



An Roinn Cultúir,
Oidhreacht agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

National Peatlands Strategy

Progress Report 2018 and 2019



Peatlands Strategy Implementation
Group

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Glossary of Abbreviations

AA	Appropriate Assessment
BnM	Bord na Móna
DAFM	Department of Agriculture, Food and the Marine
DCCAE	Department of Communications, Climate Action and Environment
DCHG	Department of Culture, Heritage and the Gaeltacht
DHPLG	Department of Housing, Planning and Local Government
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
IPCC	Irish Peatlands Conservation Council
NHA	Natural Heritage Area
NPS	National Peatlands Strategy
NPWS	National Parks & Wildlife Service (of the Department of Culture, Heritage and the Gaeltacht)
OPW	Office of Public Works
PSIG	Peatlands Strategy Implementation Group
SAC	Special Area of Conservation
SPA	Special Protection Area

Chairman's Foreword

The National Peatlands Strategy, published in 2016, is a landmark document. It contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. In order to ensure that these actions are implemented a cross Departmental group was established to monitor its implementation, the Peatlands Strategy Implementation Group (PSIG). As chairperson of this group, I am, therefore, delighted to present the 2018 and 2019 Progress Report.

This report build on the first progress report for 2017. In 2018 and 2019 investment in Peatlands continued to grow; the Environment Protection Agency invested around €1 million in peatland-related research projects and, in 2018, the Department of Culture, Heritage and the Gaeltacht operated a pilot Peatlands Community Engagement Scheme under which 14-peatland community led initiatives which promoted the awareness and conservation of raised bogs were awarded funding. .In 2019, €131,000 in funding was provided to 13 initiatives under the scheme.

The Department of Agriculture, Food and the Marine's European Innovation Partnerships (EIPs) programme has awarded a total of €59 million to 23 projects. All of these projects aim to foster a bottom-up, locally led approach to the sustainable use of farmland. Many of these are within Natura 2000 areas (e.g. the Hen Harrier Project and the Pearl Mussel Project).

In helping Ireland reach its climate change targets, the Department of Culture, Heritage and the Gaeltacht and the Environmental Protection Agency have agreed to jointly fund a 2 year research project titled: "The vulnerability of peatland ecosystems to a changing climate and increases in the frequency and severity of droughts." Forests can support diverse ecosystems and are a vital part of Ireland's biodiversity, In a joint collaboration between Coillte and Bord na Móna, approximately 1,500 hectares of Bord na Móna land that is no longer used for peat production and otherwise suitable for woodland establishment has been identified for targeted

woodland establishment. The focus will be on growing a mix of native Irish trees such as Downy Birch, Scots Pine, Alder and other broadleaf species.

In its totality, the National Peatlands Strategy represents a major opportunity for all stakeholders involved to ensure that they are managed in a manner that strengthens Ireland's contribution to the fight against climate change. Given the changing role and use of all our peatlands, it is becoming clear that we will have to adapt to the radical changes now imminent to their overall management, particularly bearing in mind that they will remain for Ireland, a huge national asset. In 2020 the Group will oversee the mid-cycle review of the progress of the Strategy.

I welcome the commitment to this work by Minister Madigan and thank her for the support she has given over the last number of years. Equally, I sincerely acknowledge the work done by each of the members of the implementation group, their respective Departments, agencies and State bodies. Also, on behalf of the implementation group, I give special thanks to the secretariat based in the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht for collating this report.

A handwritten signature in dark ink, appearing to read 'Seamus Boland'.

Seamus Boland
Chairperson

Progress Overview

There has been progress made across numerous Actions, some of the highlights are:

Action 3 – The Department of Agriculture, Food and the Marine's European Innovation Partnerships (EIPs) programme has awarded a total of €59 million to 24 projects. Many of these are within Natura 2000 areas (e.g. The Hen Harrier Project and The Pearl Mussel Project).

Action 5 A key issues paper for public consultation on a review of the use of peat in the horticultural industry has been published. Submissions were invited on the key issues paper during for three month up to end of January 2020.

Action 9 An Eddy Covariance (EC) tower has been set up at Clara Bog SAC, enabling long-term monitoring of CO₂ exchange from the bog. An EC tower is proposed to be installed in an upland blanket bog catchment in 2020 and will measure CH₄ in addition to CO₂. Finally as part of the accelerated programme of bog restoration in 2020, another Flux Tower will be installed at a degraded raised bog to measure carbon fluxes before and after full restoration measures are implemented. Collectively with a Bord na Móna flux tower, these sites will form a peatland-climate monitoring network across Ireland.

Action 12 In a joint collaboration between Coillte and Bord na Móna, approximately 1,500 hectares of Bord na Móna land that is no longer used for peat production and otherwise suitable for woodland establishment has been identified for targeted woodland establishment. The focus will be on growing a mix of native Irish trees such as Downy Birch, Scots Pine, Alder and other broadleaf species.

Action 14 The Department of Culture, Heritage and the Gaeltacht and the Environmental Protection Agency have agreed to jointly fund a 2 year research project titled: "The vulnerability of peatland ecosystems to a changing climate and increases in the frequency and severity of droughts". The project is scheduled to begin in 2020.

Action 18 In the Department. of Culture, Heritage and the Gaeltacht's Budget allocation for 2020, €5 million has been allocated to embark on an accelerated programme of peatland restoration. This programme is being funded by an increase in the carbon tax that was agreed in Budget 2020. With the injection of this funding, it is intended to restore over 1,800 hectares of protected raised bog on up to 9 sites in 2020.

Action 27 In 2018, the Department. of Culture, Heritage and the Gaeltacht operated a pilot Peatlands Community Engagement Scheme under which 14-peatland community led initiatives, which promoted the awareness and conservation of raised bogs were awarded funding. In 2019, €131,000 in funding was provided to 13 initiatives.

Action 32 The Environmental Protection Agency's 2018 research awards represent another investment of around €1 million in peatland-related research projects.

Overview of the National Peatlands Strategy

The National Peatlands Strategy has as its vision statement “*to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations*” It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

It is underlined by 25 key principles and commits to the undertaking of 32 actions across various sectors and themes, including inter alia Research, Tourism, Agriculture, Forestry, Conservation, Restoration, Peat Extraction, Energy, Water Quality and Climate Change.

The Strategy has a timeframe of 10 years and will be subject to a mid-cycle review in 2020.

Role of the Peatlands Council

The Peatlands Council continues its important role in advising the Minister for Culture, Heritage and the Gaeltacht on peatlands issues and has a key role in engagement on many of the actions set out in the National Peatlands Strategy.

Peatlands Strategy Implementation Group

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established to assist in the finalisation of the Strategy, is overseeing subsequent implementation and reports to the Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

It is a cross Departmental Group aiming to ensure a whole of Government approach to peatland issues and complements the work of the Peatlands Council. The Group also shares an independent chair with the Peatlands Council, who may convene joint sessions of the Council and the Group to facilitate communication and information exchange.

