Northern Ireland Peatland Strategy 2022-2040

August 2022

Version of Strategy to accompany Equality Impact Assessment Consultation

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Glossary

Acrotelm - The acrotelm is one of two distinct layers in undisturbed peat bogs. It overlies the catotelm. The boundary between the two layers is defined by the transition from peat containing living plants (acrotelm) to peat containing dead plant material (catotelm).

Areas of Special Scientific Interest (ASSI) - Areas of Special Scientific Interest (ASSIs) are protected areas that represent the best wildlife and geological sites in Northern Ireland. They are declared under the Environment (Northern Ireland) Order 2002.

Biodiversity - Biodiversity is defined as the diversity of all living things at genetic, species and ecosystem levels.

Bog - A particular type of wetland, which is waterlogged by direct rainfall only. Bogs are nutrient-poor and acidic habitats, support a less diverse range of species than other wetlands and contain many unique species that are specialised to bog peatlands.

Carbon Sequestration - A natural or artificial process by which carbon dioxide is removed from the atmosphere and stored.

Climate Adaptation - Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderate the impact of climate change.

Climate Mitigation - Process to reduce or prevent emission of greenhouse gases, either by using new technologies or renewable energies or by changing management practices and/or consumer behaviour.

Ecosystem - A biological community of interacting organisms and their physical environment.

Ecosystem Services - the benefits people derive from ecosystems. Besides provisioning services or goods like food, wood and other raw materials, plants, animals, fungi and micro-organisms, they also provide essential regulating services such as pollination of crops,

prevention of soil erosion and water purification, and a vast array of cultural services, like recreation and a sense of place.

Favourable Condition - A feature(s) within a Designated Site is being adequately conserved and monitoring demonstrates that the features are meeting mandatory requirements.

Fen - A fen is a wetland that receives water and nutrients from surface and/or groundwater, as well as from rainfall. Fen vegetation is typically more diverse than that found in bogs due to variation in water supply and the range of nutrients and dissolved nutrients in the water.

Natural Capital - Stocks of natural assets that provide valuable flows of ecosystem services for society.

Nature-based Solutions - Nature-based Solutions are actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

Peatlands - Peatlands are wetland ecosystems that are characterised by the accumulation of organic matter called peat, which derives from dead and slowly decaying plant material under wet conditions.

Restoration - The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. It takes time and can often be a process which requires multiple interventions and monitoring.

Restored Peatland - Formerly modified peatland where human activities have led or are expected to lead to a recovery of its natural function.

Semi-natural Vegetation - Vegetation impacted by deliberate or inadvertent human disturbance, but which has recovered to such an extent that species composition and environmental and ecological processes are close to its natural state.

Special Area of Conservation (SAC) – The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- Existing SACs and SPAs; and
- New SACs and SPAs designated under these Regulations.

Special Protection Area (SPA) - The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- Existing SACs and SPAs; and
- New SACs and SPAs designated under these Regulations.

Sphagnum Moss - *Sphagnum* is a genus containing almost 400 species of moss, of which around 20 are found in the UK. They are commonly referred to as “peat mosses”. They are highly resistant to decay and contain a chemical called sphagnan that inhibits microbial activity. This slows decomposition and is the main contributor to the formation of peat.

Sustainable Management - Management of natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide.

Turbary - The term used to describe the right to cut turf on a particular area of bog,

Wetland - Land area that is saturated with water, either permanently or seasonally.

Executive Summary

Half of the world's wetlands are peatlands, amounting to 3% of the Earth's land surface. They provide many essential ecosystem services, regulating the water cycle, purifying water and supporting a wealth of biodiversity. Peatlands also store more carbon for longer periods than any other ecosystem worldwide.

In Northern Ireland, our peatlands are of enormous importance to the stability and general well-being of our environment, conserving biodiversity, affecting river catchment hydrology and creating our distinctive upland and lowland landscapes. At both a global and local scale, peatlands can store and sequester carbon, with implications for the regulation of our climate.

However, many of our peatlands are in poor condition directly through actions such as turf cutting and drainage and through biodiversity loss from pollution sources such as agricultural ammonia. Instead of acting as carbon sinks, damaged peatlands release carbon to the atmosphere and contribute to global warming.

It is in this context that we are taking forward a Peatland Strategy for Northern Ireland, under the auspices of the UK Peatland Strategy. The Strategy will set the direction of travel over the next two decades and beyond and provides a framework for both conserving our intact peatlands and our peatland restoration programme.

Our goals

By 2040, Northern Ireland's peatland habitats are conserved and restored to optimise their Natural Capital value.

The Climate Change Act for Northern Ireland, the Green Growth Delivery Framework and the Northern Ireland Environment Strategy will together outline our approach to mitigating our local environmental challenges and delivering our international obligations. These include habitat and species loss, agricultural greenhouse gas and ammonia emissions, climate change, waste management, soil quality, air quality and waste crime and will operate in the context of ensuring sustainable growth opportunities in a new circular economy.

Peatland restoration will be an important means of restoring our environment to a condition that is healthy and will meet our biodiversity targets and our Net Zero contribution. The goal of this Strategy is to ensure that peatlands in Northern Ireland are conserved or under restoration management to become healthy, functioning ecosystems before 2040 and that the ecosystem services that they provide are acknowledged and appreciated, in line with the DAERA vision of "Sustainability at the heart of a living, working, active landscape valued by everyone".

