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Jones, Peter ORCID logoORCID: https://orcid.org/0000-0002-9566-9393 (2023) Peatland restoration in the UK. Town and Country Planning. pp. 47-52.

Official URL: http://www.tcpa.org.uk/

EPrint URI: https://eprints.glos.ac.uk/id/eprint/12348

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peatland restoration in the UK

Peter Jones looks at some of the peatland restoration plans, initiatives and projects within the UK

Anne Nygard on Unsplash

Within the UK peatlands cover some 12% of the land area

Peatlands provide a vital range of ecosystem services, including carbon storage and climate change mitigation, flood alleviation, water storage and purification, and important wildlife habitats. As such, they have an important contribution to make to sustainable development, but recognition of 'their great importance to society has been a slow awakening'.[1] Within the UK, peatlands account for 12% of the land area,[2] but an estimated 80% of these peatlands are in a damaged or deteriorating condition.[1] More positively, the Glasgow and Clyde Valley Green Network's Clyde Peatlands initiative, launched in June 2022, is just one of a number of current peatland restoration plans, initiatives and projects within the UK.

This article outlines a number of these ventures and offers some reflections on peatland restoration.

Peat and peatland characteristics

The International Peatland Society defines peat as 'the surface organic layer of a soil that consists of partially decomposed organic matter, derived mostly from plant material, which has accumulated under conditions of waterlogging, oxygen deficiency, high acidity and nutrient deficiency'.[3] However, there is little detailed consensus on the definition of peat. Although it typically consists of 50–60% carbon, with much smaller amounts of hydrogen, nitrogen, phosphorous and oxygen, and does not have more than 35% of dry mass weight, its physical properties, including its degree of composition, water content, specific density and bulk density, can vary more widely. Peat is resistant to mould and microbes because it is a sour fibre by nature, and contains some alcohol-based natural impregnating toxins.

Peatlands are terrestrial wetland ecosystems in which waterlogged conditions prevent plant material from fully decomposing. Globally, peatlands are found in 180 countries,[4] spanning a wide range of environments, including naturally forested peatlands in Europe, tropical peat swamp forests in South East Asia, permafrost areas in Russia and Canada, and high-mountain peatlands in the Himalayas and the Andes. The world's largest peatlands include the Hudson Bay Lowland and the Mackenzie River Valley in Canada, and the West Siberian Lowland in Russia.

In temperate, boreal and sub-Arctic regions, low temperatures during the long winters reduce the rate of decomposition, and peat is formed mainly from sphagnum mosses, herbs, shrubs, and small trees, while in the lowland humid tropics peat is largely derived from the leaves, branches, trunks, and roots of rain forest trees, under constant high annual temperatures.

In addressing the benefits of peatlands, the International Union for the Conservation of Nature (IUCN) claimed that:

> *'as iconic landscapes peatlands offer breathing spaces for millions of people, support livelihoods and provide a sense of place for many communities. The peat itself harbours a rich palaeo-ecological and historic archive with preserved artefacts from past human societies and a wealth of information about our changing environment, land management and climate. Peatlands are important source catchments for drinking water and also have a role in the regulation of water flows. They also support species and habitats that depend on often extreme, waterlogged conditions and are of international importance for biodiversity conservation.'*[4]

Perhaps more tellingly, the IUCN reported that 'peatlands are the world's largest terrestrial carbon stock—storing at least 550 gigatonnes of carbon globally—more than twice the carbon stored in all the world's forests',[4] and thus have a vital role to play in ameliorating and mitigating climate change.

Within the UK peatlands cover some 12% of the land area, and while they are principally in some of the more remote parts of the country (for example in the Flow Country stretching across Sutherland and Caithness in the North of Scotland), they are also found around some major cities—for example around Manchester and Liverpool. Peat has been accumulating for over 10,000 years within the UK, but its rate of formation is very slow.

