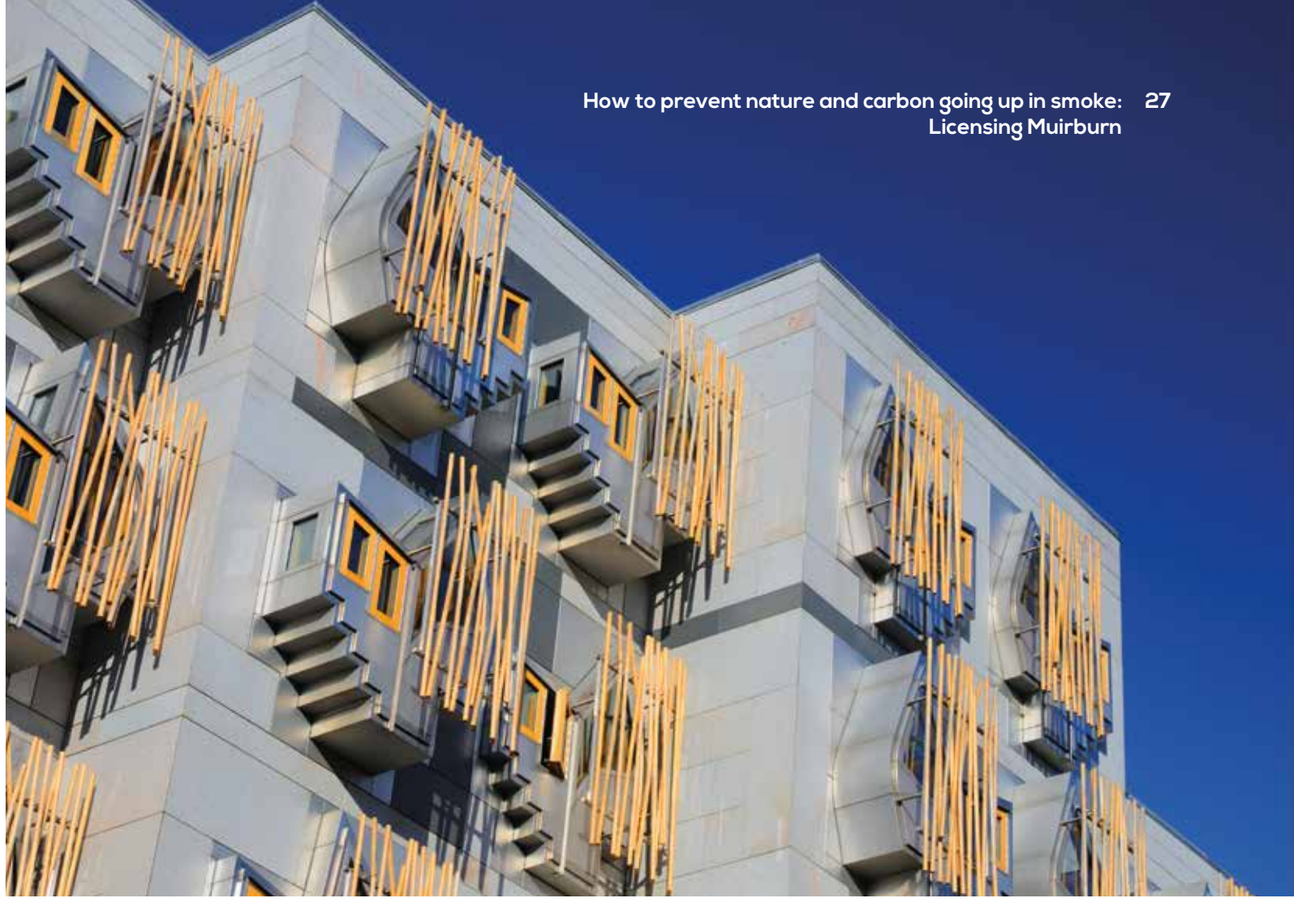
In addition, the Scottish Government will wish to maintain (and improve) the system of cross-compliance that reduces (or enables the recovery of) all/part of agricultural or forestry subsidies as a penalty for non-compliance with the terms of a muirburn licence. In particular, the Scottish Government will wish to address the deficiencies in the current cross-compliance system addressed in the "Werritty review"[71].