How we will achieve our goals

Restoring our peatlands will require significant long term investment from the public and private sector. However, nature based solutions, such as peatland restoration, is well recognised as a key means of delivering climate mitigation and adaptation outcomes. DAERA is looking at ways to develop a bespoke, long term funding mechanism which will build on current DAERA funding, including the Environment fund and will be complemented by other external funding streams such as Peace+ and the Shared Island Fund.

There are already excellent examples of government and other stakeholders working together to safeguard and restore our peatlands and it is recognised that we will need to ensure that the knowledge, skills and funding are in place to allow us to deliver on the objectives contained within our Strategy. DAERA has representation on the IUCN UK Peatland Programme Steering Group and it is intended that a 5 Nations Peatlands Forum will be established to allow learning, collaboration and alignment in strategic implementation across the jurisdictions.

It is our intention to develop a Strategy Implementation Plan with delivery phases, scale and sources of funding and reporting metrics identified. At a local level, we will set up a cross-sectoral Stakeholder Group which will guide the delivery of the Strategic Objectives and play a key part in bringing about a new era for our peatlands here.

What we will deliver

We will publish, by March 2023, an Implementation Structure for the strategy with delivery phases, scale and sources of funding and reporting metrics identified. The Implementation Structure will focus on achieving a series of deliverables including:

- Compilation of a Northern Ireland Peatland Asset Register and identification of a list of potential peatland restoration sites to for targeted investment to ensure maximum return in terms of both carbon and biodiversity.
- Establishment of peatland restoration demonstration sites on land in public or private ownership with agreement of the landowner.
- Development and implementation of Conservation Management Plans for peatland sites within and outside of our network of designated sites.
- Development of Land Management schemes through new policies, which provide support to underpin the appropriate management of all peatlands long-term.
- Development and publication of supporting policies and strategies.
- Commissioning and funding research and monitoring activities into a range of key areas relevant to peatlands.
- Boost awareness of peatlands, their role in ecosystem service provision and peatland heritage.
- Assess the feasibility of access for recreation and education in any future peatland restoration plans.

How we will measure success

In line with the recommendations of the Climate Change Committee, success will be measured by bringing 150,000 hectares of peatland under restoration/sustainable management by 2050.

Introduction

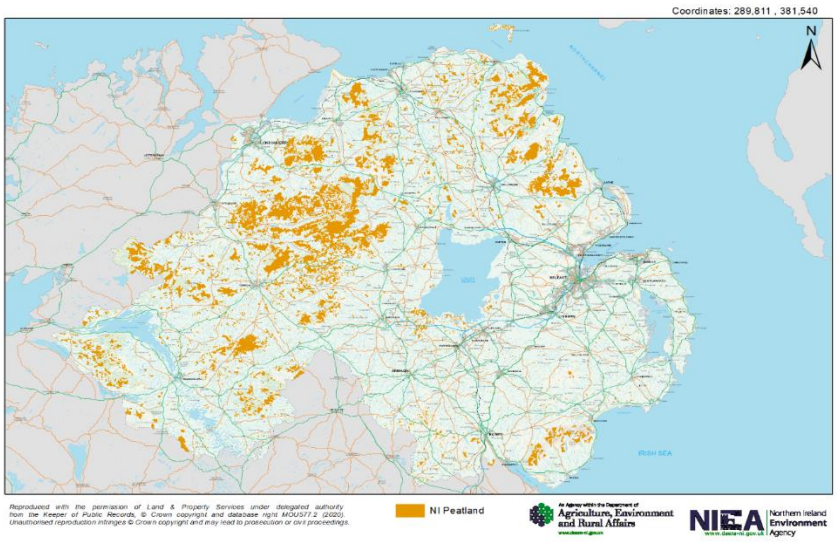
What are peatlands?

Peatlands are one of the most valuable ecosystems on Earth - although they occupy just 3% of the Earth's land surface, they are of enormous importance to the stability and general well-being of our environment – in tropical and boreal regions, they have natural tree cover and may be categorised as 'forest'.

In Northern Ireland, peatland can be divided into three broad habitat types: lowland raised bogs, blanket bogs and fens. These cover approximately 12% of the land area of Northern Ireland and took thousands of years to form (See Figure 1). Peat soils cover an estimate 18% of NI's land area. The percentage cover of peatland on the island of Ireland is only exceeded in global terms by three countries, Finland, Canada and Indonesia and as such, our peatland habitats are recognised as being important globally, nationally and locally.

For many decades, our peatlands were viewed by many as barren and unproductive places, but in reality supported many economic activities and often provided our ecosystem services unnoticed. Currently, most of our peatlands have been degraded to some degree, releasing carbon rather than storing it. However, there is now an increasing focus on peatland conservation and restoration and an appreciation of the ecosystem services that they provide. Without ambitious action to protect and restore peatlands, it is unlikely that our shared climate change, sustainable development and biodiversity conservation goals can be reached.

Figure 1: Peatland Resource in Northern Ireland



Why they are important? - Natural Capital and Ecosystem Services

Peatlands create distinctive upland and lowland landscapes, support a range of specialised plants and animals and act as a major store of soil carbon. They are a rare and valuable habitat in their own right but we also now can consider them in terms of **Natural Capital and Ecosystem Services.**

Natural Capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called Ecosystem Services that make life possible.

