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

NATIONAL PEATLANDS STRATEGY
Progress Report 2017

Peatlands Strategy Implementation Group

Contents

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

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 the Minister responsible, Heather Humphreys TD, established a cross departmental group to monitor its implementation, the Peatlands Strategy Implementation Group (PSIG). As part of its remit, the group is required to present on an annual basis a report on the progress made, thereby ensuring that the strategy itself is a living document and is delivering real results. As chairperson of this group I am therefore delighted to present this the first report on progress made since its publication.

The implementation group brings together the Departments of Housing, Planning and Local Government; Agriculture, Food and the Marine; Communications, Climate Action and Environment; Culture, Heritage and the Gaeltacht; and the Office of Public Works as well as the EPA, Bord Na Móna, and Coillte. All of these carry significant responsibility in ensuring that our peatlands, which are home to some of the rarest species and habitats in Ireland are protected in a structured manner and the long term security of these peatlands is guaranteed.

The report details the work done by each Department, agency and semi-State body on actions assigned to them. It is the beginning of a process that will on a yearly basis strengthen the sustainability of peatlands in terms of their contribution to the overall quality of the environment and protection of rare species and habitats. It will also complement the work of the EU LIFE project designed to complete restoration on 12 of the protected bogs under the European Union Habitats Directive.

I am particularly pleased that each of the Departments, agencies and semi-State bodies in question has embraced the actions in a manner that has ensured real progress in terms of achieving the objectives as outlined in the National Peatlands Strategy. It also links locally led actions in the rural development programme 2014 to 2020 to the valuable work done by Bord Na Móna, Coillte and others to a range of studies designed to enhance the development of peatlands. These studies will also

yield considerable learning in terms of protection of a rich peatland heritage as well as pointing to their role in meeting the challenges posed by climate change.

This work will also inform the design and management of the National Raised Bog SAC Management Plan 2017-2022. It will inform the design of regulations necessary to govern large scale peat extraction. Agencies such as the EPA, Bord Na Móna and Coillte are but a few of the entities committed to the strategy and in this report have demonstrated their commitment by delivering on the actions outlined.

Of course, the work is not completed. Much of the work necessary to protect our peatlands must be undertaken on an annual basis. Therefore, each year the implementation group will need to meet on a regular basis to ensure that delivery of the strategy's actions continues to be monitored into the future. The work is of course an essential part of the implementation of the Habitats Directive. Equally it is an essential part of Ireland's own heritage and preservation of the uniqueness of our peatlands and the many forms of rare species they contain.

I welcome the commitment to this work by Minister Humphreys and thank her for the support she has given over the last number of years. I look forward to working with Minister Josepha Madigan on these issues.

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.

Seamus Boland

Chairperson

Progress Overview

This first report shows the work undertaken, since the publication of the National Peatlands Strategy, where each Department, agency and Semi-State body reported on how and when the actions relevant to them will be completed. Significant progress on actions has been made under a number of policy areas and some are highlighted below:

- Targeted support actions underpinning the sustainable use of peatlands have been included as one of the committed themes to be addressed under the locally-led schemes under the Rural Development Programme 2014 -2020.
- Numerous studies are underway on peatland sites in regards to peatlands' effect on climate change including a Trinity College lead study on carbon sequestration at Clara Bog SAC (Special Area of Conservation).
- The EPA has funded a large number of peatland-focused research projects examining various priority topics within this subject area and considerable research investment has been made to advance our understanding of the issues and potential solutions, while also increasing capacity within the Irish research community. EPA has invested over €1.1 million in peatland-related research in three projects awarded in 2015 and 2016.
- The National Raised Bog SAC Management Plan 2017-2022, published in December 2017, sets out the approach to how the raised bog SACs are to be conserved, managed and restored into the future and how the needs of turf cutters are to be addressed.
- Priority is being given to draft Regulations to establish a new regulatory regime in respect of large-scale peat extraction with a view to finalising them.
- As a starting point for the consideration for a National Peatlands Park, an examination of existing and potential visitor facilities has been undertaken. This examination has shown that there are fifteen Peatlands sites, mainly in public ownership with visitor facilities.

- In relation to the power generation sector, Bord na Móna has increased the level of co-firing at its power station at Edenderry over this reporting period. In addition, it is working closely with the ESB to introduce co-firing at the ESB's two peat stations from 2019.

- The Forest Service in the Department of Agriculture, Food and the Marine has published various documents that are relevant to the National Peatlands Strategy, these include the Land Types for Afforestation (March 2016); the Environmental Requirements for Afforestation (December 2016) and the Felling & Reforestation Policy document (May 2017), which sets out the requirements for afforestation, felling and reforestation.

- The option of using Bord na Móna bogs for flood storage was assessed as part of the Catchment Flood Risk Assessment and Management Study (CFRAMS) (www.cfram.ie) on the Shannon. It was calculated that the potential available storage will have an insignificant change in 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, this flood risk management measure was found to be technically unviable as it had an insignificant impact on peak water levels in all flood events.