There are three broad types of peatlands in the UK: blanket bog, raised bog, and fen. While blanket bog is rare globally, it forms the most extensive peatlands in the UK, largely, but not exclusively, in upland areas, and is mainly composed of bog vegetation, fed only by rainfall, and is nutrient poor and acidic. Raised bogs, found mainly in lowland areas of the UK, are localised domes of peat rising above the surrounding land, while fens are fed by mineral-rich ground or surface water and they can contain a range of vegetation, including cotton grass, sedges, reeds, and mosses.

Only an estimated 20% of the UK's peatlands are still in a near natural state, and, here, damaged peatlands are a significant source of net greenhouse gas emissions. Over the years, a number of factors have been responsible for damage to, and the deterioration of, peatlands. Factors at work include drainage for agricultural improvement and commercial forestry, grazing, burning to encourage new heather growth for game management and for livestock, commercial extraction to provide peat for gardening, and localised peat extraction, particularly in the Scottish Islands and Northern Ireland for fuel.

The majority of the lowland peatlands have been drained and are under often intensive agricultural use. Where lowland peats have been reclaimed for intensively managed agriculture, often with pumped drainage schemes, as found to the east of Southport in West Lancashire, peatland surfaces have dropped several metres, and this can lead to increased flood risks and soil erosion.

Peatland plans, initiatives, and projects

Peatland restoration plans, initiatives and projects cover a wide variety of scales, and embrace a wide range of management measures that look to restore the original form and function of peatlands, and their habitats, to favourable conservation status. The major measure for peatland restoration is the management of site hydrology, which helps to control emissions of greenhouse gases. Other measures can include covering bare peat areas with vegetation, blocking drains to raise the water table and return the waterlogged conditions, re-introducing mosses into areas where they have been lost, and the control of burning and grazing. Traditionally, the aim and specific objectives of peatland restoration projects and initiatives are set out in a management plan, which would have a timetable for its implementation and a means of monitoring its effectiveness.

The Glasgow and Clyde Valley Green Network's Clyde Peatlands initiative is looking to deliver 'large-scale peatland restoration across the eight local authorities that make up Glasgow City Region'.[5] The initiative has three elements, namely 'carbon', 'connectivity', and 'community'.[6] First, the focus is on 'large scale bog restoration to reduce emissions and lock up carbon, particularly in the upland areas around Glasgow City Region'. Secondly, connectivity is concerned with the 'restoration of a rich and diverse wildlife habitat and the creation of a permeable landscape that allows species to move freely through and between peatland habitats', and thirdly the accent is on 'creating local opportunities for people to learn about the importance of bogs

Rosser1954. Creative Commons Attribution-Share Alike 4.0. https://commons.wikimedia.org/wiki/File:Lenzie_Moss_-_boardwalk.JPG

Lenzie Moss in East Dunbartonshire

and to provide volunteering opportunities in practical restoration'.

Within the area covered by the Clyde Peatlands initiative, a number of small-scale peatland restoration projects have been under way for some time, and these projects have been showcased by the Glasgow and Clyde Valley Green Network. At Whitelee Wind Farm near East Kilbride, for example, ScottishPower Renewables committed to restoring 900 hectares of previously forested blanket bog and 1,700 hectares of drained blanket bog. Restoration techniques include ground-smoothing the deforested areas and blocking the drained areas to encourage re-colonisation by peatland species.

Lenzie Moss in East Dunbartonshire is a lowland raised bog which had been degraded by historic peat extraction. Over the past 20 years East Dunbartonshire Council and the Friends of Lenzie Moss have worked in partnership to improve the condition of the bog in order to provide habitats for wildlife and important bog-building plants, and improvements in access have helped to create an important outdoor space for informal recreation for local communities.

The government's England Peat Action Plan[7] offers 'a blueprint for how we will take action to ensure our peatlands are functioning healthily for the needs of wildlife, people and planet'. It also claims that:

'Peatland restoration will enable our peatlands to meet their Net Zero contribution, but also contribute to wider environmental goals. Where it is not appropriate to restore lowland peat, we will develop new responsible management measures to make sure the topsoil is retained for as long as possible and greenhouse gas emissions are reduced.'