The Millennium Ecosystem Assessment defined Ecosystem Services as "the benefits people derive from ecosystems". Besides provisioning services or goods like food, wood and other raw materials, plants, animals, fungi and micro-organisms, peatlands provide essential regulating services such as pollination of crops, prevention of soil erosion and water purification, and a vast array of cultural services, like recreation and a sense of place.

Peatlands Ecosystem Services:

- Climate regulation and adaptation (carbon capture and storage)
- Unique biodiversity & habitat for wildlife
- Drinking water filtration
- Flood attenuation and water storage
- An historical archive
- Areas for recreation and understanding of our cultural heritage
- Food production

Climate regulation is one of the most important ecosystem services that peatlands provide. Healthy peatlands sequester atmospheric carbon dioxide, an important "greenhouse" gas, and trap in their soils. However, unhealthy peatlands release carbon dioxide back to the atmosphere, adding to the greenhouse gases which are causing climate change.

In order for our peatlands to provide vital ecosystem services they must be healthy.

How do we protect them?

In Northern Ireland, a number of measures including government policy, legislation, protected sites and education are currently utilised as part of a strategy for the protection and conservation of peatlands.

Some peatland sites are designated and legally protected under the national Areas of Special Scientific Interest (ASSIs) system. The legal protections afforded through the EU Habitats and Birds Directive will still apply, post-Brexit, to the network of designated sites known as Special Area of Conservation (SAC) and Special Protection Area (SPA). Currently NI has 54 SACs, 14 SPAs and 291 ASSIs. However, site designation only covers around 10% of peatland habitat.

Are our peatlands healthy?

Habitats such as peatlands can be described as being in "Favourable Condition" when site condition monitoring demonstrates that they are being adequately conserved and which is defined by setting targets or target ranges for a series of different attributes – components or characteristics of the vegetation that are relatively easy to measure, but which are reliable indicators of the 'health' of the habitat.

Recent condition assessment data for all peatland SACs and ASSIs has demonstrated that a high proportion of the habitat within designated sites is generally 'unfavourable' or at best 'unfavourable-recovering' condition. The relevant assessments from the 2019 Article 17 report for Northern Ireland Annex I peatland habitats can be found at https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-habitats/.

At present, little is known about the condition of a significant proportion of the peatland resource which lies outside the network of designated sites. Although the most recent information on the condition of the resource outside designated sites is now more than 10 years old, it suggested that the condition of the majority of peatland habitats in the wider countryside was unfavourable.

Strategic context

The Green Growth Delivery Framework

DAERA, on behalf of the NI Executive, is developing a Green Growth Strategy and associated Climate Action Plan which will be our initial route map to climate action, green jobs and a clean environment. It aims to transform our society towards net zero by 2050, protect and enhance our environment and sustainably grow our economy through improved efficiency which will in turn help more business become more profitable. The Strategy will look out to 2050 and provide a pathway with sector-specific greenhouse gas emission targets. It will also set a pathway for a clean environment and green jobs. The associated Climate Action Plan will focus on the short term actions we must take across all sectors. Peatlands as a potential carbon sink will be an important consideration of Green Growth and as such the Peatland Strategy should aim to align closely with its aims.

Net Zero and the Climate Change Act for Northern Ireland

To meet the UK Net Zero target, the UK Climate Change Committee has set 5-yearly carbon budgets to restrict the amount of greenhouse gas the UK can legally emit. The Climate Change Committee recommended that Northern Ireland's fair and equitable contribution towards achieving UK Net Zero should be a reduction in emissions of greenhouse gas emissions by at least 82% by 2050.

In March 2022 the NI Climate Change Bill was finalised and a more ambitious 2050 target of net zero target was agreed but with the caveat that methane emissions will be limited to 46% under a Just Transition provision which acknowledged the importance of agriculture to the Northern Ireland economy.

The Climate Change Committee has advised that land use change and in particular nature based solutions (such as afforestation, biomass production and peatland restoration) should be a significant element of a holistic strategy to deliver this target. The potential for carbon fixing of healthy peatlands means that they will play an important role in achieving net zero as part of a Nature-Based Solutions approach.

Northern Ireland Environment Strategy

A Draft Northern Ireland Environment Strategy has been published as part of the Executive's Green Growth Strategy. This will outline the approach to facing up to our local environmental challenges, including habitat and species loss, agricultural greenhouse gas and ammonia emissions, climate change, waste management, the development of a circular economy, soil quality, air quality and waste crime.

While the strategy will focus on local approaches, it will also provide the framework by which Northern Ireland meets its responsibilities in meeting national targets set out in the UK Environment Strategy as well as to UK international commitments in terms of the UN Climate Change Conference (COP26) and Convention on Biological Diversity (COP15) targets. The Northern Ireland Peatland Strategy will be a key tool in achieving several of the strategy's aims, in particular the reduction of greenhouse gases and restoration of habitats and species.

Northern Ireland Biodiversity Strategy

A new Biodiversity Strategy for Northern Ireland is being developed to take account of COP15 targets to be agreed in September 2022. These targets will embrace the 2020 UN Leaders' Pledge on Actions for Nature. The targets commit DAERA to consider actions on a number of important issues, including sustainable food production, ending the illegal wildlife trade and implementing nature-based solutions for tackling climate change and reversing biodiversity loss. These actions will aim to create a nature positive future with 30% of our land and seas conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area based conservation measures, and integrated into the wider landscapes and seascapes by 2030.