Finally, the Scottish Government and/or NatureScot will wish to work with land managers to raise awareness of the new legislation and policies, as well as to improve education and training. The latter is supported by the industry itself – for instance, a former Director of the Heather Trust has been quoted as saying "most [wildfires linked to muirburn] were caused by people attempting to carry out muirburn, but who 'don't know what they're doing' – a problem, he said, that is far too familiar in Scotland."[72]

71 https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/ (page 34)

72 https://www.scotsman.com/news/environment/scotland-wildfires-scottish-moorland-chief-renews-call-for-better-education-on-muirburn-to-prevent-the-countrys-fast-growing-wildfire-crisis-3140421

Shooting butt



Scottish Parliamentary building by ChrisHepburn (istockphoto.com)

3 Peatland

The review of evidence above supports the Scottish Government's commitment to introduce a ban on burning over peatland. Such a ban will have significant biodiversity benefits – by preventing the further deterioration (and encouraging the restoration) of important wildlife habitats. It is essential as part of meeting climate targets – by reducing emissions from burning but, most importantly, by protecting and enabling the enhancement of the 'carbon store' held in Scotland's peatlands and woodlands. The restoration and re-wetting of peatlands may also help to prevent the spread of wildfires.

These conclusions are supported by the RSPB's recent review of evidence on the environmental impacts of grouse moor management[73], which stated:

> "The UK's upland peatlands are mostly in sub-optimal condition. Field et al. (2020)[74] note clear climate and biodiversity benefits from the continued protection and improved management of these carbon-rich habitats (e.g. blanket bog). The restoration of the UK's upland peatlands has a key role to play in tackling the climate and nature emergencies (Field et al. 2020). Rather than continuing to burn our peatlands, we need to re-wet them and reintroduce peat-forming Sphagnum mosses to increase resilience to wildfire and secure a wider range of peatland ecosystem services."

73 https://www.rspb.org.uk/globalassets/downloads/documents/birds-and-wildlife/gamebird-shooting-review/grouse_moor_evidence_review_final.pdf

74 Field, R.H., Buchanan, G.M., Hughes, A., Smith, P. & Bradbury, R.B. 2020. The value of habitats of conservation importance to climate change mitigation in the UK. Biological Conservation, 248, https://doi.org/10.1016/j.biocon.2020.108619

In addition, a ban on burning peatlands will end the apparent policy contradiction whereby the Scottish Government is investing £250m over ten years to restore peatlands[75]; yet it remains legal to burn and accelerate the deterioration of other such areas.

While the voluntary Muirburn Code already discourages the burning of peatland, it is unclear whether this is widely followed. The evidence, in relation to other aspects of the Code, suggests that its provisions are not commonly known, or are widely misunderstood or ignored. Moreover, with 28% of 1-km burnt squares [on grouse moors] classified as overlying deep peat in Scotland[76], it is clear that the practice of burning peatland remains ongoing, especially when burns for agricultural reasons are added. It is therefore both appropriate and welcome that the Scottish Government plans to strengthen the Code's voluntary ban to a statutory ban.

The current voluntary approach considers that peatlands are areas where the soil "contains more than 60 per cent of organic matter and exceeds 50 centimetres in thickness". This definition is especially narrow – it contrasts, for example, with the UK Forestry Standard[77] and recent Scottish Forestry planting guidance[78] that both use a depth of 50cm to define peatlands. Both of these contrast with scientific consensus, summarised by Lindsay and Anderson (2018), who suggest that:

> "a widely accepted definition of peat states that peat is a soil with at least 30 % organic plant matter which has accumulated in situ and has a thickness of 30 cm or more."[79]

As the ban on peatland burning is implemented, it is crucial that a clear and consistent approach to definition is adopted. In response to the "Werritty review", the Scottish Government has agreed that it "will undertake a review of the current definition of peatland, taking expert advice on whether it should be revised, and a stricter definition imposed" (see annex 1). This commitment is welcome, and RSPB Scotland understands that NatureScot is likely to be involved in this review, but work has yet to start. It is important that this begins as soon as possible – both to ensure the ban is well implemented, but also to inform Parliament as it considers the forthcoming legislation.