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 will have 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, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to 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

The Group has met four times since the publication of the National Peatlands Strategy.

Update on Actions

Existing Uses Actions 1-12

Action	Bodies Responsible	Indicative timeframe for completion
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.

The Department of Agriculture, Food and the Marine (DAFM) operates a number of Schemes under the Common Agriculture Policy (under both Pillar I and II). As part of the qualifying conditions for such Schemes, farmers are required to manage their holdings to certain environmental standards and this is controlled under cross-compliance. These standards, which are a combination of Good Agricultural and Environmental Conditions (GAEC) and Statutory Management Requirements (SMRs), were recently reviewed and implemented under the most recent CAP reform from 2015. These standards apply to water quality, soil and carbon stock, biodiversity and landscape management, setting out minimum conditions to protect water quality, erosion, carbon stocks and safeguard protected areas under agricultural management. Failures to comply with these minimum standards will leave farmers liable to appropriate sanctions.

Action	Bodies Responsible	Indicative timeframe for completion?
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	End of 2017.

Commonages make up approximately 422,000 hectares of the land area in Ireland. The existing cross compliance must be followed to ensure the sustainable management of all soils in Ireland, including commonages, many of which are blanket bogs. Under the new Green Low-Carbon Agri-environment Scheme (GLAS), farmers with commonage lands have been afforded priority entry, provided they commit to participating in a joint Commonage Management Plan (CMP) prepared by a trained farm commonage advisor. These commonage management plans will set out minimum and maximum stocking levels for individual farmers and for whole commonages as well as any additional conditions which will bring the commonage into a more sustainable ecological condition, for example, controlled burning, controls to alleviate dumping etc. An online planning system has been developed to facilitate the production of these CMPs.

Action	Bodies Responsible	Indicative timeframe for completion?
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	End of 2017 and beyond.

In December 2016, DAFM launched an open call for proposals for co-operative-based locally-led pilot projects under the European Innovation Partnership Fund for Rural

Development. Projects developed under this open call will form part of the Department's new 'Locally-Led' initiative, under the Rural Development Programme 2014 – 2020. Support for these open call applications is structured around a competitive fund under two streams. The first stream focused on themes such as farm viability, economic performance, sustainable forest management, and innovative technologies. The second stream is focused on challenges related to environmental, biodiversity and climate change issues. Proposals for projects targeting the restoration of upland peats were specifically invited. A number of projects under the peatlands theme were successful at stage 1 and the successful groups are currently being assessed with announcements on successful projects due by the end of 2017.

Action	Bodies Responsible	Indicative timeframe for completion?
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.

Peatlands can be susceptible to wildfire activity, and the consequences of fire can be adverse and long term, particularly in sensitive sites such as Natura designated sites and other sites with high conservation value. Uncontrolled burning of land and wildfires can threaten such habitats and the wildlife dependent upon them as well as placing human lives and property at risk. A code of best practice for controlled burning has been developed by DAFM (Forest Service) and is available on DAFM's website (see www.agriculture.gov.ie/forestservice/firemanagement/). The code is intended as a land management tool to complement good grazing management, to further avoid accidental damage and to limit environmental harm from wildfires. This activity is also regulated under Section 40 of the Wildlife Act, which is currently under review.

A review of Section 40 of the Wildlife Act was completed in 2015 with the idea of certain burning allowed in March under regulations. Consideration of the guidelines underpinning any allowed burning will take place in development of the regulations. The

Heritage Bill, to give effect to the section 40 review, is proceeding through the necessary stages in the Houses of the Oireachtas.

Action	Bodies Responsible	Indicative timeframe for completion?
A5 A review of the use of peat in the horticultural industry will be undertaken.	DAFM, DCCAE & DCHG	To be commenced in 2018.

A working group will be established in 2018, chaired by DCHG, to undertake a review of the use of peat in the horticultural industry and a policy paper for public consultation will be prepared. It is envisaged that the policy paper for public consultation will be published in 2018.

Action	Bodies Responsible	Indicative timeframe for completion?
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	December 2019.

In relation to the power generation sector, Bord na Móna has increased the level of co-firing at its power station at Edenderry over this reporting period (2016-2017). In addition, it is working closely with ESB to introduce co-firing at the ESB's two peat stations from 2019. Bord na Móna is also developing biomass supply chains for both indigenous supply and biomass imports. In addition, a number of growing trials have recently commenced to again assess the potential of growing biomass crops on cutaway lands. A BogFor project (forestry on cutaway) is underway, led by the Department of Agriculture, Food and the Marine.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2017 and 2018.

Identification and mapping of peatlands on Coillte estates is complete to compartment level (high granularity). The Felling & Reforestation Policy document of the Forest Service of the Department of Agriculture, Food and the Marine sets out provisions for reforestation. In certain situations, trees and forests maybe incompatible with the conservation of protected Annex habitats and species at a site and/or national level, and deforestation may be considered. This approach was applied within the context of EU LIFE Projects focused on bog restoration. The Land Types for Afforestation and the Environmental Requirements for Afforestation documents of the Department of Agriculture, Food and the Marine are also relevant regarding afforestation on peat soils.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2016-2020 and beyond.