The members of the Group are:

- The Department of Culture, Heritage and the Gaeltacht
- The Department of Housing, Planning and Local Government
- The Department of Communications, Climate Action and Environment
- The Department of Agriculture, Food and the Marine
- The Office of Public Works
- The Environmental Protection Agency
- Bord na Móna
- Coillte

Update on Actions

Existing Uses Actions 1-12

Action	Bodies Responsible	Status in relation to implementation of action
A1 The existing cross compliance requirements set down good agricultural and environmental practices (GAEC) and statutory management requirements (SMRs) which must be followed to ensure the sustainable management of all soils including peatland areas. These provisions have recently been amended under the revised CAP Regulations and will offer continued safeguards for land protection.	Lead: DAFM Other: DCHG	Ongoing.

Good Agricultural and Environmental Condition (GAEC): This obligation refers to a number of minimum standards to ensure that farmland is maintained in good agricultural and environmental condition. The standards are applicable to all farmland types, including peatlands and include standards for the protection and maintenance of soil organic matter, avoiding the deterioration of habitats and water protection.

The provisions under Cross Compliance continue to provide safeguards for farmland protection.

Action	Bodies Responsible	Status in relation to implementation of action
A2 The management of commonage lands, under DAFM schemes, will be designed so as to ensure appropriate, sustainable grazing regimes for upland peat soils.	Lead: DAFM Other: DCHG	Completed.

The conservation and sustainable management of commonages/uplands is a key aim of the Dept. of Agriculture, Food and the Marine co-funded Pillar 2 Green, Low-carbon, Agri-environment Scheme (GLAS). Commonages are categorised as Priority

Environmental Assets (PEAs) under the Scheme as commonages provide a wide range of benefits. Commonages comprise various habitats including peatlands. Management of grazing is primary measure required to conserve or to restore favourable peatland habitat condition on commonage lands.

Commonage management plans (CMPs) are a core requirement of the GLAS commonage action. There are approximately 9,000 GLAS participants with the commonage action, which represents 60% of all farmers with commonage, and these farmers have approx. 68% of the commonage area declared for payment. This has resulted in the preparation and submission of ~ 4000 CMPs. A GLAS Commonage approved advisor prepared each CMP. Commonages should be managed as per the CMP requirements, which include a grazing plan with minimum and maximum Ewe Equivalents (EE) for each commonage. EE were assigned based on habitat type and condition.

Action	Bodies Responsible	Status in relation to implementation of action
A3 Targeted support actions underpinning the sustainable use of farmland, taking into account the particular sensitivities of peatlands, uplands and Natura areas, will be considered and incorporated, where appropriate, in Ireland's next agri-environmental Scheme, under the Rural Development Programme 2014-2020 (RDP).	Lead: DAFM Other: DCHG	Completed but is continuing through European Innovation Partnerships and a Locally Led Agri-Environment Scheme for the eight designated Freshwater Pearl Mussel areas.

GLAS (The Green Low-Carbon Agri-environment Scheme) under the RDP 2014-2020 supports approximately 50,000 farmers. It includes actions and measures which support peatlands, upland habitats and Natura 2000 areas such as Farmland Habitat (Private Natura), Commonage Management Plans and Conservation of Farmland Birds.

Dept. of Agriculture, Food and the Marine's European Innovation Partnerships (EIPs) programme has awarded a total of €59 million to 243 in this period. All of these projects aim to foster a bottom-up, locally led approach to the sustainable use of farmland. Many of these are within Natura areas (e.g. The Hen Harrier Project and The Pearl Mussel Project) and involved improvements in upland and peatland habitat management. Several more are targeted specifically at improving the management of agriculture for the conservation of upland habitats (Sustainable Uplands Agri-environment Scheme; Sustainable Agricultural Plan for the MacGillycuddy Reeks; Blackstairs Farming Futures; Inishowen Upland Farmers Project; and North Connemara Locally Led Agri-environmental Scheme). Thus, a crosscutting deliverables of all of these projects is ecologically sustainable grazing of upland habitats, which would include blanket bog, heaths and associated peatland

habitats. The MacGillycuddy Reeks project also proposes to clear 85ha of Rhododendron and 85ha of Bracken and to improve management of recreational impacts by trail provision and management.

EU LIFE Projects:

The EU KerryLIFE project, led by the DCHG with DAFM and involving Coillte, Teagasc, the community-based South Kerry Development Partnership, and others focussed on sustainable land-use management for the conservation of Freshwater Pearl Mussel. KerryLIFE, which worked on the Caragh and Kerry Blackwater catchments, trialled a wide range of approaches under both agriculture and forestry, and the outcome of the latter will have the potential for much wider application within the forestry sector. It aimed to improve the conservation status of c. 2,500 ha of farmed land in the Caragh and Kerry Blackwater catchments – a significant proportion of which comprises peatland habitats e.g. blanket bog and heath habitats. The project ran to December 2019.

In 2018, under the national conservation strategy for the Freshwater Pearl Mussel, the DAFM, in collaboration with the DCHG, launched a €10 million Locally Led Agri-Environment Scheme (LLAES) for the eight designated Freshwater Pearl Mussel areas selected for priority action. Funded through the Rural Development Programme, the LLAES is adopting a “bottom-up” approach to partnership and will build on the experiences of the KerryLIFE project, which focussed on the Caragh and Kerry Blackwater catchments. The scheme is targeting up to 800 participants. Envisaged interventions to improve water quality will also include better management of peatland habitats thereby improving their conservation status. The scheme is set to run until 2023.

Action	Bodies Responsible	Status in relation to implementation of action
A4 A code of best practice will be established regarding the use of fire as a land management tool, to avoid accidental damage and to limit environmental harm.	Lead: DAFM Other: DCHG	Completed.

The first version of the Prescribed Burning Code of Practice - Ireland <http://www.agriculture.gov.ie/forests-service/firemanagement/> was published in 2012. A revised version of this to take account of recent technical developments and changes in legislation is currently being drafted.

The Heritage Act 2018 provides that the Minister for Culture, Heritage and the Gaeltacht may make regulations to allow the burning of vegetation in March and the cutting of roadside hedges in August. In 2019 the Minister decided against introducing regulations to extend the season for the burning of vegetation into March due to the below average rainfall in the 6 months before the ban on burning.

Action	Bodies Responsible	Status in relation to implementation of action
A5 A review of the use of peat in the horticultural industry will be undertaken.	DAFM, DCCAE & DCHG	To complete consultation process by first quarter 2020.

A working Group was set up in 2018 and consists of Dept. Of Culture, Heritage and the Gaeltacht, Dept. of Agriculture, Food and the Marine, Dept. Of Communications, Climate Action and the Environment and the Environmental Protection Agency. Under the auspices of the working group a key issues paper for public consultation on a review of the use of peat in the horticultural industry has been published. Submissions have been invited on the key issues paper during the three month period closing on 31 January 2020.

Action	Bodies Responsible	Status in relation to implementation of action
A6 The State energy companies will continue to work with the biomass sector on the potential of co-firing in the short term at State owned peat stations. Biomass power generation projects will be supported through the REFIT scheme.	Bord na Móna, ESB & DCCAE	REFIT3 scheme runs to 2030 and Bord na Móna plan to transition away from peat by 2028.

Bord na Móna's peat fired electricity generating station at Edenderry in County Offaly was awarded support for biomass combustion under the REFIT3 Scheme for up to 30% of the installed capacity up to 2030. Bord na Móna commenced co-firing at its Edenderry Plant with biomass in 2008 and currently has planning permission to 2023.