RSPB Scotland considers, both on the basis of scientific consensus and the precautionary principle[80], that the adopted definition of peatlands should be a 30cm depth of peat.

Whatever definition is used, it will be important to ensure that it is well applied. While some mapping data on the distribution and location of deep peat is available[81], it may not be widespread enough or sufficiently detailed to assess individual muirburn proposals. As such, it should be the responsibility of any applicant for a new muirburn licence to undertake a "peat depth survey" to demonstrate that the proposed burning will not contravene the ban. Scottish Forestry's guidance on cultivation for upland planning states, "on sites where deep peat may be present, we expect an appropriate level of assessment to be carried out to identify its location" and gives guidance on how this should be carried out to avoid cultivation of deep peat[82]. A similar approach should be adopted for muirburn.

75 https://www.gov.scot/news/funding-to-restore-scotlands-iconic-peatlands/

76 Douglas et al. 2015. Vegetation burning for game management in the UK uplands is increasing and overlaps spatially with soil carbon and protected areas. Biological Conservation 191, 243-250; also at: https://muirburncode.org.uk/wp-content/uploads/2016/08/Douglas-et-al-Burning-for-Game-Management-2015-1.pdf

77 https://forestry.gov.scot/forests-environment/soil-and-water-management

78 https://forestry.gov.scot/publications/1032-cultivation-for-upland-productive-woodland-creation-sites-applicant-s-guidance/viewdocument/1032

79 Lindsay & Andersen (2018) Peat. In Finlayson et al. 2018. The Wetland Book (ii) Distribution, Description and Conservation

80 See UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021, section 13(1)(b).

81 https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/

82 https://forestry.gov.scot/publications/1032-cultivation-for-upland-productive-woodland-creation-sites-applicant-s-guidance/viewdocument/1032

Conclusions and recommendations

Muirburn is a 'traditional' means to manage vegetation for the purposes of grouse shooting, and/or sheep or deer grazing. It is currently 'lightly' regulated with some statutory regulations supported by a voluntary code of best practice. There is little evidence of any systematic monitoring of activity, and no means by which the code can be enforced.

Anecdotal evidence presented here illustrates that the best practices recommended by the code are often not followed – although as this is not a systematic sample, it cannot be determined how representative or widespread these poor practices are. That said, these examples of poor practice were identified without great effort and evidence suggests that burning is an important factor in causing the poor condition of many peatlands and other upland habitats. Given the substantial evidence, supported by academic review and Government advisors such as the "Werritty review" and the UK Committee on Climate Change, that muirburn is has significant impacts, the Scottish Government has agreed to implement stricter regulations.

RSPB Scotland warmly welcomed the announcement, in December 2020, that muirburn will in future only be permitted under licence and that such licences would not be available for burning on deep peat. The latter part of this commitment underlines the primary climate reason for this policy; any continuation of burning on peatland risks leading to the release of its massive carbon store. In addition, of course, reducing or stopping burning across the uplands will reduce emissions from the act of burning, as well as allow the habitats to recover and sequester more carbon.

As yet, no legislation – or even timetable for legislation – to implement this policy change has been announced. The Scottish Government continues to profess "world leadership" on climate action and seeks to display such leadership at COP26 in Glasgow in November. Yet, with a new muirburn season commencing in October, there is a real risk that much of Scotland's uplands will be in the process of being burnt (again!) as the world leaders meet.

To ensure its credibility at Glasgow, the Scottish Government must, as part of its wider climate change policies, outline as soon as possible the full details and timetable for the implementation of its new muirburn policy. The commitment to legislate "as a matter of urgency" in the Scottish Government/Scottish Green Party's draft shared policy programme[83], subsequently approved by both parties, is therefore very welcome.