A comprehensive programme of restoration of raised bog Special Areas of Conservation (SAC) and Natural Heritage Areas (NHA) will be undertaken through the implementation of the National Raised Bog SAC Management Plan 2017-2022. Restoration Plans have been prepared for all 53 raised bog SACs and a contract was placed in November 2017, to begin work on the preparation of restoration plans for

NHAs. Initially, restoration works will focus on lands owned by the State and it is intended to commence restoration works in up to 9 raised bog SAC/NHA sites in 2018. The Raised Bog EU LIFE project is well underway (since 2016) and plans are in train to commence restoration works on 12 raised bog SACs, where 60% of the lands are State-owned.

Under the Bord na Móna Bog Restoration Project over 1000 ha has been restored so far. Several rehabilitation projects have been completed in the past year including bog restoration at Clonboley Bog and on the Bracklin bog remnant. This work will help Ireland meet its commitments to conserve raised bog habitats under the EU Habitats Directive.

All Bord na Móna lands used for peat production will be rehabilitated in the long term in accordance with draft plans supplied to the EPA. Implementation of this programme is ongoing with some 15000 ha rehabilitated to date. A wide variety of environmental, commercial and social after uses have already been developed including forestry, woodland development, 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.

The Bord na Móna Biodiversity Action Plan 2016-2021 outlines strategic objectives and actions to increase delivery of all ecosystem services of naturally functioning ecosystems through rehabilitation. Rehabilitation (and delivery of ecosystem services) can be carried out in combination with developing commercial after use (e.g. Mountlucas wind farm).

Coillte have restored over 3,000 hectares of raised bog and blanket bog habitat on its estate in partnership with the EU LIFE Nature programme. Coillte have completed mapping to a compartment level (high granularity). Consideration will be given to management options aimed at increasing the delivery of all peatlands ecosystem services within the context of the Forestry Act 2014 and the National Peatlands Strategy.

Action	Bodies Responsible	Indicative timeframe for completion?
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.

As part of the commitment of the Department of Culture, Heritage and the Gaeltacht (DCHG) to implementing restoration measures within the network of designated raised bog sites (SACs/NHAs) the focus will be on ecological, environmental and carbon dividends. However, the amenity value of all sites will be examined and, where feasible, they will be developed to promote visitor access (especially walking facilities) with the intention of promoting local/regional tourism with the concomitant economic spin-offs.

Bord na Móna's Strategic Framework for Future Use of Peatlands sets out the key factors and considerations which it takes into account in making decisions about this important national asset. A review of the Strategic Framework is currently underway with a view to achieving completion early in 2018. The Bord na Móna Biodiversity Action Plan 2016-2021 includes a specific action to carry out a review of ecosystem goods and services for all of the Bord na Móna lands. This is expected to progress in 2017 when a national review of ecosystem goods and services is published.

Action	Bodies Responsible	Indicative timeframe for completion?
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.

A number of new growing trials commenced in 2016 to, again, assess the potential of growing biomass on cutaway lands. In addition, Bord na Móna's Ecology Team established a new Sphagnum inoculation trial in 2017. The development and results of this trial will be monitored over the next 5 years.

Action	Bodies Responsible	Indicative timeframe for completion?
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.

The option of using Bord na Móna bogs for flood storage was assessed as part of the Catchment Flood Risk Assessment and Management Study (CFRAMS) (www.cfram.ie) on the Shannon. It was calculated that the potential available storage will have an insignificant change in 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.

Bord na Móna owns approximately 2% of the land in the Shannon Catchment. Much of this land is critically important to the supply of peat for the power stations at Lanesborough and Shannonbridge. Bord na Móna has an obligation to ensure those

stations are supplied. In addition, significant direct and indirect employment is provided in supplying the peat required – over 350 jobs in Bord na Móna alone.

Action	Bodies Responsible	Indicative timeframe for completion?
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	Lough Boora Discovery Park is in place. Other recreation projects are likely to be developed over the next decade as more cutaway lands become available.

Coillte have restored over 3,000 hectares of raised bog and blanket bog habitat on its estate in partnership with the EU LIFE Nature programme. In addition, much of Coillte's non-forested peatlands habitats are currently managed as biodiversity areas with nature conservation objectives the primary management goal. Consideration will be given by Coillte to management options aimed at increasing the delivery of all peatlands ecosystem services within the context of the Forestry Act 2014 and the National Peatlands Strategy.

Lough Boora Discovery Park (LBDP) is an outstanding and 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 2016. Bord na Móna are also contributing to strategic projects such as the National Outdoor Recreation Plan, Lough Ree and Mid Shannon project and the Midlands Cycling Destination project as well as supporting the work of the Offaly Tourism Forum and many projects in partnership with local communities. The Bord na Móna Biodiversity Action Plan was updated in 2016 and now sets out specific objectives and actions for the period 2016-2021 and these are currently being progressed. One of the main objectives of the plan is to enhance the development of

biodiversity on the cutaway in association with various after-uses and commercial development.