Northern Ireland Ammonia Strategy

Ammonia is a colourless gas that is produced through some human activities including farming - 97% of ammonia emissions in Northern Ireland come from the agriculture sector. It has a harmful effect on human health and can lead to significant biodiversity loss through loss of plant species and changes in ecosystem structure and function.

A Northern Ireland Ammonia Strategy is currently being finalised prior to public consultation. The strategy will aim to address emissions by introducing NI-wide measures for reducing on-farm ammonia outputs, by implementing habitat restoration and management and by revising the Operational Protocol for assessing ammonia in the planning process.

The achievement of ammonia emission reductions through the Ammonia Strategy is vital to the success of the Peatland strategy, as until ammonia pollution is reduced to below harmful levels our peatlands cannot be restored to favourable status.

Future Agricultural Policy - Farming with Nature Package

In March 2022, the DAERA announced the publication of the Future Agricultural Policy. All land managers with three or more hectares of eligible agricultural land who meet the scheme requirements will be able to participate; participants will be required to comply with the new Farm Sustainability Standards and participate in the Soil Nutrient Health Scheme. The

package will have an outcome based approach and will focus on creating and restoring habitats that are important for species diversity.

It is in this strategic context, facing the twin challenges of climate change and significant biodiversity loss, where peatland restoration offers a major opportunity to rectify these, that this Northern Ireland Peatland Strategy has been developed. The Strategy includes 5 Strategic Objectives, with associated actions, which taken together will ensure that our peatlands are conserved and restored.

In order to deliver on the Strategy Objectives, it is the intention of DAERA to develop a robust Northern Ireland Peatland Strategy Implementation Structure with measurable targets, milestones, delivery partners and costings identified, in order to return peatlands in Northern Ireland to a healthy state. Given the scale of activity required, this will be a long term programme with the attendant need for appropriate financial resources to support delivery.

Scope, Vision and Aim of the Northern Ireland Peatland Strategy

Scope of the Strategy

The Scope of the Strategy includes intact peatland, degraded peatland and peatland soils which could be restored or managed to support greater carbon storage and nature recovery, whether publicly or privately owned.

Vision of the Strategy

The Vision of the Strategy is that our peatland habitats in Northern Ireland are protected, enhanced and managed sustainably, are recognised for their intrinsic value and for the benefits they provide – for wildlife, people and climate.

Aim of NI Peatland Strategy

By 2040, Northern Ireland's peatland habitats are conserved and restored to optimise their Natural Capital value.

Peatland Conservation, Restoration & Management

Appreciation of the importance of peatlands is relatively recent and past and current land use practices have left many in a damaged state. Although it will be challenging to achieve, peatlands that are damaged and degraded can be set on the road to recovery – our goal is to ensure that our peatland habitats can lock up carbon, support rare and specialised plants and animals, minimise the risk of wildfire, improve water quality and mitigate flood risk.

Strategic Objective 1 - Peatlands in Northern Ireland are conserved, restored and appropriately managed, in accordance with the Climate Change Committee recommendations.

Actions:

1. Compile a Northern Ireland Peatland Asset Register which will quantify distribution, type, condition, current management practices, potential threats and restoration potential of peatland and associated peat rich soils.

2. Establish a Peatland Restoration Action Partnership to deliver capital work schemes.

3. Identify and declare new peatland ASSIs.

4. Compile a list of potential peatland restoration sites on public land and prioritise these for restoration.

5. Develop a decision-making framework for targeted investment in peatland restoration to ensure maximum return in terms of both carbon and biodiversity.

6. Identify and prioritise areas of afforested peat for restoration, particularly where biodiversity and carbon gains could be maximised.

7. Develop and implement Conservation Management Plans for peatland SACs and current and new ASSIs.

8. Develop and implement Conservation Management Plans for peatland sites outside the Designated Site Network.

9. Establish peatland restoration demonstration sites on land in public or private ownership with agreement of the landowner(s).

10. Develop and implement an agreed and co-ordinated strategic approach among relevant stakeholders to the issue of wildfires.

Policy Alignment and Delivery Initiatives

Delivering the objectives of this strategy will require a change in the way we do things - peatland restoration is a cross cutting, cross-departmental issue which will require policy alignment and we will need to have the right policies and incentives in place to ensure that we achieve our goal of functioning peatland ecosystems.

Strategic Objective 2 - By 2025, policies and supporting delivery initiatives are in place to underpin appropriate management and restoration of peatlands in Northern Ireland

Actions:

11. Conduct a review and publish a key issues paper on peat extraction and the use of peat and peat products by 2023 and take forward any recommendations made.

12. Publish a Position Statement on Upland Management, with accompanying new legislation if required.

13. Develop Land Management schemes through new policies, which provide targeted support to underpin the appropriate management of peatlands long-term.

14. Develop, publish and implement an Ammonia Strategy, which will include priority actions to address nitrogen deposition on peatland.

15. DAERA will work collaboratively in supporting delivery partners (including other Departments and councils) with seeking to ensure any relevant future policies and other measures are fit for purpose and suitably future proof.

16. Encourage all statutory bodies and agencies to phase out the use of peat products.

17. Encourage Local Authorities to review planning approvals for peatland extraction sites to ensure that all planning conditions are adhered to, including responsibility for reinstatement/restoration.