In focusing on delivery, the England Peat Action Plan aims to:

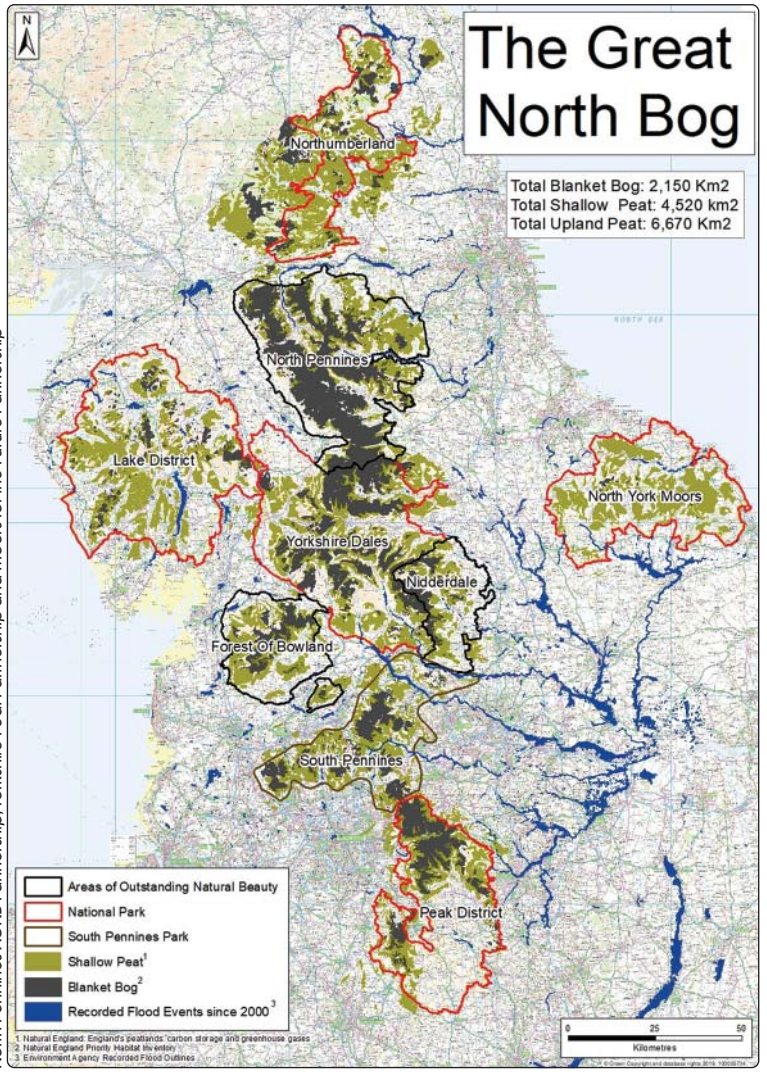
'Secure our peatlands' carbon store so they meet their contribution to Net Zero by 2050 [...] Deliver Natural Flood Management and improve water quality, to increase drought resilience and the sustainability of our water supplies. Protect and restore peatland habitats so that they are healthy well-functioning ecosystems, rich in wildlife. [...] Drive private investment in peatland restoration through natural capital markets that allow the accreditation and sale of the ecosystem services that healthy peatlands can provide.'

The largest initiative within the Action Plan is the Great North Bog, an ambitious landscape-scale peatland restoration initiative which covers 7,000 square kilometres of peatland soils across Lancashire, Yorkshire, Northumberland, and Derbyshire, takes in four National Parks and three Areas of Outstanding Natural Beauty, and includes some 90% of the upland peat in England. The Pennine PeatLIFE project, for example, funded by a number of partners, including the European Union, the Environment Agency and Yorkshire Water, is delivering over 1,300 hectares of peatland restoration in the North Pennines, Yorkshire Dales and the Forest of Bowland. Here, new restoration techniques

have been pioneered to respond to the unique climatic conditions.