The Irish Peatlands Conservation Council is engaged in two projects:

1. The first with Bord na Móna is called Lodge Bog Wetlands in Co. Kildare. It is working with Bord na Móna to rewet an area of 35ha of cutaway bog adjacent to a raised bog reserve that it owns and manages called Lodge Bog. Both sites are in the famous Bog of Allen. The rewetting process began in November 2016. IPCC was also involved with Bord na Móna in an experimental programme on the site of re-introducing Sphagnum moss onto acidic peat deposits remaining on the site using Beadamoss, BeadGel and Sphagnum plant plug technology. At present, this site is not open to the public.

2. The second project involves the management of Lullymore West Bog (4ha) in Co. Kildare, a former cutaway bog which has regenerated with wet grassland and birch woodland habitats for biodiversity. There is a colony of Marsh Fritillary Butterfly breeding on the site. IPCC have established a long term monitoring programme for this butterfly and all of the butterflies on the site. It contains a butterfly transect which is recorded for 6 months of the year and the data is submitted to the National Biodiversity Data Centre. Each year IPCC carries out active management of this reserve to ensure the quality of the habitat for butterflies. This reserve is open to the public and is located on the Lullymore Biodiversity Trail (see www.ipcc.ie).

Peatlands and Climate Change Actions 13-14

Action	Bodies Responsible	Indicative timeframe for completion?
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	Research projects to be completed by 2019.

A number of research projects are underway measuring climate change indicators in peatlands sites. Professor Ger Kieley (UCC) is heading up a team of scientists who have erected a high-spec Eddy Covariance Flux Tower (in 2016) above the canopy of regeneration birch woodland at Bord na Móna's Lullymore cut-away bog. This will measure a comprehensive suite of climatic parameters (including CO2, CH4, air temperature, atmospheric pressure). It will also feed data into global networks (FLUXNET and ICOS).

An EPA-funded project entitled 'A framework for the restoration of degraded peatland' will run from 2015-2018 and involves an inter-disciplinary team of scientists from TCD, led by Professor Laurence Gill. The project funds 2 full-time PhD researchers at Clara Bog SAC and Abbeyleix Bog. Research as part of the project involves measurement of carbon fluxes at both a plot scale and atmospheric scale. The latter required the installation of an Eddy Covariance Tower at Clara Bog SAC which will align the work with the Integrated Carbon Observation System (ICOS; www.icos-ri.eu).

Also, the EPA-funded AUGER Project: 'Peatland properties influencing greenhouse Gas Emissions and Removals' which runs from 2016-2019 and is led by Dr Florence Renou-Wilson addresses this Action. The EPA-funded project 'Survey of GHG emission and sink potential of active and degraded blanket peatlands in Ireland, led by Professor Gerard Kiely, will soon publish an EPA Research Report presenting flux measurements of CO2, CH4 and DOC over a 10 year period at the Glencar Atlantic blanket bog in County Kerry.

Findings, conclusions and recommendations from both pieces of EPA research will be published as EPA Research Reports following completion of each project. Research outputs from both 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.

Once the research projects have been completed, a review will be undertaken as to how best to further progress this action.

Action	Bodies Responsible	Indicative timeframe for completion?
A14 The vulnerability of Ireland's functioning peatlands to the impacts of climate change will be assessed.	**Lead:** DCHG **Other:** DCCAE	First project has an end date of 31/07/2017, 2025 - interim date; 2040 - end date

DCHG is engaging with the Climate Change, Energy and Communications Section of the Department of the Taoiseach in exploring the potential of wetlands (particularly restored peatlands) to perform carbon storage and sequestration functions that can assist in achieving Ireland's Greenhouse Gas (GHG) reduction targets. The Department has assisted in the funding of carbon sequestration research by Trinity College Dublin at Clara Bog SAC since 2015 and recently has provided resource support for an on-going EPA-funded, state-of-the-art project that will allow Ireland to contribute to international efforts to understand the issue of carbon sequestration in peatlands.

The National Raised Bog SAC Management Plan 2017-2022 commits to undertaking research at the level of greenhouse gas emissions from peat soils under various management practices and to identify and review peatland restoration projects and techniques to assess their effectiveness in terms of hydrology, carbon storage and sequestration potential.

The results of these projects will inform the next steps on the assessment of the vulnerability of Ireland's functioning peatlands to the impacts of climate change.

The projects referred to under action 13 will feed into the aims of this action. However, a desktop research project will be required to properly assess the vulnerability of Ireland’s functioning peatlands to the impacts of climate change. An EPA-funded Project is underway on Vulnerability Assessment of Peatlands: exploration of impacts and adaptation options in relation to climate change through UCD.

Protected Peatlands Sites Actions 15-18

Action	Bodies Responsible	Indicative timeframe for completion?
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	2018.