In relation to the supply of biomass, Bord na Móna sources sustainable biomass of which up to 80% is from domestic sources.

Bord na Móna's Brown to Green Strategy delivers on national and EU decarbonisation policies. This has driven a significant reduction in peat-milling volumes and operational footprint in summer 2019 that in turn enables progression of de-commissioning and rehabilitation plans. As part of company re-structuring, a dedicated operational unit has now been set up to plan, progress and report on de-commissioning and rehabilitation. As part of the development of rehabilitation plans, Bord na Móna undertakes to consider and assess impact on flood risk management in areas deemed appropriate for flood alleviation.

The Electricity Supply Board has announced that both West Offaly Power and Lough Ree Power stations will cease generation of electricity at the end of December 2020, The implications of this development are being dealt with under the Government's Just Transition programme.

Action	Bodies Responsible	Status in relation to implementation of action
A7 The relevant authorities, working with stakeholders, will introduce guidance and criteria for the identification and future management of peat areas currently afforested in line with the aims of this strategy. They will also provide clear guidance on future afforestation of peat soils.	DAFM & Coillte	Completed with project continuing to 2022.

Coillte became a partner with a range of other stakeholders in a new EPA led Project called REFORM Water. This major project from 2019 to 2022 is focussed on reducing the potential harmful effects of peatland forest management in inland waters under the increased demands for tree biomass and climate change. The project will, inter alia, investigate forest management as a tool for reducing dissolved organic matter (DOM) load, use of biochar as a tool to reduce the export of DOM to inland waters, develop models for site-specific scenarios in Ireland and give recommendations for peatland dominated forest catchments to protect the water quality in freshwater systems.

Action	Bodies Responsible	Status in relation to implementation of action
A8 The present management of State-owned peatland areas will be evaluated and alternative management options aimed at increasing the delivery of all the ecosystem services of naturally functioning peatlands will be considered.	All relevant owners of State land	Commenced in 2016 and will be completed in 2022.

The Dept. of Culture, Heritage and the Gaeltacht proposed a drained area of blanket bog habitat on state lands in the Ox Mountains Bogs SAC for rewetting in the EU INTERREG CABB (Ireland/UK Co-operation Across Borders for Biodiversity 2017 to 2022) project and provides ongoing scientific advice to this project. An eco-hydrological monitoring programme has also been established at the site in to allow

subsequent measurement of the efficacy of the restoration works which are set to commence Autumn 2020.

Under the above-mentioned CABB project the open perimeter areas of the Pettigo Plateau National Nature Reserve (800-900ha and wholly state-owned) in Co. Donegal had been stock-proofed (9961 meters, enclosing an area of approx. 800 ha) in 2018 with the aim of improving stock management and showing an improvement in habitat condition by management of grazing by the end of the project (2021/2022).

NPWS/DCHG is undertaking conservation measures within National Parks including management of deer; control of trespassing stock; management of tracks and trails; control/clearance of Rhododendron all of which measures help to, prevent damage to/or to restore, areas of peatland habitat.

The Bord na Móna Biodiversity Action Plan 2016-2021 outlines strategy objectives and actions to increase delivery of all ecosystem services of naturally functioning ecosystems through rehabilitation.

The Bord na Móna Raised Bog restoration programme is ongoing. The company has restored about 2,000 hectares of raised bog as part of the programme and expects to restore another 2,000 hectares by 2025. This supports the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

A wide variety of environmental, commercial and social after uses have already been developed including forestry, grassland, amenity, biodiversity, and commercial uses (e.g. Lough Boora Discovery Park, wind farms etc.). Future after use will continue to balance and maximise the commercial, social and environmental value of the cutaway.

Bord na Móna is also supporting new research projects into various ecosystem services of peatlands such as SmartBog (EPA funded), Carepeat (Interreg), WaterPeat (EPA) and Swamp (EPA). These research projects are comprised of studying various ecosystem services of peatlands such as GHG fluxes, carbon storage and creating future carbon sinks, improving water quality and regulating water flows. The research projects will use several Bord na Móna cutaway bog study sites.

Coillte continues to monitor and maintain the restored blanket bog and raised bog habitats in former Coillte EU LIFE project sites. Primarily, this work involves removal of naturally regenerating pine and birch from open restored bog.

In 2018, Coillte collaborated with the Dept. of Culture, Heritage and the Gaeltacht to progress maintenance measures on a selected number of raised bog sites on the Coillte estate that required significant follow-up management measures. The work consolidated restoration measures that formed part of Coillte's two raised bog LIFE projects. Some of the sites required complex drain-blocking, for which Bórd na Móna provided support, in terms of advice and mapping.

Action	Bodies Responsible	Status in relation to implementation of action
A9 An examination of all publicly owned lands and privately owned cutaway will be undertaken with a view to identifying appropriate uses, which will aim to harness their potential to contribute to Ireland's environmental, ecological and economic wealth, with particular emphasis on mitigating carbon losses.	Lead: DCHG Other: Owners of relevant state land	Commenced in 2017 and will be undertaken on a phased basis in coming years.

The Dept. of Culture, Heritage and the Gaeltacht, in collaboration with Trinity College Dublin, has set up an Eddy Covariance (EC) tower at Clara Bog raised bog Special Area of Conservation, enabling long-term monitoring of CO₂ exchange from the bog. An EC tower is proposed to be installed in an upland blanket bog catchment in 2020 and will measure CH₄ in addition to CO₂. Finally as part of the accelerated programme of bog restoration in 2020, another Flux Tower will be installed at a degraded raised bog to measure carbon fluxes before and after full restoration measures are implemented. Collectively with a Bord na Móna flux tower, these sites will form a peatland-climate monitoring network across Ireland.

As part of the Department of Culture, Heritage and the Gaeltacht's EU LIFE 'Living Bog' project (Ref: NAT/IE/000032) an assessment of the socio-economic impacts of the raised bog restoration project actions on the local economy and population is proposed. The project team has been liaising with academics and professionals working in the field of socio-economic research and proposals to examine the impact of the project have been drafted. Tender documentation for a comprehensive Eco System Services report is currently being prepared.

In 2018, Coillte completed BioClass, a major project aimed at reviewing, assessing and mapping habitats of conservation value across its estate. Coillte has mapped these habitats as biodiversity areas since 2001, but BioClass represents a major review of biodiversity areas, categorising them according to their ecological quality and value. BioClass covered the full range of habitats on the Coillte estate, including peatland habitats (raised bogs, blanket bogs and fens), and highlighted the best of those habitats for biodiversity management.

Bord na Mona's approach to management of its lands is set out in its Strategic Framework for Future Use of Peatlands, which sets out the factors and considerations that the company takes into account in making decisions about this national asset. A review of the Strategic Framework is underway.

Bord na Móna is also supporting new research into carbon fluxes of peatlands. The company is working with University College Cork to continue the research project at one site. This research will provide valuable input to the evaluation of the contribution of peatlands to carbon management and informing rehabilitation to mitigate carbon losses.

Action	Bodies Responsible	Status in relation to implementation of action
A10 New crop production techniques, such as paludiculture (especially cultivation of Sphagnum moss), will be explored.	Bord na Móna	Bord na Móna programme of growing trials is in place and will extend to 2022.