The following recommendations, based on the evidence and discussion in this report, highlight the approach that RSPB Scotland considers should be taken.

83 https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/documents/

Recommendations:

- The Scottish Government should speedily implement its commitment to introduce legislation to require that all muirburn is subject to licencing as set out in the Programme for Government 2021-2. This must ensure that any muirburn undertaken without a licence, or in contravention of the conditions of such a licence, is an offence. Such legislation should be in effect before next year's muirburn season – that is, by 1st October 2022.
- This legislation should prohibit the issuing of licences for muirburn on peatland of over 30cm depth, except for certain specified purposes (such as habitat restoration). It should be noted, however, that IUCN advice is that "restoration management of peatlands is widely achieved without burning."[84] This exception should therefore be rarely, if ever, applied.
- All licences should subject to full compliance with the current Muirburn Code (that is, all "shoulds" would, in effect, become "musts"). Failure to comply with the Code would thus invalidate any licence and would be an offence or lead to administrative fines. There should, however, be an additional incentive for Code compliance in that RPID should revise the cross-compliance conditions to address the deficiencies identified in the "Werritty review".
- The existing "supplementary information" that exists alongside the Muirburn Code should be formally incorporated as part of the Code; and whole Code should be reviewed/updated on a regular basis (five yearly?).
- NatureScot should begin preparation for the implementation of the licencing scheme. This should include, in co-operation with Police Scotland and COPFS, preparations for monitoring compliance and, where necessary, enforcement action against any non-compliance. The Scottish Government should ensure that NatureScot is adequately funded to carry out this work effectively.
- Implementation should be fully transparent and NatureScot should be required to publish, and/or report to Parliament, the numbers and nature of licences issues, as well as the results of their compliance and impact monitoring.

84 https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2020-04/IUCN%20UK%20PP%20Burning%20and%20Peatlands%20Position%20Paper%202020%20Update.pdf

Annex

The recommendations in relation to muirburn of the Grouse Moor Management Group (GMMG or "Werritty"), along with the formal Scottish Government response and their stated 'next steps'[85].

GMMG ("Werritty") recommendations

Muirburn

- That muirburn should be subject to increased legal regulation
- This should apply to all muirburn, not only on grouse moors
- That the Scottish Government should increase regulatory control relating to the Muirburn Code
- That SNH [NatureScot] and [the Scottish Government] Rural Payments and Inspections Directorate (RPID) should be given power and resources to monitor adherence to the Muirburn Code by any land manager carrying out muirburn, whether or not they are in receipt of muirburn-related support payments
- That increased training should be required for any land manager directly involved in setting and managing fires
- That the Muirburn Code should be subject to regular updates to represent best available knowledge and consideration of predicted changes in climate that might require additional changes to parts of the Code. That this process be subject to expert peer-review
- That a fire danger rating system for Scotland should be introduced to better support decision-making about where and when to burn
- That the Scottish Government explore changes to the current RPID support payments that would discourage malpractice more effectively than the current very limited breach and penalty powers
- That the Muirburn Code published in 2017 should be updated to include the Supplement to the Code: A guide to Best Practice
- That muirburn should be unlawful unless carried out under a licence.

Scottish Government response

The Scottish Government agrees that muirburn should be subject to tighter regulation and oversight and that in future it should only be undertaken under licence from NatureScot.

Next steps

- During the next parliamentary term, following a full public consultation, we will bring forward the legislation necessary to enhance the monitoring and regulation of muirburn and to introduce a licensing regime
- We will also bring forward legislation within the next parliament to ban muirburn on peatland (expect in very limited cases as part of an approved habitat restoration programme)
- And we will undertake a review of the current definition of peatland, taking expert advice on whether it should be revised, and a stricter definition imposed.

85 https://www.gov.scot/publications/scottish-government-response-grouse-moor-management-group-recommendations/