As set out in the National Peatlands Strategy, a pilot project has commenced to develop a conservation management plan for a fen SAC, including specific examination of the implications for drainage. Tory Hill SAC (Site Code 000439) was chosen as the pilot site on the grounds that it is an arterially drained natura site, geographically is a relatively confined site and has a limited number of other non-fen qualifying interests, thereby reducing the complexity for a pilot management plan. The ecological and hydrological baseline studies conducted show that the adjoining arterial drainage channel exerts a considerable influence over the hydrology of the fen area. Monitoring is continuing to further understand the interlinkage between the water level in the drain and the water table of the adjoining lands. Learning from this pilot work, ecological and hydrological baseline studies are to be commenced on a further fen natura site i.e. Ballymore Fen SAC (Site Code 002313). Similar to Tory Hill, OPW in partnership with DCHG, will commence to build the baseline scientific data necessary, as the first step in developing conservation measures for the site.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2017-2019.

The Department of Culture, Heritage and the Gaeltacht provides compensation to turf cutters affected by the cessation of turf-cutting on raised bog SACs and NHAs and facilitates the relocation of turf cutters who wish to continue to cut turf to non-designated bogs, where feasible. However, for a number of the special area of conservation sites, the relocation site identified may not be suitable or may not have the capacity to cater for the number of turf cutters who may wish to relocate there. In such cases and within the framework of the National Raised Bog SAC Management Plan 2017-2022, the Department, in consultation with turf cutter representatives, is considering the available options in terms of relocation and the provisions of article 6.3 and article 6.4 of the Habitats Directive.

Fourteen raised bog SAC sites have been selected for an examination of the feasibility of continued cutting in parts of the sites in accordance with article 6.3 of the Habitats Directive under the National Raised Bog SAC Management Plan 2017-2022. Any such proposal for turf cutting in an SAC would be subject to the consent of the relevant public authority.

Action	Bodies Responsible	Indicative timeframe for completion?
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. It is scheduled for Report Stage in Dáil Éireann.

The review of Ireland's network of raised bog NHAs (entitled Review of Raised Bog Natural Heritage Area Network) (www.npws.ie/peatlands-and-turf-cutting/management-plans) was published in January 2014. Its objective was to fundamentally review the current NHA network and set out a series of measures to ensure that Ireland meets its obligations under the Habitats Directive to maintain or restore raised bog habitat to favourable conservation status and its Environmental Impact Assessment Directive obligations relating to the regulation of turf cutting on NHAs; whilst avoiding unnecessary impacts on the traditional rights of landowners and users and minimising the cost to the State. As part of the review over 270 raised bog sites were scientifically examined and evaluated including 53 raised bog Special Areas of Conservation (SACs), the existing 75 raised bog NHAs and over 100 other non-designated sites.

Along with examination of sites from a nature conservation and management perspective; environmental, technical and socio-economic criteria was used for the NHA review to identify the bogs most suitable as replacement SAC habitat and those most suitable for a new reconfigured NHA network.

The review concluded that a reconfiguration of the NHA network was required in order to meet nature conservation objectives more effectively whilst having regarding to economic, social and cultural needs.

The Wildlife (Amendment) Bill 2016 was published on 25 July 2016 and has been presented to Dáil Éireann. The Bill provides for the Minister for Culture, Heritage and the Gaeltacht:

a. to conduct and complete the 2014 Review of Raised Bog Natural Heritage Area Network; and

b. arising from the 2014 Review, to amend or revoke Natural Heritage Area Orders and to make new Natural Heritage Area Orders.

The Bill is proceeding through the necessary stages in the Houses of the Oireachtas.

Action	Bodies Responsible	Indicative timeframe for completion?
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	From 2017 (6 year initial programme).

The National Raised Bog SAC Management Plan 2017-2022 sets out the approach to how the raised bog SACs are to be conserved, managed and restored into the future and how the needs of turf cutters are to be addressed. The Plan was published in December, 2017. The Plan will be implemented in 3 six year cycles.

Site-specific restoration plans are necessary for each raised bog SAC and implementation of these plans form a major part of the programme of conservation measures. As part of the National Raised Bog SAC Management Plan 2017-2022, draft site-specific restoration plans have been developed for 53 SACs as well as the two raised bog complexes due to be proposed for designation as SACs. The plans include proposals for the restoration of high bog and surrounding cutover bog, which is essential to meet national and site-specific conservation objectives.

The focus of restoration activities within the first cycle of the National Raised Bog SAC Management Plan 2017-2022 will primarily be on the high bog, with some

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

The project funding of €5.4m will make a significant positive start to the restoration process. This project will work on the implementation of the site-specific restoration plans in consultation with stakeholders on 12 SACs. These plans will be developed further to include drainage management plans and will also outline community benefits such as the installation of boardwalks or walking trails where feasible.

For the remainder of the raised bog SACs in the network, the draft restoration plans will evolve over the current and upcoming cycles into complete restoration plans for each of the raised bog SAC sites, in consultation with stakeholders.

The development of restoration plans for the raised bog NHA network commenced in Q4 2017 with a view to completion by 2019.