Bord na Móna developed several Sphagnum inoculation cutaway projects in 2012/2013 at Kilberry and 2017 at Lodge and Bunihinly. These trials continue to be monitored. While more time is required to evaluate the success of these trials, initial results indicate that Sphagnum colonisation and growth is poor, due to local environmental factors.

Bord na Móna also participated in a review of the BOGFOR Project, led by the Department of Agriculture, Food and Marine. This research project examined the development of commercial forestry on cutaway peatland. The review of forestry planted on the 1980s and 1990s indicates that while conifer forestry has been successful in specific sites, the majority of commercial conifer forestry is not currently commercially viable. One of the key issues affecting growth and production is nutrient deficiency.

Bord na Móna continue to explore the potential of other potential biomass crops. Several trials with Reed Canary-grass and Eucalyptus are ongoing. Currently the use of cutaway for grasses like Reed Canary-grass to develop a biomass crop is not commercially viable.

Bord na Móna continues to engage with various research projects including the CarbonConnects INTEREG Project. One of the objectives of this project is to explore the development of paludiculture on degraded peatlands. Bord na Móna is currently exploring if a cutaway site can be made available to this research group.

Teagasc has confirmed that it does not currently conduct any research on new crop production techniques such as paludiculture.

Action	Bodies Responsible	Status in relation to implementation of action
A11 The viability of using cutaway peatlands for flood attenuation measures will be considered as part of a national programme of Flood Risk Management Plans being rolled out under the Floods Directive.	Lead: OPW Other: Coillte & Bord na Móna	Completed.

This action was completed in 2017. It was calculated that the potential available storage would have an insignificant impact on peak water levels for the 2 year, 10 year and 100 year flood events. The reason for this is that the storage available is insignificant in relation to the volume of flow in the River Shannon. Accordingly, the flood risk management measure was found to be technically unviable as it had an insignificant impact on peak water levels in all flood events.

<https://www.floodinfo.ie/publications/?t=22&a=644>

Action	Bodies Responsible	Status in relation to implementation of action
A12 The work of Bord na Móna, Coillte and the Irish Peatlands Conservation Council in developing ecologically rich futures for cutaway and formerly forested bogs will be developed. Such areas can bring new tourism and recreation attractions to the midlands and the west.	Lead: Bord na Móna Other: Coillte	Completed with other recreation projects likely to be developed over the next decade.

Bord na Móna is currently updating its Strategic Framework for the Future use of Peatlands. This document will help guide the development of eco-tourism and recreation opportunities on Bord na Móna land in association with other stakeholders and local communities.

Lough Boora Discovery Park (LBDP) is an outstanding and a well recognised example of the potential to develop sites that have biodiversity value as well as wider value for amenity and tourism. Visitor numbers to LBDP have grown significantly in recent years, reaching over 100,000 in 2018. Bord na Móna initiated a feasibility study in 2018 to consider how the amenity at LBDP could be developed further. Other recreation projects are likely to be developed over the next decade as more cutaway lands become available.

Bord na Móna has been working closely with Longford County Council in the past few years to facilitate the development of several public walkways, trails and cycleways across Bord na Móna cutaway. In 2017, a new track was constructed on part of Corlea Bog and in 2018, the first phase of peatland rehabilitation was carried out at Corlea Bog.

Bord na Móna also works closely with the Lullymore Heritage and Discovery Park in Co. Kildare and continue to provide support and guidance in relation to management and development of peatland habitats. Bord na Móna has leased an area of cutaway to the group for amenity development and assisted with the development of a tourist railway attraction on this cutaway area.

Bord na Mona continue to support other projects including the Ballydangan Red Grouse Project, Abbeyleix Bog Project, Derrycastle wetlands and Loch Doire Bhile in Co. Tipperary. Bord na Móna has worked closely with local stakeholders to make these peatland areas publically accessible and to develop their biodiversity, recreation and educational value.

In 2019 Coillte established a new unit within the company known as Coillte Nature, it will focus on the environment and recreational forests. Coillte Nature will target the delivery of new woodlands facilitating species diversity, biodiversity and carbon sequestration as part of the Government's National Forestry Programme.

In a joint collaboration between Coillte and Bord na Móna, approximately 1,500 hectares of Bord na Móna land that is no longer used for peat production and otherwise suitable for woodland establishment has been identified for targeted woodland establishment. The focus will be on growing a mix of native Irish trees such as Downy Birch, Scots Pine, Alder and other broadleaf species.

Peatlands and Climate Change Actions 13-14

Action	Bodies Responsible	Status in relation to implementation of action
A13 An assessment will be undertaken of the value of identifying a number of priority peatland sites as part of a network of climate change related indicators and for their establishment as EU and global monitoring sites.	EPA & DCCAE	To be completed by the end of 2020.

Currently there are two Eddy Covariance towers in Ireland, both on peatland sites (Clara Bog SAC and on Bord na Móna lands at Lullymore). Within the next few years there will be a further two towers erected as part of ongoing peatland restoration projects. Together these towers will form a robust network with a good geographical

range. A LIFE IP bid is currently being prepared which would include a further two towers, if successful.

An Environmental Protection Agency- project entitled '*A framework for the restoration of degraded peatland*' started in 2015 and involves an inter-disciplinary team of scientists from TCD, led by Professor Laurence Gill. The Research Team believes that it will have a proofed and edited publication by April 2020.

An EPA funded project entitled: AUGER: Peatland properties influencing greenhouse Gas Emissions and Removals, started in 2017 and is due for completion in 2020.

Recent publications from EPA-funded Projects and a list of EPA awards from 2018 Research calls are in Appendix 1.

Action	Bodies Responsible	Status in relation to implementation of action
A14 The vulnerability of Ireland's functioning peatlands to the impacts of climate change will be assessed.	Lead: DCHG Other: DCCAE	2 year research project to commence in 2020.

EU Regulation 2018/841 requires the inclusion of greenhouse gas emissions and removals from the land-use sector (within the framework of Land Use Land Use Change and Forestry (LULUCF)). This means mandatory accounting by EU Member States of managed wetlands is to commence from 2026. The new regulation is part of the EU's efforts to reduce its GHG emissions by 40% below 1990 levels by 2030. In preparation for this regulation the National Mitigation Plan (July 2017) published by the Department of Communications, Climate Action and Environment contained an action to "progress the cross-Departmental working group to analyse the feasibility of including wetland draining and rewetting in the national inventory."

The inter-departmental working group on wetlands was comprised of representatives of the Department of Communications, Climate Action and Environment, the Department of Agriculture, Food and the Marine, the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht and the Environmental Protection Agency. The first meeting of the group was in March 2018.

On 30 April 2019, the Environmental Protection Agency and Department of Culture, Heritage and the Gaeltacht agreed to jointly fund a 2 year research project titled: "The vulnerability of peatland ecosystems to a changing climate and increases in the frequency and severity of droughts". The project will cost €400,000 and begin in 2020.