Capacity Building & Research

Delivery of restoration and management objective will need to be supported with significant upskilling, within and outside the Department. Restoration activities will need continued R+D support to ensure that all activities are evidence-based with state-of-the art scientific input. DAERA will need to commission or support appropriate research activities funded through Evidence and Innovation schemes and where possible, through external funding mechanisms.

Strategic Objective 3 - Capacity building and appropriate research are supported to ensure delivery of the Northern Ireland Peatland Strategy.

Actions:

18. Develop and deliver knowledge transfer and innovation programmes to meet the needs of landowners, organisations and contractors, to build capacity in peatland conservation, restoration and management.

19. Commission and fund research into the vulnerability of peatlands in Northern Ireland to climate change and the role that peatlands can have in mitigating and adapting to a changing climate.

20. Carry out research into peatland management which can support both biodiversity and farming outcomes at CAFRE Hill Farm and other demonstration sites.

21. Provide funding for and build on research already carried out into the long-term effects of nitrogen deposition on peatlands in Northern Ireland.

22. Commission research at AFBI/CAFRE into the development of alternative growing media and identify evidence gaps that require further research, particularly those of relevance to the Horticulture Industry. This should include examining the barriers to uptake of alternatives.

23. Ensure evidence informs the development of peatland restoration and management plans and identify evidence gaps that require further research.

Knowledge Sharing, Communication & Access

Public understanding of the benefits of peatlands is low and in order to achieve our goal of restoring peatlands to functioning ecosystems, we will need to increase awareness and ensure that we support a range of knowledge exchange activities. It is also well established that access to nature is good for both mental and physical health and we will endeavour to facilitate access to peatlands where possible and where landowners are in agreement.

Strategic Objective 4 - Peatlands are recognised for their unique biodiversity and ecosystem services provision and improved access to peatland sites is facilitated.

Actions:

24. Develop and adequately resource a Knowledge Exchange Network to share good practice with other peatland stakeholders in Ireland, the UK and other European countries, via conferences, workshops and site visits.

25. Communicate the results of research on peatlands commissioned by DAERA in order to maximise national and international impact.

26. Establish a long-term Peatland Communications campaign (in conjunction with other stakeholders) to boost awareness of peatlands, their role in ecosystem service provision and peatland heritage.

27. Encourage the adoption of peat alternatives and the correct use of soil conditioners by both professional and amateur users.

28. Assess the feasibility of access for recreation and education in any future peatland restoration plans. Upgrading traditional routes/old access roads could be considered to facilitate recreational access. Any installation of access facilities may not be desirable or feasible for every site and would need agreement from the landowner.

29. Document the environmental history and cultural heritage value of peatlands to provide a context for conservation, restoration actions and communication activities.

Governance, Implementation & Funding

Achieving successful, value for money implementation of conservation objectives is a large scale, ambitious, expensive and complex undertaking requiring significant resources and careful governance and project management. DAERA will establish senior level, inter and cross departmental management and governance structures to oversee the successful implementation of the Peatland Strategy.

Government funding will be instrumental in taking forward peatland conservation and restoration, but unlocking private finance and enabling a partnership approach will also be key to ensuring that our peatlands are managed sustainably or under restoration management.

Strategic Objective 5 - The necessary structures are in place to fund, facilitate, monitor and review delivery of the Northern Ireland Peatland Strategy.

Actions:

30. Establish a Senior Group within DAERA to oversee implementation of the Peatland Strategy and report at least every three years on progress to the DAERA Minister and Northern Ireland Executive.

31. By 2023, develop an Implementation Plan and Reporting Framework for the Peatland Strategy with delivery phases, scale and sources of funding and reporting metrics identified.

32. Convene a Stakeholder Forum with representative membership to provide advice to DAERA.

33. Secure funding to implement Conservation Management Plans, recognising the long term nature of peatland restoration.

34. Promote the Peatland Code and facilitate privately-funded projects, working with businesses and landowners to take them forward.

References

Artz, R., Evans, C., Crosher, I., Hancock, M., Scott-Campbell, M., Pilkington, M., Jones, P., Chandler, D., McBride, A., Katherine Ross, K. & Weyl, R.S. (2019). Update: The State of UK Peatlands.

Committee on Climate Change (2011). The appropriateness of a Northern Ireland Climate Change Act – Northern Ireland Report.

Committee on Climate Change (2017). UK Climate Change Risk Assessment 2017 Evidence Report - Summary for Northern Ireland.

Committee on Climate Change (2019). Net Zero – The UK's contribution to stopping global warming.

Committee on Climate Change (2019). Land use: Policies for a Net Zero UK.

Committee on Climate Change (2019). Reducing emissions in Northern Ireland.

Committee on Climate Change (2020) Recommendations to Government on the level of the Sixth Carbon Budget.

Committee on Climate Change (2020) Letter to Minister Poots on a fair contribution to the UK Net Zero target.

Cooper, A. & McCann, T. (2001). The Northern Ireland Countryside Survey 2000. Environment and Heritage Service, Belfast.

Crane E, (2020). Woodlands for climate and nature: A review of woodland planting and management approaches in the UK for climate change mitigation and biodiversity conservation. Report to the RSPB.

Cruickshank, M.M. & Tomlinson, R.W. (1988). Northern Ireland Peatland Survey. Department of the Environment for Northern Ireland (Countryside and Wildlife Branch). Belfast.