Peatlands outside protected sites Actions 19-24

Action	Bodies Responsible	Indicative timeframe for completion?
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	2018 for regulations relating to large-scale peat extraction.

Draft regulations are being progressed by the Department of Housing, Planning and Local Government that will put in place a streamlined licensing system for large-scale commercial peat extraction operated by the EPA that involves mandatory environmental impact assessment (EIA) and also appropriate assessment. Under the revised regulatory system, large-scale commercial peat extraction will be exempted from the requirement to obtain planning permission.

When these regulations come into operation, DHPLG will focus on developing a separate regulatory regime in respect of smaller scale peat extraction, which will also be aimed at ensuring compliance with the EIA and Habitats Directives' requirements.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2020.

It is the policy of DCHG that sausage machines should not be used on designated bogs. Preliminary enquiries suggest that sausage machines are no longer used on any raised bog sites and only a small number operate in blanket bog sites.

Action	Bodies Responsible	Indicative timeframe for completion?
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 relevant organisations to be held in 2018.

DCHG have a comprehensive repository of baseline information on land ownership and turbary rights within designated SAC and NHA raised bogs. DCHG will contact the organisations concerned with the intention of meeting to progress this action in 2018 with a view to generating improved baseline information and deciding how best to continue to co-operate.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2019.

The European Commission is to publish an update to its guidance on Article 6 of the Habitats Directive. This update is required before national guidelines are finalised. It is envisaged that the DHPLG will publish revised guidance for planning authorities on appropriate assessment of plans and projects in consultation with the DCHG, which Department will provide significant technical input to the guidance document.

Action	Bodies Responsible	Indicative timeframe for completion?
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	2018-2019.

Planning legislation currently applies AA requirements to peat extraction and these requirements will continue to apply in new regulatory regimes for peatlands referenced in Action 19.

Action	Bodies Responsible	Indicative timeframe for completion?
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	

DHPLG is currently reviewing the Wind Energy Development Guidelines 2006 (to be published under the Planning and Development Acts) and will present DCHG with the opportunity to provide technical input into the updating of the relevant sections of the guidelines relating to AA, as necessary.

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

Action	Bodies Responsible	Indicative timeframe for completion?
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	Ongoing.

This Action relates to obligations placed on the relevant public consenting authorities regarding the Water Frame 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.

Subcatchment characterisation undertaken by the EPA has identified that peat extraction is causing a significant 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 EPA during the period 2018-2021.

Action	Bodies Responsible	Indicative timeframe for completion?
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	Ongoing.

This action relates to obligations placed on the relevant public consenting authorities regarding the Habitats and WFD Directives and associated regulations. These 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.

The environmental objectives for sub-catchments containing habitats, including peatlands, were identified and agreed at regional catchment workshops during Quarter 2 2017. The outcomes of these workshops were submitted to the DHPLG for consideration and potential inclusion in the final River Basin Management Plan, which is due to be published at the end of 2017. The development of the River Basin Management Plan will set the framework for ensuring Water Framework Directive environmental objectives are met for waterbodies where peat-related activities are considered a pressure.

As mentioned under Action 19 draft regulations are being progressed by the Department of Housing, Planning and Local Government that will put in place a streamlined licensing system for large-scale commercial peat extraction operated by the EPA. The obligations, with respect to designated raised bog habitats, will be informed by the National Raised Bog SAC Management Plan 2017-2022 and the outputs of related research projects.

Bord na Móna must comply with licences issued by the EPA in managing its bogs and these include obligations in relation to silt control, stabilisation and rehabilitation of cutaway bogs etc. which must be strictly complied with. Any deliberate re-wetting

of bogs and creation of extensive wetlands have to comply with these licence conditions.

The Bord na Móna Biodiversity Action Plan 2016-2021 (http://biodiversityactionplan.bordnamona.ie/index.html) outlines strategy, objectives and actions to increase delivery of all ecosystem services of naturally functioning ecosystems through rehabilitation. Rehabilitated cutaway is already providing some flood attenuation via wetlands within the Lough Boora Discovery Park and in other sites. Bog restoration sites also provide flood attenuation services.

Deliberate re-wetting of cutaway during the rehabilitation phase requires significant planning with regard to water levels, hydrological management and impacts on adjacent land. Relatively deep water could have negative environmental impacts, which also require assessment.

Neighbouring lands can benefit from drainage and flood control measures taken by Bord na Móna. Any re-wetting should be carefully managed so that there are no negative flooding impacts on neighbouring lands.

Bord na Móna has agreed to assess and reconfigure, where appropriate, pumping and peat stock management to increase retention of water on its bogs during flood events, subject to maintaining its transport links and drainage systems. In the medium to long term, the company is open to considering using exhausted cutaway bogs where appropriate and in compliance with any legal and regulatory obligations which apply. This might include for example, deposition of silt on such bogs under carefully controlled conditions. The funding requirement for such an initiative is likely to be significant. . An example of such an approach is the peat deposition site at Srahmore in County Mayo.

Public Awareness & Education Action 27

Action	Bodies Responsible	Indicative timeframe for completion?
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	2019.