Protected Peatlands Sites Actions 15-18

Action	Bodies Responsible	Status in relation to implementation of action
A15 The Office of Public Works, in co-operation with the Department of Culture, Heritage and the Gaeltacht will progress a pilot Conservation Management plan for a fen SAC, including specific examination of the implications for drainage. This pilot will allow for more elaborated conservation objectives to be prepared for the fen habitat in general.	Lead: OPW Other: DCHG	Pilot completed with follow on actions to be implemented.

The Office of Public Works will fund the installation of monitoring boreholes at Tory Hill and, the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht will manage the project. The data collected from the boreholes will allow us to more accurately characterise the hydrogeology of the fen catchment area and determine what level the fen groundwater table must rise to restore the ecosystem to favourable conservation status.

Action	Bodies Responsible	Status in relation to implementation of action
A16 Ireland will devise and implement a system of management that will ensure that turf-cutting on protected bog sites continues only in such a way that will not threaten the integrity of SACs.	DCHG	The National Raised Bog Special Areas of Conservation Management Plan 2017-2022 published in 2017 with mid-term review to be undertaken in 2020.

The National Raised Bog Special Areas of Conservation Management Plan 2017-2022 was approved by the Government and published in December 2017. The Management Plan sets out how the raised bog special areas of conservation are to be managed, conserved, restored and how the needs of turf cutters are to be addressed. Within the framework of this plan, article 6 Habitats Directive investigations, to assess the impact of domestic turf-cutting with 14 SACs, have been ongoing.

A review of the National Raised Bog Special Areas of Conservation Management Plan 2017-2022 is currently underway.

Action	Bodies Responsible	Status in relation to implementation of action
A17 The review of Ireland's raised bog NHAs will be implemented and Turf-cutting on raised bog NHAs will be undertaken in accordance with the review.	DCHG	Dependent on passage of the Wildlife (Amendment) Bill 2016 through the Houses of the Oireachtas.

The Wildlife (Amendment) Bill 2016, to give legal effect to the proposed reconfiguration of the raised bog Natural Heritage Area (NHA) network arising from the 2014 raised bog NHA review and to provide for a possible review(s) of blanket bog NHAs, has been passed by the Dáil and Seanad Éireann. 16 amendments to the Bill have been made in the Seanad.

These amendments are for consideration by the Dáil.

Action	Bodies Responsible	Status in relation to implementation of action
A18 A comprehensive programme of restoration of Raised bog SACs and NHAs shall be undertaken through the implementation of the Raised Bog SAC Management Plan and development of management plans for NHAs, in partnership with affected land-owners.	DCHG	Commenced in 2017 and current phase of the restoration programme scheduled to continue until 2024 approximately.

The Department of Culture, Heritage and the Gaeltacht is currently undertaking the restoration of active raised bog on 12 raised bog SACs under the EU funded LIFE Programme 2014–2020 (LIFE14 NAT/IE/000032) .

Restoration works were completed on six LIFE project special area of conservation sites in 2018/2019 (Mongan Bog SAC, Co. Offaly, Ardagullion Bog SAC, Co. Longford, Garriskil Bog SAC, Co. Westmeath, Carrownagappul Bog SAC, Co. Galway, Ferbane Bog SAC, Co. Offaly and Moyclare Bog SAC, Co. Offaly). Following a procurement process all the remaining sites are now contracted for, with restoration works have commenced on Carrowbehy Bog SAC, Co. Roscommon and Clara Bog SAC, Co. Offaly. Works on Killyconny Bog SAC, Co Cavan, Sharavogue Bog SAC and Raheenmore Bog SAC, Co. Offaly are to follow with the remaining works to be completed later in 2020.

In tandem with the LIFE project, the National Parks and Wildlife Service of the Department, building on previous restoration measures, is undertaking restoration works on State owned lands within the designated raised bog network. Restoration

measures on State owned lands were completed in 2018 on two raised bog special areas of conservation (Kilsallagh Bog SAC, Co. Galway and Drumalough Bog SAC, Co. Roscommon). Work was completed in 2019 to restore State owned land in Shankill West Bog SAC, Co. Galway and restoration work commenced in January 2020 on State owned lands in Clonydonnin Bog NHA Co. Offaly/Westmeath

In Budget 2020, €5 million has been allocated to embark on an accelerated programme of peatland restoration. This programme is being funded by an increase in the carbon tax that was agreed in Budget 2020. With the injection of this funding, it is intended to restore over 1,800 hectares of protected raised bog on up to 9 sites in 2020. 23 other raised bog designated sites have been identified for restoration works over the next number of years under the programme.

NPWS/DCHG also worked with Coillte in 2018 and carried out restoration works on Mount Hevey Bog SAC and Drumalough Bog SAC.

Restoration Plans have been prepared for each of the raised bog SACs, to be developed further in consultation with stakeholders. Restoration plans for the raised bog NHAs are being developed with a view to completion by mid 2020.

Peatlands outside protected sites Actions 19-24

Action	Bodies Responsible	Status in relation to implementation of action
A19 The existing legal framework relating to the regulation of peat extraction in terms of planning, environmental protection and habitats protection will be reviewed, and recommendations developed to bring about a clearer, proportionate and enforceable system of regulation that also ensures compliance with appropriate EU environmental legislation and to ensure best practice in peat extraction operations.	Lead: DHPLG in partnership with DCHG Other: EPA	For completion in 2020-2021.

In 2018, the Department of Communications, Climate Action and Environment (DCCA) and the Department of Housing, Planning and Local Government (DHPLG) drafted new regulations to provide for a streamlined regulatory framework for large-scale peat extraction to be operated solely by the Environmental Protection Agency (EPA) and to exempt large-scale peat extraction from the requirement to obtain planning permission. It was envisaged that the new streamlined regime would

replace the dual system, which required both planning permission and an Integrated Pollution Control (IPC) licence from the EPA for peat extraction involving an area of 30 hectares or more.

These new regulations came into operation in January 2019. On the 25 January 2019, the Minister for Communications, Climate Action and Environment made regulations entitled European Union (Environmental Impact Assessment) (Peat Extraction) Regulations 2019 (S.I. No. 4 of 2019), which introduced the expanded EPA licensing system. Corresponding supplementary regulations were made by the Minister for Housing, Planning and Local Government entitled the Planning and Development Act 2000 (Exempted Development) Regulations 2019 (S.I. No. 12 of 2019), which exempted peat extraction of 30 hectares and above from the requirement to obtain planning permission. These came into operation on the same day as S.I. No. 4. In April 2019, Judicial Review proceedings were initiated, which challenged both sets of regulations. A High Court Judgement on 20 September 2019 set aside the new regulations. The consenting process for large-scale peat extraction now reverts to the pre-existing dual regulatory regime under both the planning system and the EPA.

In terms of smaller scale peat extraction, the DHPLG in partnership with DCHG will review provisions for smaller-scale peat extraction of less than 30ha on non-designated peatlands once provisions for large-scale peat extraction have been settled.

Action	Bodies Responsible	Status in relation to implementation of action
A20 Consideration will be given to ending the use of the sausage machine, or to allow its use in specific areas only. Turf-cutting contractors and other interested parties will be consulted in the course of the development of such proposals.	DCHG & DHPLG	For completion in 2020-2021.

Indication are that the sausage machine is not in much use around the country, in designated or undesignated bogs. Its use seems to be completely gone from the midlands bogs. It does not seem to have been used in west of Ireland peatlands in recent years.