Department of Agriculture, Environment & Rural Affairs (DAERA) (2019). Northern Ireland Climate Change Adaptation Programme 2019-2024.

Department of Environment (NI) (1993). Conserving Peatland in Northern Ireland – A Statement of Policy.

Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan: Blanket Bog.

Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan: Lowland Raised Bog.

Department of the Environment for Northern Ireland (2005). Northern Ireland Habitat Action Plan: Fens.

Department of the Environment for Northern Ireland (2015). Valuing Nature – A Biodiversity Strategy for Northern Ireland to 2020.

Department of Culture, Heritage and the Gaeltacht (2017). National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

Department for Regional Development (2010). Regional Development Strategy 3035 – Building a Better Future.

European Commission (2011). Our life insurance, our natural capital: an EU biodiversity strategy to 2020.

IPCC, 2019: Summary for Policymakers. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S.

Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.
IUCN UK Committee (2016) Peatland Programme (2016). Briefing Note No. 13 – Atmospheric Pollution.

Joint Nature Conservation Committee (2011). Towards an assessment of the state of UK peatlands. JNCC Report No.445. Lindsay, R. A.

Joint Nature Conservation Committee (2019). Article 17 Habitats Directive Report 2019.
Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.

National Parks and Wildlife Service (2015). Managing Ireland's Peatlands. A National Peatlands Strategy.

Natural Capital Committee (2020). Advice on using nature based interventions to reach net zero greenhouse gas emissions by 2050.

Natural Capital Committee (2020). Natural Capital Committee's Seventh Annual Report.
Northern Ireland Executive (2010). Everyone's Involved - Sustainable Development Strategy.

Office for National Statistics (2019). UK natural capital: mountains, moorland and heath accounts.

RSPB Scotland (2011). Realising the Benefits of Peatlands – Overcoming policy barriers to peatland restoration.

RSPB (2020). Woodlands for climate and nature: a review of woodland planting and management approaches in the UK for climate change mitigation and biodiversity conservation – Briefing for Policy Makers.

Scottish Natural Heritage (2015). Scotland's National Peatland Plan – Working for our Future.

UK NEA (2011). UK National Ecosystem Assessment.

United Nations Environment Programme & Food and Agriculture Organization of the United Nations (2020). Strategy of the United Nations Decade on Ecosystem Restoration (Draft).

Department of Agriculture, Environment & Rural Affairs (DAERA) Publication (2018): Northern Ireland Priority Habitat Guide – Fens (https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Habitat%20Guide%20-%20Fens.PDF)

Department of Agriculture, Environment & Rural Affairs (DAERA) Publication: Northern Ireland Priority Habitat Guide – Blanket Bog

Department of Agriculture, Environment & Rural Affairs (DAERA) Publication (2018): Northern Ireland Priority Habitat Guide – Lowland Raised Bog (https://www.daera-ni.gov.uk/publications/habitat-guide-lowland-raised-bog)

Appendices:

Appendix 1 – Threats & Costs to Society of Degraded Peatlands

Appendix 2 - Benefits to Society of Healthy Peatlands

Appendix 3 - Strategies in other jurisdictions

Appendix 1 – Threats & Costs to Society of Degraded Peatlands

Peat extraction

Traditionally, peat cutting was undertaken by manual cutting so only small blocks were harvested at a time. Since the early 1980s there has been a trend towards mechanised peat extraction, which has greatly accelerated bog degradation and loss. Mechanised peat removal has a major ecological impact, stripping away the living layer and subsequently exposing large quantities of peat to oxidation and loss of carbon.

Afforestation

During the twentieth century, improvements in technology meant that land previously seen as barren and useless could be drained for agriculture and forestry. Forestry planting operations and associated drainage, fertiliser application and tree growth have an adverse impact on peatland biodiversity and peatland function including loss of or changes in bog vegetation under plantations, as well as long-term hydrological impacts on adjacent and associated peat bodies, and other water-dependent habitats.

Drainage

Since healthy peatland ecosystems all depend upon the maintenance of a high water table, any drainage is damaging. The impact varies depending upon a range of environmental factors in addition to the actual drainage operation itself. However, it is likely that active peat formation will, at best, be inhibited and at worst, it will result in the peat becoming inactive, causing carbon loss into the atmosphere and producing rapid runoff into rivers and streams.

Burning

The damage to a peatland by burning depends on the intensity and frequency of burning. Many of the rare and sensitive plants found on peatlands cannot survive fires. Repeated burning also decreases the cover of *Sphagnum* and so decreases the capacity to generate new peat. Wildfires are a serious concern as once established they are difficult to extinguish and can release significant amounts of carbon. Appropriate management of peatlands can significantly reduce fire risk.

Grazing

On bogs, inappropriate levels of grazing and trampling from grazing livestock can have adverse effects on the peatland ecosystem. Ultimately, it results in loss of peat-forming vegetation and consequent drying out of the bog surface. On fens, high grazing levels can result in excessive poaching and nutrient enrichment although conversely, lack of grazing or mowing can result in a loss of low growing plant communities and loss of fen to reed-bed or woodland and an eventual drying of the site.

Peat Sediment in Water Bodies

Much of our drinking water originates from upland, peat-dominated catchments. Peatlands that are degraded can result in the release of suspended sediments, causing issues for water quality and drinking water provision. Dissolved organic carbon (the brown colour of peaty water) has to be removed during the processing of drinking water, resulting in higher costs – Excess peat sediment carried into rivers and water bodies can build up on stream beds and clog stream gravels, impacting on fish spawning and invertebrate habitats.