In early 2018, the DCHG will establish a working group composing of the relevant public authorities to review activities and approaches in regards to education and public awareness of the value and uses of peatlands. The outcome of the review will be submitted to the PSIG. This group will then be in a position to decide on how the action should be further progressed.

Development of an education and awareness programme by DCHG (and other relevant bodies) on the benefits of conservation/restoration is included as an action in the National Raised Bog SAC Management Plan 2017-2022.

Development of community based conservation and management groups, which can act as custodians of these local bogs, is recognised as one of the best ways to ensure the long-term protection of habitats and species whilst educating and

informing local communities of the benefits of conservation. These networks can be used as a platform for community engagement where different stakeholders (e.g. community based groups, landowners and volunteers) working on the conservation of wetland sites can educate, share information and experiences and promote conservation of peatlands.

The Department of Culture, Heritage and the Gaeltacht will also work with local authorities and heritage organisations that also have a role to play in promoting the benefits and values of peatlands.

Bord na Móna's Biodiversity Action Plan 2016-2021has an objective to increase the awareness of the value of peatlands and a number of initiatives are ongoing. For example, in 2016, a series of events were held at Corlea Bog in Co. Longford as part of a Biodiversity Awareness Day, which provided information on a number of aspects of biodiversity of the peatlands in that area. Lough Boora Discovery Park continues to host numerous events aimed at specific topics and audiences e.g. nature walks and guided tours for schools, walking groups, etc.. Bord na Móna is also facilitating school visits and tours to Mountlucas wind farm which have attracted significant numbers of visitors to the wind farm facility and the associated biodiversity area. Bord na Móna also launched and operated the Eco-Rangers biodiversity education programme directed at primary schools - 204 schools (and 36,720 pupils) have taken part in this programme to date.

Tourism & Recreational Use Actions 28-30

Action	Bodies Responsible	Indicative timeframe for completion?
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	Long Term.

An examination of existing and potential visitor's facilities has shown that there are fifteen peatlands sites with visitor facilities.[1] These sites are mainly in public ownership and provide many of the features to be expected in a Peatlands Park.

Lough Boora Discovery Park already provides many of the features that are expected in a peatlands park. This extends to over 5,000 acres and provides a wide range of recreation and amenity options for visitors. In addition, Bord na Mona, Longford County Council and other stakeholders are working on the Lough Ree and Mid Shannon project. This project seeks to create a significant recreation and amenity attraction in the mid Shannon region, which would include wetlands and wild areas.

[1] *A list of these sites is in the attached appendices*.

Action	Bodies Responsible	Indicative timeframe for completion?
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 with12 raised bog LIFE project sites being assessed for the feasibility of the provision of recreational amenities within/linked to SAC sites which are prioritised for restoration in coming years. Further assessment will be undertaken as restoration works are phased in.

Substantial opportunities exist for the enhancement of raised bogs as sustainable tourism and recreation amenities and to return a community dividend. The open, natural environment of an SAC can be an ideal place for physical exercise, relaxation, social interaction and can provide general benefits to health and well-being. Having these amenities in turn encourages inward investment through eco-tourism and other industries.

As part of the national designated raised bog restoration strategy each restoration plan, following consultation with stakeholders, will consider socio-economic impacts of the restoration works and recommend recreational amenities, if any, for each site. Under the EU LIFE Raised Bog Restoration project 2016-2020 consideration is been given to the tourism and recreational benefits of the project for the 12 SAC sites.

Recreational amenities might include building or improving existing facilities (i.e. tracks, boardwalks, bog bridges), encouraging the creation of small tourism enterprises, promoting the benefits to human health and well-being and enhancing the value of a site as an educational resource (both for ecological features and potential industrial archaeological and architectural heritage features that may be present within and surrounding the site). There is significant potential for investment in upgrading, expanding and maintaining these facilities as access routes for amenity and recreation.

Consideration will also be given by DCHG to support tourism/recreational proposals for peatlands either directly or through other mechanisms such as LEADER and local community forums.

Action	Bodies Responsible	Indicative timeframe for completion?
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	As above.

One of the core objectives of the Peatlands Strategy and the National Raised Bog SAC Management Plan 2017-2022 is to raise awareness and understanding of the benefits and value of Ireland's peatlands and to encourage community involvement to inform future decisions. During the implementation of the programme of restoration measures on designated raised bogs, in particular, the opportunities for the provision of recreational amenities within the designated raised bog network will be explored.

The Community Wetlands Forum (CWF), under the umbrella of Irish Rural Link, currently includes over ten community lead wetland conservation groups (e.g. Abbeyleix group, Cabragh group, Corlea group, Cloughjordon group and Clara group). It functions as a forum for exchange of information, support to other groups, production of best practice guidelines, community involvement, recreational activities experience (walks and talks), volunteer opportunities, stewardships options and management agreements. Many of these groups emerged as community responses to immediate threats to the survival of their respective wetlands and as a result of the far-sighted view of these groups of the multiple socio-economic benefits that the conservation of these sites can provide.