Action	Bodies Responsible	Status in relation to implementation of action
A21 DCHG, Geological Survey of Ireland, OSI, DHPLG, PRA, the DAFM and local authorities will continue to cooperate to generate improved baseline information as to the extent of extraction activities and information on land ownership and turbary rights and information on the extent and physical (including geotechnical) aspects of Ireland's peatlands.	The Organisations listed working together	First meeting of organisations scheduled to be held in 2020.

A working group on this action is being established consisting of the above mentioned Departments and State Bodies. It will discuss the current levels of cooperation and decide on how best to continue to co-operate.

The National Land Cover and Habitat Working Group is continuing in its work to develop mapping and geospatial data for land use planning and development management. Led by the EPA, the cross-agency public sector initiative will address clear data gaps for a wide variety of public agencies by establishing a nationally shared and standardised resource. It is expected that the resource will be delivered by year-end 2020.

Action	Bodies Responsible	Status in relation to implementation of action
A22 To ensure compliance with Article 6 of the Habitats Directive, further guidance will be developed in relation to Appropriate Assessment of plans or projects involving peatlands.	Lead: DHPLG Other: DCHG	For completion in 2020.

Following publication by the European Commission of an update to its guidance on Article 6 of the Habitats Directive, it is now envisaged that the Dept. of Culture, Heritage and the Gaeltacht will publish a revision of its 2010 guidance for planning authorities on appropriate assessment of plans and projects, in consultation with the Dept. of Housing, Planning and Local Government and the members of the National Appropriate Assessment Forum.

Action	Bodies Responsible	Status in relation to implementation of action
A23 The existing regulatory system will be reviewed to ensure that all relevant peat extraction is subject to AA. In addition, the assimilative capacity of the peatland to absorb impacts will be considered.	Lead: DHPLG Other: DCHG	For completion in 2020-2021.

Planning legislation and the regulatory regime for large-scale peat extraction under the Environmental Protection Agency, as referenced in Action 19, both apply appropriate Assessment requirements to peat extraction.

Action	Bodies Responsible	Status in relation to implementation of action
A24 Specific guidance in relation to appropriate assessment and wind farms will be included in the guidance referred to in A23.	Lead: DHPLG Other: DCHG	For completion in 2020.

The Dept. of Housing, Planning and Local Government is currently reviewing the Wind Energy Development Guidelines (2006) and the Dept. of Culture, Heritage and the Gaeltacht has provided input into the review as part of the associated Strategic Environmental Assessment process. Revisions to the Wind Energy Development Guidelines, which consider the appropriate assessment of windfarms, shall ensure cross references to the Dept. of Culture, Heritage and the Gaeltacht's proposed update to its 2010 guidance for planning authorities on appropriate assessment.

Following the conclusion of the public consultation phase, the Department will analyse the submissions received and make any further changes to the guidelines which are deemed necessary or appropriate. The final revised Guidelines will be issued to planning authorities under section 28 of the Planning and Development Act 2000, which requires planning authorities to have regard to them in the performance of their planning functions including the determination of planning applications. In the meantime, the current 2006 Guidelines remain in force

Water Quality, Water Framework Directive and Flooding Actions 25-26

Action	Bodies Responsible	Status in relation to implementation of action
A25 For all peatland related activities, it should be demonstrated that they do not, either individually or in-combination with other activities , adversely impact on the environmental objectives of the WFD, associated daughter Directives and national regulations.	Lead: DHPLG & EPA Other: DCHG	Commenced and on-going during the timeframe of the National Peatlands Strategy.

This Action relates to obligations placed on the relevant public consenting authorities regarding the Water Framework Directive (WFD) and associated regulations. These obligations, such as Environmental Impact Assessment and Appropriate Assessment, will be required to be taken into account in relation to ongoing and proposed peatland related activities and associated authorisations by the operator and relevant authorities.

Sub-catchment characterisation undertaken by the Environmental Protection Agency has identified that peat extraction is causing a risk to ecological status objectives in over 110 water bodies. The impacts are generally caused by ammonia, suspended solids and hydromorphological conditions. It is planned that possible measures to mitigate the generation and impact of ammonia will be assessed by Bord na Móna in conjunction with the Environmental Protection Agency during the period 2018-2021. A call went out through the EPA Research Programme in 2018 in relation to this action. The Strategies to improve Water quality from Managed Peatlands (SWAMP) project was awarded funding, the project team lead by Florence Renou-Wilson from UCD is now underway. Bord na Mona is on the Steering Committee for the project in an advisory function. Details are in Appendix 1.

Action	Bodies Responsible	Status in relation to implementation of action
A26 Peatland related activities should not significantly alter the environmental supporting conditions for designated habitats such that these cause a failure of the conservation objective for that designated habitat and by inference cause a risk of the WFD environmental objectives relating to protected areas not being met.	Lead: DHPLG & EPA Other: DCHG	Commenced in 2018 and on-going during the timeframe of the National Peatlands Strategy.

As required under the Water Framework Directive (WFD), the Dept. of Housing, Planning and Local Government prepared the River Basin Management Plan for Ireland 2018-2021, which was published in April 2018. The River Basin Management Plan sets the framework for ensuring the Water Framework Directive environmental objectives are met for waterbodies where peat-related activities are considered a pressure. Section 7.4 of this plan outlines the actions being undertaken to address pressures on water bodies from the harvesting of peatlands.

These actions include:

- The preparation of new legislation adopted in January 2019 - Further details are provided in Action 19.
- The obligations, with respect to designated raised bog habitats, will be informed by the National Raised Bog Special Areas of Conservation Management Plan 2017-2022 and the outputs of related research projects.
- The Bord na Móna Biodiversity Action Plan 2016-2021 outlines objectives and actions for long-term rehabilitation of cutaway bogs, which acknowledge obligations under the WFD and the Habitats and Birds Directives. These include trialling ammonia attenuation /retention opportunities in cutaway peatlands and establishing a raised-bog restoration programme.
- The preparation of a research report that will evaluate mitigation strategies for improving water quality from drained peatlands. The project, of which Bord na Mona sits on the Steering Committee in an advisory function, is now underway and will integrate with the ongoing mitigation trials being undertaken by Bord Na Móna.

Public Awareness & Education Action 27

Action	Bodies Responsible	Status in relation to implementation of action
A27 Relevant public authorities will review their activities and approaches in regard to education and public awareness of the value and uses of peatlands and will outline the outcome of their review to the Peatlands Strategy Implementation Group. The Peatlands Group, in consultation with the Peatlands Council will assess current activities, including those of NGOs, and make recommendations to Government regarding further measures that may be required to inform the public of the economic, social and environmental benefits of responsible peatlands management. The recommendations of the Bogland Report will be considered by the Peatlands Group in this context.	All relevant authorities	Commenced in 2018 and on-going during the timeframe of the National Peatlands Strategy.

Development of an education and awareness programme by the Dept. of Culture, Heritage and the Gaeltacht (and other relevant bodies) on the benefits of conservation/restoration is included as an action in the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

In 2018, the Dept. of Culture, Heritage and the Gaeltacht operated a pilot Peatlands Community Engagement Scheme under which 14-peatland community led initiatives, which promoted the awareness and conservation of raised bogs were awarded funding. In 2019, €131,000 in funding was provided to 13 projects including the development of walking trails, local area amenity improvements, education programmes along with a photographic exhibition, environmental surveys and an oral history project.