Renewable Energy

Renewable Energy plays a vital role in mitigating the impacts of climate change. Many wind farms are located on peatlands because these sites are typically windy, remote, and generate low returns from agriculture and other land uses. They are also often located on areas of degraded habitat where the peatland has been cut or drained. Wind farm developments can have impacts at the construction, operational and de-commissioning stages. Currently all wind farms approved in Northern Ireland are required to prepare a Habitat Management Plan which offers an opportunity to restore degraded areas of peatland.

Deposition of Atmospheric Nitrogen

Excessively high ammonia concentrations in the air at peatlands (>1.0 µg m-3) can have a toxic effect on the growth of a range of nitrogen sensitive plant species, leading to die-back of *Sphagnum*, lichens and dwarf shrubs. In Northern Ireland, most of our nitrogen sensitive habitats are receiving too much nitrogen and are exposed to damaging levels of ammonia in the air.

Invasive Alien Species

The high moisture content and low nutritional value of peatland habitats can act as a natural control for invasive species. However, when peatland habitat is altered, through deposition of atmospheric nitrogen and activities such as drainage, it becomes vulnerable to rapid colonisation by native and non-native species such as Willow and Rhododendron, excluding the native bog flora.

Climate Change

The Millennium Ecosystem Assessment (2005) predicted that by the end of the 21st Century, climate change (with increasing temperatures and changes in rainfall pattern) would be the major cause of biodiversity loss – these predicted changes are likely to have a major impact on peatland ecosystems on the island of Ireland. Higher temperatures will lead to the drying out of peat and an increased likelihood of wildfire. In addition, an increasing number of heavy rainfall events are likely to cause more erosion on damaged peatlands. As most peatland species are extreme habitat specialists, they may have difficulty in adapting to a rapidly changing climate.

Appendix 2 - Benefits to Society of Healthy Peatlands

Peatlands & carbon

Peatlands represent the largest single store of global soil carbon and have a greater density of stored carbon than any other ecosystem. It is estimated that temperate peatland contains around one quarter of terrestrial carbon. Intact peatland accumulates carbon estimated at 12% of human-instigated carbon release worldwide annually. Conversely, if they are drained or dry out and cease to grow, they no longer accumulate carbon but release it back to the atmosphere, adding to the greenhouse gases which are causing climate change. In Northern Ireland, while peatlands only covers 12% of the land area, they account for 53% of the soil carbon pool.

Peatlands also release methane which is a potent green-house gas, but the amount is minimal in comparison to their storage of carbon. Countries can use the carbon storage capacity of peatlands to offset a proportion of their carbon emissions and thus reduce their carbon output. Carbon trading between countries is currently permissible so the carbon stored within peatlands may also have an economic benefit.

Peatlands have the potential to be a natural solution to reducing greenhouse gas emissions. They hold a vast stock of carbon in their soils and can add more by sequestering carbon from the atmosphere. However, this natural carbon capture and storage ability can only happen if peatland habitats are healthy and functioning.

Peatlands & biodiversity

Blanket bogs, lowland raised bogs and fens in Northern Ireland occur where waterlogged conditions slow down the natural decomposition of plant remains allowing peat to form, and provide important habitat for highly specialised plant species that have adapted to surviving in these harsh environments. Due to their specialisation, many of these plants are poor competitors and not viable outside a peatland environment.

On blanket bogs and lowland raised bogs, key plant species include peat-forming plants particularly bog mosses *Sphagnum* species and Cotton-grass *Eriophorum* species with a

limited range of other characteristic species including Heather *Calluna vulgaris*, Cross-leaved Heath *Erica tetralix*, Deer Grass *Trichophorum cespitosum* and Purple-moor Grass *Molinia caerulea*. They are also important for a rich and unique assemblages of invertebrates and breeding birds such as Golden Plover, Curlew and Hen Harrier.

Fens are highly diverse habitats which support a very wide range of plant and animal species – they are particularly important for invertebrates; these include dragonflies such as the Irish Damselfly, Water beetles, Carabid beetles, pond skaters, and butterflies and moths such as the Marsh Fritillary Butterfly. A number of locally rare plant species are associated with Fens such as the Fen Bedstraw *Galium uliginosum*, Greater Water-parsnip *Sium latifolium*, Grass of Parnassus *Parnassia palustris*, Irish Lady's-tresses *Spiranthes romanzoffiana*, Marsh Helleborine *Epipactis palustris* and Marsh Pea *Lathyrus palustris*.

Peatlands & water regulation

Peatlands are valued for their capacity to store, filter and provide water. They reduce the risks of flooding, serving as a buffer against rapid run off during heavy downpours. They help maintain a consistent supply of clean water to rivers, loughs and reservoirs. Reservoirs that drain areas of blanket bog on the Garron Plateau, the Sperrin Mountains and Mourne Mountains provide much of our drinking water in Northern Ireland. Exposed or dry peat on degraded peatland is more susceptible to erosion and can contribute to high organic content and the supply of poor quality raw water to reservoirs. This increases costs during the water treatment process to remove colour, turbidity and organic matter from the peat-stained water, which can cause issues in the network as well as taste and odour problems.