By way of contrast, the Lancashire Mosslands Project was established 'to address concerns about the fate of lowland raised bog habitat in North West England', and the aim is 'to restore and reconnect these sites, helping to reconnect people with their peatland heritage'.[8] These peatlands, originally covering 28,000 hectares, have been reduced over the years owing to continuing urban development, intensive agriculture and peat extraction, and just 7,500 hectares remain spread across Lancashire, Greater Manchester, and Merseyside. Led by the Lancashire Wildlife Trust, the project has employed a range of measures, from the purchasing and leasing of land and the establishment of management agreements to re-levelling, scrub removal, and ditch re-profiling, in order to conserve bog habitats and the variety of the wildlife within them.

Wales' first National Peatland Action Programme looks to address six 'priority themes', namely 'peatland erosion', 'peatland drainage', 'the sustainable management of blanket peatlands', 'the sustainable management of lowland peatlands', 'the restoration of afforested peatlands', and 'the gradual restoration of our highest carbon emitting peatlands'.[9] In physical terms the aim is to deliver 600–800 hectares of restoration per annum over the lifespan of the project across a range of land uses on both private and public land. More specifically, the New LIFE for Welsh Raised Bogs project[10] is the first restoration programme for raised bogs (indeed, for any peatland habitat) in Wales. The programme, which covers seven areas (including Cors Caron, at Tregaron, Cors Fochno, north of Aberystwyth, and Esgyrn Bottom, south east of Fishguard), will involve working in partnership 'with local communities, landowners and contractors' to improve the conditions of the peatland, remove invasive species and scrub, and introduce light grazing. Specific measures will include removing rhododendrons, cutting and removing some trees



North Pennines AONB Partnership, Yorkshire Peat Partnership and Moors for the Future Partnership

The Great North Bog is a large-scale peatland restoration initiative being developed by the North Pennines AONB Partnership, the Yorkshire Peat Partnership and the Moors for the Future Partnership, together with the Northumberland Peat Partnership, Cumbria Peat Partnership, and Lancashire Peat Partnership

in, or near, the bogs to encourage mosses to grow, and creating low-level banks of peat.

The Garron Plateau, in North Antrim, is the largest blanket bog in Northern Ireland, and a restoration project was launched in 2013 'to re-establish natural hydrological conditions and restore the function of the bog and its ability to sequester carbon, and to improve the quality and reliability of the water received at Northern Ireland Water's Dungonnell treatment works which is supplied by the Garron catchment'.[11] More generally, the focus has been on demonstrating what could be achieved at a landscape scale across Northern Ireland. The initial phase of the project (2013–2014) saw the establishment of a catchment management plan and work with farmers to reduce grazing densities and raise the water table, while in the second phase (2014–2019) a conservation action plan was developed to ensure that appropriate management continued to secure protection for the site. Peatland restoration projects are also under way in Northern Ireland at Tullychurry Forest in County Fermanagh, and at Ballynahone Bog and Glenullin Bog, both in County Derry.

Concluding reflections

While the detailed objectives of the various peatland restoration plans, initiatives and projects vary, a number of issues merit reflection and discussion. First, governments, governmental nature agencies and those organisations who currently lead on peatland restoration look to provide a positive image of their plans, projects and initiatives, but in reality, peatland restoration faces a number of challenges.

In examining the experiences of peatland restoration in Scotland, Novo *et al.*[12] identified a number of challenges, including environmental challenges, challenges during restoration activities, and challenges with the funding process. Environmental challenges included those associated with both 'present conditions' and 'past events'. Those associated with present conditions included problems caused by snow, heavy rain and strong winds, delays to work attendant upon bird nesting and the lambing season, and access problems for machinery in remote and/or steep locations. One of the major challenges identified during restoration activities were communications between some of the players in the process — for example between contractors and both landowners and peatland action officers — and were often seen to be particularly problematic when a number of partners were involved in the restoration works. Tellingly, the authors found that interactions between the challenges listed above often led to the slowing down, or partial completion, of restoration work, or resulted in completion to a lower standard.