One of the key objectives of the Bord na Móna Biodiversity Action Plan is increasing the awareness of the value of peatlands and Bord na Móna cutaway. In 2018, the company worked with other stakeholders and led several guided walks at sites such as Ballydangan Bog and Lough Boora Discovery Park. Bord na Móna also supported a number of different seminars and workshops in support of peatland education and continued to facilitate the 3rd level education sector with guided tours, where

possible. Guided Tours were also available for 1st and 2nd level schools at Lough Boora Discovery Park.

In 2018 Bord na Móna continued to develop an education and visitor experience at Mountlucas Windfarm. This was targeted at 1st and 2nd level schools. The looped-walk amenity was extended by 5 km and an Outdoor Physical Fitness Amenity Facility opened along the walkway.

Tourism & Recreational Use Actions 28-30

Action	Bodies Responsible	Status in relation to implementation of action
A28 The Peatlands Strategy Implementation Group (See Chapter 5) will be tasked with considering this recommendation on a Peatlands Park. A starting point for such consideration will be an examination of existing and potential visitor facilities in the ownership of public, semi-State and voluntary bodies.	Organisations part of the Peatlands Strategy Implementation Group	Feasibility study to be undertaken in 2020.

The National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht in consultation with other relevant agencies will undertake a feasibility study in relation to the creation of a National Peatlands Park in 2020.

Bord na Móna continues to maintain and develop Lough Boora Discovery Park and works closely with other key stakeholders. It is also a member of the Mid Shannon Wilderness project which has completed a feasibility study on the creation of significant recreation and amenity attractions in the mid Shannon region. This would include wetlands and wild areas.

In 2017 a walkway, funded by Longford County Council, was constructed by Bord na Móna on part of the Corlea cutaway bog, adjacent to the Corlea Trackway Centre. In 2018, the 1st phase of rehabilitation at Corlea Bog was completed. In 2019, Bord na Móna began construction of another walkway, funded by the Council, on Derryarogue Bog, close to Lanesborough.

In 2018, after discussions with Tipperary County Council, Bord na Móna commissioned a feasibility study to examine the eco-tourism and visitor potential of the Littleton Bog Group. This was associated with the ongoing Littleton Bog Group rehabilitation programme.

Action	Bodies Responsible	Status in relation to implementation of action
A29 The enhancement of peatlands as sustainable tourism and recreation amenities, which have the potential to return a community dividend, will be considered as part of the National Raised Bog SAC Management Plan and other appropriate plans.	DCHG	Commenced in 2017 with 12 raised bog LIFE project sites being assessed for the feasibility of the provision of recreational amenities within/linked to SAC sites which would be prioritised for restoration in coming years. Further assessment will be undertaken as restoration works are phased in.

The EU LIFE programme funded raised bog SAC restoration project (The Living Bog- LIFE14 NAT/IE/000032) is supporting amenity development in a number of raised bog SACs as part of its project actions. The amenities have been devised in conjunction with local communities and all relevant stakeholders, and are aimed at increasing the educational awareness of raised bog SACs.

A planning application was lodged in late 2019 with Galway County Council for the provision of an educational and amenity park (approx. 0.361ha) at Mountbellew (Carrowmagappul Bog SAC). Works within the park area will comprise of pedestrian access routes, viewing and demonstration area, boardwalk parking area and associated site works.

Planning is at an advanced stage for community-based amenity proposals in Ferbane, Co. Offaly (Ferbane Bog SAC) which will include a section of boardwalk, parking and a viewing area.

A link to two existing community walks is proposed for Carrowbehy Bog SAC, Co Roscommon. All necessary surveys have taken place in relation to the proposal and an application for planning permission is to be lodged with Roscommon County Council.

Amenities are proposed for Killyconny Bog SAC in Mullagh, Co. Cavan, and the proposals are under assessment. Preliminary works are to begin on an area of Clara Bog SAC in February 2020.

The Dept. of Culture, Heritage and the Gaeltacht's Peatland Community Engagement Scheme supported the development of a number of community led walking trails, signage, interpretative infrastructure and promotional material in relation to raised bogs in 2018 and 2019. Projects supported under the scheme in 2019 include the development of walking trails and looped walks around bogs, local

area amenity improvements, education programmes along with a photographic exhibition, environmental surveys and an oral history project.

Action	Bodies Responsible	Status in relation to implementation of action
A30 The consideration of peatlands as an amenity formed part of Ireland's application under the LIFE programme and will be part of relevant future restoration plans.	DCHG	Completed

As per Action 29 above, the EU LIFE programme funded raised bog SAC restoration project (The Living Bog- LIFE14 NAT/IE/000032) is supporting amenity development in a number of raised bog SACs as part of its project actions. The amenities have been devised in conjunction with local communities and relevant stakeholders, and are aimed at increasing the educational awareness of raised bog SACs.

As part of the national protected raised bog restoration programme, in 2020, the feasibility of development of public amenities and implementation on one of the nine project bogs proposed for restoration will be assessed to determine if any site is suitable for the development of an amenity facility.

Unauthorised Dumping Action 31

Action	Bodies Responsible	Status in relation to implementation of action
A31 The National Raised Bog SAC Management Plan will include provisions to combat unauthorised dumping on these sites.	DCHG and Local Authorities	Completed

The National Raised Bog Special Areas of Conservation Management Plan 2017-2022 outlines that the site specific restoration plans for each raised bog designated site will address waste management concerns, where necessary. Funding is available through the Dept. of Culture, Heritage and the Gaeltacht's Peatlands Community Engagement Scheme for waste management initiatives by local communities. Under this funding, one group received funding for waste management initiatives in 2018. Ballygar Tidy towns, Co. Galway, received funding for a litter awareness campaign, held five major clean-up days, and removed 20 loads of illegal dumped rubbish from Ballygar Bog, Co. Galway. Prior to the scheme in 2014/2015

Looscaun Shannonside Rural Development Group were funded by the Department, in conjunction with the local authority, to removed almost 90 tonnes of waste from Clonmoylan Bog SAC, Co. Galway.

As consultation is undertaken with local stakeholders on the site specific restoration plans on a rolling basis, waste management concerns will be addressed further.

Research Action 32

Action	Bodies Responsible	Status in relation to implementation of action
A32 The areas of research listed in section 5.13 will be assessed and a priority ranking assigned to each topic, along with indicative costs, duration and the exact scope of the research required, with a view to implementing a programme of research projects.	EPA & DCHG	<p>The current EPA Research Programme runs between 2014-2020. EPA-funded projects are mutli-annual projects which may still be running by the end of 2020.</p> <p>A new EPA research programme and strategy will be launched in 2021.</p>

The Environmental Protection Agency's 2018 research awards represent an investment of c. €1 million in peatland-related research projects, with four new awards related to peatlands.

In 2019, research priorities for Environmental Protection Agency research funding were identified following an extensive consultation with stakeholders including the Department of Culture, Heritage and the Gaeltacht, the National Research Coordination Groups (<http://www.epa.ie/researchandeducation/research/nationalcoordination/>) as well as the research community. Environmental Protection Agency peatland-related research projects represents c €1.3 million.