Peatlands & archaeology

Peat also preserves a unique and irreplaceable record of past human activity, ecology and climate. Archaeological research has revealed much evidence of human activity through the preservation of artefacts such as canoes, bog butter and even human bodies. The peat sequence also holds information on past ecology and climate in the form of sediments and pollen. Several lowland raised bogs are also of international importance for volcanism over much of the Holocene (post 10,000 years before present) with volcanic glass shards (tephra)

recorded in the peat column. These bogs are also of international importance for peat stratigraphy providing much of the dendrochronology for radiocarbon calibration.

Peatlands & landscape

Peatlands contribute to the character of the Northern Ireland landscape; indeed, for many visitors they would be considered emblematic. Society values wild and mountainous and unspoilt areas for their scenic qualities and these areas attract tourists and walkers, who play an important role in the local economy. The number of people interested in outdoor recreation and eco-tourism has increased in recent years which could result in negative impacts for peatlands, if not properly managed. The value people place in these landscapes can also be seen through elements of culture in poetry, writing and art.

Peatlands and food production

Upland areas provide large areas of grazing land, primarily for hill sheep, and have an important role in hill-farming. Bogs are particularly sensitive to overgrazing and trampling and in recent decades, overstocking has impacted on upland landscapes and biodiversity. A major element of agri-environment and other land management schemes is establishing grazing regimes that allow recovery and sustainable management of habitats and which support ecosystem service delivery. However, getting the right grazing levels suitable for these areas (neither under-grazing nor over-grazing) and undertaking sensitive restoration, such as drain blocking, the condition of the peatlands can be improved and these impacts eventually reversed.

Peatland restoration and job creation

As part of the green recovery, it is vital that we invest in nature-based solutions which, amongst other things, are a key mechanism for tackling climate change. Peat restoration delivers carbon and biodiversity benefits and thus can deliver significant savings for the public purse, but it can also lead to job creation e.g. in peatland restoration activities and ecotourism. Investing in large-scale peatland restoration also brings with it an opportunity to build capacity and ensure the provision of ongoing employment opportunities.

Appendix 3 - Peatland strategies in other jurisdictions

UK Peatland Strategy

The UK's first collaborative Peatland Strategy was published by the IUCN UK Peatland Programme in 2018 and aimed to embed a shared vision for our peatlands, encourage partnership and identified a common way forward for UK Peatlands to 2040.

There has been significant progress in England, Scotland and Wales. Comparatively, in Northern Ireland, peatland restoration is still in its infancy and it is through the Northern Ireland Peatland Strategy that we intend to carry out the considerable body of work to catch up with the other jurisdictions. Having said that, there are considerable ongoing peatland restoration projects already underway here e.g. Ballynahone Bog, Peatlands Park, Garry Bog and Cuilcagh Bog. This work has been underpinned by extensive research activities by DAERA and its partners, investigating biodiversity status and monitoring ammonia pollution and greenhouse gas fluxes on peatlands.

England

In 2019, Natural England initiated a series of pilot restoration projects on 5 important iconic peatland sites such as Dartmoor. DEFRA published the England Peat Action Plan in 2021 with a commitment to immediately fund at least 35,000 ha of peatland restoration by 2025 and by summer 2022 to have recommendations for a more sustainable future for lowland agricultural peatlands. This coincided with the Nature for Climate Peatland Grant Scheme (NCPGS) was opened to provide funding to restore peatlands in the uplands and lowlands of England.

Scotland

The Scottish Government, through the National Peatland Plan, has signalled its commitment to peatland restoration and to nature based solutions to the climate and biodiversity crisis, publishing its budget for 2020/21 in which it provided £20m for peatland restoration and a commitment to invest £250m over the next 10 years. Through Nature Scot's Peatland ACTION 25,000 hectares have already been put on the road to recovery since 2012.

Wales

Natural Resources Wales published the National Peatland Action Programme 2020-2025 to facilitate the Welsh Government's long term Peatland Policy, with goals to ensure "all peatlands

with semi-natural vegetation are subject to favourable management/restoration (a minimum estimated area of 30,000 ha)" and restoring "a minimum of 25% (~c. 5,000 ha) of the most modified areas of peatland". A number of key projects are already underway in Wales including, the LIFE Welsh Raised Bogs project which commenced in 2017 and aims to restore seven of the very best examples of raised bogs in Wales, representing 50% of this habitat in Wales.

Republic of Ireland

The Republic of Ireland published its Peatland Strategy in 2015 and a Management Plan for its Raised Bog SAC network in 2017, which set out a roadmap for the long-term management, restoration and conservation of protected raised bogs. They have also committed to an accelerated exit to the use of peat for power generation.

In the New Decade, New Approach document, all political parties in Northern Ireland recognised the need for a coordinated and strategic approach to the challenge of Climate Change within the Programme for Government. They accepted that actions and interventions would be required across a wide range of areas in order to address both the immediate and longer term impacts of climate change in a fair and just way. It is clear that the management of peatland on the island of Ireland is also a transboundary issue, particularly regarding the effects of transboundary ammonia pollution. As with climate change, peatland management in border areas will require a joined-up approach and there are a number of potential cross border funding schemes available to facilitate this including Peace+ and the Shared Island Fund.

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Cover photographs courtesy of Paul Corbett:

Front cover - Bog Pools at Cuilcagh Mountain, Co Fermanagh.

Back cover - Hares-tail Cottongrass Slieve Gullion, Co Armagh.

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