Secondly, there are issues relating to the monitoring and evaluation of peatland restoration projects and initiatives. Over a decade ago, Natural England emphasised that a programme of monitoring should be an important element in peatland restoration projects, and provided a review of the available techniques for such monitoring.[13] Ideally, a monitoring and evaluation methodology should be both flexible and scientifically rigorous — flexible in that it can be used in a variety of restoration environments, and scientifically rigorous in that it should be unbiased and well controlled. Looking to the future, remote sensing and the employment of digital technologies may have an increasingly important role to play in monitoring and evaluating the effectiveness of peatland restoration initiatives, but here cost factors may prove prohibitive.

That said, there are also problems with timescales. On the one hand, pre-restoration monitoring procedures, to establish baseline conditions, should ideally be in place for up to two years, but securing the funding for such monitoring may pose difficulties. On the other hand, Walker[14] has suggested that while all peatland restoration projects are required to evidence their outcomes, 'many struggle to design and adopt a robust monitoring programme — especially within the short timescales of most restoration projects in which baseline monitoring, capital works and post intervention monitoring must be completed, typically within a 2–5 year window'. Concerns about the timescale problems for monitoring and evaluation are underwritten by the reality that 'peatlands form and respond to environmental change over decades to centuries, and at a landscape scale'.

Thirdly, a consistent underlying theme in peatland restoration is its role in facilitating the transition to a more sustainable future, and, in many ways, peatland restoration might be seen to epitomise nature-based solutions to climate change, biodiversity loss, and the deterioration of ecosystem services, which pose major challenges for sustainable development. However, support for nature-based solutions in tackling environmental problems is not unqualified.

Seddon *et al.*,[15] for example, claimed that the potential for nature-based solutions 'to provide the intended benefits has not been rigorously assessed' and that 'there are concerns over their reliability and cost-effectiveness compared to engineered solutions, and their resilience to climate change', and they issued a warning that such concerns could result in 'maladaptation, especially in a rapidly changing world where biodiversity-based resilience and multi-functional landscapes are key'. They also expressed concern that enthusiasm for nature-based solutions to climate change mitigation 'does not curtail or distract from the urgent need to rapidly decarbonize our economy, including through radical systemic change'.

Elsewhere, Seddon *et al.*[16] also argued that nature-based solutions are 'distracting from the

need to rapidly phase out use of fossil fuels and protect existing intact ecosystems'.

Finally, while peatland restoration is seen as offering an important contribution to sustainable development, and given that 'the purpose of the planning system is to contribute to the achievement of sustainable development',[17] it is conspicuous by its absence from the current version of England's National Planning Policy Framework (NPPF), although it does assert that planning policies should 'not identify new sites or extensions to existing sites for peat extraction', and that minerals planning authorities should 'not grant planning permission for peat extraction from new or extended sites'.

In Scotland planning policies should 'only permit commercial extraction in areas suffering historic, significant damage through human activity and where the conservation value is low and restoration is impossible'.[18] In both Scotland and Wales the need to protect peatland is explicitly recognised in national planning policy, while England's NPPF more generally emphasises the importance of 'conserving and enhancing the natural environment', including 'sites of biodiversity'.

At the same time, in exploring how biodiversity targets have been incorporated in spatial planning policy in England, Wilson[19] concluded that 'biodiversity has been 'mainstreamed' in English spatial planning policy'. However, she also reported that there were 'spatial variations in policy approach between protected sites and the wider countryside and urban areas' and that 'responsibility for biodiversity enhancement in the wider countryside and urban areas [rely] mainly on local policy and instrumental arguments that are likely to lead to tensions over the 'replaceability' of nature'.

Looking to the future, research designed to investigate local planning authorities' perceptions of the importance of peatland restoration, and, where appropriate, if and how planning authorities had facilitated peatland restoration in contributing to sustainable development in both upland and lowland areas, deserves attention.