The Environmental Protection Agency's current Research Programme runs to 2020. Findings, conclusions and recommendations from each research project will be published as an Environmental Protection Agency Research Report following completion of each project. Research outputs from the projects (e.g. datasets generated, maps generated, etc.) will be made available in open access through the EPA's online Secure Archive For Environmental Research (SAFER) data archive <http://erc.epa.ie/safer/>.

The full list of peatland-related research is available on the Environmental Protection Agency's Public Projects Database: <http://erc.epa.ie/smartsimple/>. The

Environmental Protection Agency's Research Reports published since 2014 on completion of the research projects are available on: <http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/>. Projects Resources (databases, presentations, etc.) are available via the Environmental Protection Agency's Research Data Archive: <http://erc.epa.ie/safer/>.

Appendix 1

Research 250: Vulnerability Assessment of Peatlands: Exploration of Impacts and Adaptation Options in Relation to Climate Change and Extreme Events (VAPOR) (<http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/research250.html>)

Research 228: PeatGHG - Survey of GHG Emission and Sink Potential of Blanket Peatlands (<http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/research228.html>)

Research 236: Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS) (<http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/research236.html>)

Awards from 2018 Environmental Protection Agency Research Calls:

2018-CCRP-LS.2 - Smart observations of management impacts on peatland function (PI: Matthew Saunders, TCD) 48-month project started in 2019

The SmartBog project will assess the impacts of anthropogenic management activities, such as drainage, on the greenhouse gas (GHG) emissions and removals from peatland ecosystems. The project will utilise earth observation data from COPERICUS satellite products and near-earth high-resolution imagery to identify drainage features and to assess drainage status and peatland habitat across Ireland. From this assessment, a series of sites across a drainage gradient will be selected to measure both land-atmosphere, and fluvial carbon and GHG emissions. The latter aspect is of importance as these losses can be significant but are generally not reported in the net GHG assessment of terrestrial ecosystems. The point source GHG measurements will also be undertaken at two verification sites equipped with eddy covariance towers to enhance spatial up-scaling and emission reporting from peatland land cover classes. In addition, an Internet of Things (IoT) sensor platform will be established at each site to provide real-time environmental variables used to interpret/predict GHG fluxes and verify EO data. The outputs of this work will be compiled and interrogated using machine learning techniques to provide a stakeholder user interface that can be used to detect change in GHG emissions and removals.

2018-W-LS-18 - Strategies to improve Water quality from Managed Peatlands (PI: Florence Renou-Wilson, UCD) 48-month project started in 2019

Peatland drainage has disturbed nearly 90% of peat soils in Ireland and potentially led to the deterioration of water quality in affected catchments. The peat extraction sector must develop mitigation strategies that ensure the status of water bodies is protected, maintained and improved in line with the requirements of the Water Framework Directive and Flood Directive. Robust mitigation measures must ensure

reliable water purification methods as well as peak flow control, such as controlled flooding in ditches and flood plains. Ultimately, sustainable and effective watershed management to prevent environmental degradation will combine site-specific technological measures to reduce pollutants together with the restoration of previously degraded peatlands and carefully planned rehabilitation of cutaways/cutovers.

The SWAMP project aims (1) to appraise the significance and extent of contaminants in drained/mined peatlands and affected catchments; (2) evaluate/develop robust methods and treatment technologies to prevent and reduce pollution at site levels and develop best practice guidelines to apply in this sector; (3) propose predictive tools for effective watershed management involving drained/mined peatlands that would include land use management and sustainable restoration and after-use of cutaway/cutover bogs in order to protect water quality with potential for synergy with biodiversity-climate change measures and policies.

2019-W-MS-40: Transnational award from the 2018 Water JPI Joint call: Reducing the Effects of Forest Management to Inland Waters (PI: Florence Renou-Wilson, UCD) 36-month project start in 2019

Since the demand for bioenergy and biomass is expanding rapidly, and a large part of forests in the Nordic countries and Ireland is located on peatlands, there is a need for comprehensive analysis of the environmental effects of peatland forest harvesting and subsequent forest management practices such as drainage and clear-cutting operations on water quality.

Terrestrial and aquatic systems are interlinked; the nutrients and organic matter are transported in runoff and drainage water from land to lakes via streams and rivers. The changes in water quality also have drastic effects on aquatic biogeochemistry and ecosystem functioning. Nutrients and organic matter transported in runoff and drainage water causes eutrophication which increases the oxygen consumption of the lakes and rivers virtually always. Although the effects of brownification varies, it also often results in increased hypoxia and even anoxia.

In the Irish part of the REFORM project, we propose to first review long-term existing datasets as well as collect field data from experimental sites that will inform the development and testing of the process model. This study will help to reduce forestry-related negative effects on water quality.

In Europe, peatlands have been drained for agriculture, forestry and peat extraction. Peatland drainage leads to several negative impacts on water resources (e.g. drinking water or recreation) due to peat erosion, leaching of nutrients, organic matter and iron. The impacts of peatland drainage are also severe for the socio-economic system. Peatland management requires careful land and water management to reduce a range of negative impacts on water resources and their ecosystem services. However, lack of knowledge on land and water management is a key issue in peatland management, which hampers sound decision-making. This project will improve our knowledge on peatland hydrological and geochemical process, develop and test methods to reduce leaching and other negative impacts

that occur after peatland drainage, and disseminate the knowledge gained to stakeholders.

The Irish team will: (1) study peat soil geochemistry and reasons for nutrient, acidity, iron and dissolved organic carbon leaching in rainfall simulation experiments, (2) jointly review and test new options for mitigation and restoration to limit leaching and land and water resources degradation (3) develop with stakeholders improved options for land use planning, surveillance and zoning practices to reduce downstream environmental impacts, provide guidance for sustainable biomass production and maintenance of other ecosystem services.

**2019-W-MS-42: Transnational award from the 2018 Water JPI Joint call: on Water Management for Sustainable Use and Protection of Peatlands
36-month project start in 2019- (PI: Mark Healy, NUIG)**

WATERPEAT addresses the main theme of the Water JPI Call, as it links “observations, experiments and modelling to better understand hydrological processes and their connection, and to analyse the effectiveness of management methods.” Exploring water management will impact peatland water research, which is required in the Call (improve use of human resources, reduce fragmentation). The proposal focusses on fresh water and coastal lowlands, which is a priority of the Call (theme 1.3). Moreover, the proposal meets the FPO goals, as it is transdisciplinary, combines basic and applied research, and promotes international collaboration. The proposal is linked to WaterJPI call themes 1 and 2, and in particular sub-themes 1.1 (Promoting adaptive water management for global change), 1.2 (Integrative management by implementing Natural Water Retention Measures), 1.3 (mitigating water stress).

The project replies to SDG 6, as it aims to protect and restore water related ecosystems such as wetlands (peatland is the most common type of wetland). The project research is well linked to SDG 13 goals, as peatland management also has the goal to limit subsidence and GHG emissions. If well implemented, water management has the potential to prevent fires, which destroy forests and consequently reduce soil and canopy C stocks.

Ends