● ***Peter Jones*** *works in association with the School of Business at the University of Gloucestershire. The views expressed are personal.*

Notes

1 *UK Peatland Strategy*. IUCN UK Peatland Programme, 2018. www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-07/2018_UK%20Peatland%20Strategy_DIGITAL_3.pdf

2 *UK Natural Capital: Peatlands*. Office for National Statistics, 2019. www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalforpeatlands/naturalcapitalaccounts

3 'What is peat?'. Webpage. International Peatland Society. https://peatlands.org/peat/peat/

4 'About peatlands'. Webpage. IUCN UK Peatland Programme. www.iucn-uk-peatlandprogramme.org/about-peatlands

5 'Glasgow City Region's peatlands set to help fight climate change'. News Release. NatureScot, 14 Jun. 2022. www.nature.scot/glasgow-city-regions-peatlands-set-help-fight-climate-change#:~:text=Today%20sees%20the%20launch%20of,the%20region's%20Net%20Zero%20ambitions

6 See GCV (Glasgow & Clyde Valley) Green Network's 'Clyde Peatlands: Addressing the climate and ecological crises' webpage, at www.gcvgreennetwork.gov.uk/clyde-peatlands

7 *England Peat Action Plan*. HM Government, May 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1010786/england-peat-action-plan.pdf

8 See the IUCN UK Peatland Programme's 'Lancashire Mosslands' webpage, at www.iucn-uk-peatlandprogramme.org/projects/lancashire-mosslands

9 *National Peatland Action Programme 2020–2025*. Natural Resources Wales, Nov. 2020. https://cdn.cyfoethnaturiol.cymru/media/692545/national-peatlands-action-programme.pdf

10 See Natural Resources Wales' 'New LIFE for Welsh Raised Bogs' webpage at https://naturalresources.wales/about-us/our-projects/nature-projects/new-life-for-welsh-raised-bogs/?lang=en

11 'Nature 2030 case studies — Garron Plateau Bog Restoration Project'. Webpage. MyNI, Northern Ireland Department of Agriculture, Environment and Rural Affairs, Sept. 2021. www.myni.life/nature/nature-2030-case-studies-garron-plateau-bog-restoration-project/

12 P Novo, M Sposato, C Maynard and K Glenk: *Understanding the Experiences of Peatland Restoration in Scotland*. Scotland's Rural College, for ClimateXChange, Mar. 2021. www.climatexchange.org.uk/media/4857/cxc-understanding-peatland-restoration-experiences-final-march-2021.pdf

13 *A Review of Techniques for Monitoring the Success of Peatland Restoration*. NECR086. Natural England, Sept. 2011. http://publications.naturalengland.org.uk/publication/46013

14 J Walker: *Written Evidence*. NSD0034. Presented to the House of Lords Science and Technology Committee Inquiry into Nature-Based Solutions for Climate Change. Swansea University, Sept. 2021. https://committees.parliament.uk/writtenevidence/38956/pdf/

15 N Seddon, A Chausson, P Berry, *et al.*: 'Understanding the value and limits of nature-based solutions to climate change and other global challenges'. *Philosophical Transactions of the Royal Society B*, 2020, Vol. 375, 20190120. https://royalsocietypublishing.org/doi/pdf/10.1098/rstb.2019.0120

16 N Seddon, A Smith, P Smith, *et al.*: 'Getting the message right on nature-based solutions to climate change'. *Global Change Biology*, 2021, Vol. 27(8), 1518–46

17 *National Planning Policy Framework*. Ministry of Housing, Communities and Local Government, Jul. 2021. www.gov.uk/government/publications/national-planning-policy-framework--2

18 *Scottish Planning Policy*. Scottish Government, Jun. 2014. www.gov.scot/publications/scottish-planning-policy/

19 O Wilson: 'Putting nature centre stage? The challenges of 'mainstreaming' biodiversity in the planning process'. *Journal of Environmental Planning & Management*, 2021, Vol. 66(3), 549–71. www.tandfonline.com/doi/epub/10.1080/09640568.2021.1999219?needAccess=true