These networks can be used as a platform for community engagement where different stakeholders, (e.g. community based groups, landowners and volunteers) working on the conservation of wetland sites, share information and experiences and support each other.

In addition, supports will be made available by the State for small-scale conservation and community education and awareness projects in areas affected by the cessation of domestic turf cutting on raised bog special areas of conservation and natural heritage areas.

There are also a number of schemes highlighted in the Action Plan for Rural Development through which funding may be provided for certain types of community projects.

Bord na Móna is working with other state companies and agencies to achieve a co-ordinated approach to the management and development of recreation and tourism assets on State owned lands. This Outdoor Recreation Group is chaired by the Department of Culture, Heritage and the Gaeltacht. Bord na Móna is also working with other stakeholders on the Lough Ree and Mid Shannon project. The objective of this group is to complete a plan to significantly develop tourism and recreation in the mid Shannon region.

Lough Boora Discovery Park continues to grow in popularity and attracted over 100,000 visitors in 2016.The Park provides a wide range of facilities for visitors as well as people who live in the local area. It provides a good example of a project where cutaway lands have been developed for recreation, amenity and tourism. Bord na Móna has worked with Coillte and Offaly County Council to complete a Feasibility Study on the development of a Midlands Cycling Destination which outlines the potential of a major cycling network much of which would be located on cutaway peatland.

Unauthorised Dumping Action 31

Action	Bodies Responsible	Indicative timeframe for completion?
A31 The National Raised Bog SAC Management Plan will include provisions to combat unauthorised dumping on these sites.	DCHG and Local Authorities	From 2017.

The site specific restoration plans for each raised bog designated site will address waste management concerns where necessary. Some provision is available through DCHG for public engagement funding for waste management initiatives by local communities affected by the cessation of turf cutting.

Research Action 32

Action	Bodies Responsible	Indicative timeframe for completion?
A32 These areas of research 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	Assessment of peatlands research projects to be undertaken in 2018.

Key research will be undertaken in the next six years under the National Raised Bog SAC Management Plan 2017-2022 to improve peatland management and restoration practices into the future. Further research will be needed in the areas of supporting bog vegetation, groundwater losses, climate change mitigation, flood attenuation, peat subsidence and peat formation on cutovers. These areas of research will be assessed and prioritised based on scope, costs and duration with a view to forming a programme of peatlands research projects.

The Department of Culture, Heritage and the Gaeltacht will work with relevant agencies and organisations to prioritise such projects in 2018.

The EPA has funded a large number of peatland-focused research projects examining various priority topics within this subject area and considerable esearch investment has been made to advance our understanding of the issues and potential solutions, while also increasing capacity within the Irish research community. The EPA has invested over €1.75 million in peatland-related research projects since 2012, with investment in three projects awarded in 2015 and 2016 alone amounting to >€1.1 million[2]

[2] Further details of these research projects are attached in the appendices

The EPA's current Research Programme runs to 2020, by which time all research projects listed will be complete. Findings, conclusions and recommendations from each research project will be published as an EPA 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.

Bord na Mona is developing and supporting new research into the carbon fluxes of peatlands at Lullymore, County Kildare. The Lullymore Carbon Flux Tower Project is now running for one year. This research will provide valuable input for the evaluation of the contribution of peatlands to carbon management.

Appendices

A 28 Peatlands Visitor Sites

Name	Facilities	Public Awareness & Education	Bog type	Designation
Abbeyleix Bog, Abbeyleix, Co. Laois.	• Wheelchair accessible boardwalk	• School trips • Information Panels • Community engagement • Art Exhibitions	Active raised bog	no
Girley Bog Meitheal, Kells, Co. Meath	• Boardwalk	• Information Panels	Raised Bog	NHA 001580
Scohaboy Bog, Cloughjordan, Co. Tipperary.	• Viewing platform • Bog Bridge	• Information Panels	Raised Bog	NHA 000937
Corlea Trackway Visitor Centre, Kenagh, Longford.	• Visitor Centre • Car park	• Information Panels	Raised Bog	no
Lough Boora Discovery Park, Boora, Co Offaly.	• Visitor Centre • Public toilets • Café • Picnic area • Car park	• Tours		no
Lullymore Heritage Park, Lullymore, Co. Kildare.	• Visitor Centre • Playground • Train ride	• Information on Peatlands	Raised Bog	no

	• Boardwalk			
Bog of Allen Nature Reserve, Lullymore, Co. Kildare.	• Visitor centre • Car park • Toilets • Picnic Area	• Curriculum linked education modules • Introduction to peatlands • Community programs focusing on peatlands • Education Officer delivering workshops around the country	Raised Bog	no
Lodge Bog, Lullymore, Co. Kildare.	• Boardwalk	• Information Panels	Raised Bog	no
Fenor Bog, Fenor, Co. Waterford.	• Boardwalk	• Information Panels	Alkaline Fen	Nature Reserve
Clara Bog Visitor Centre, Clara, Co. Offaly.	• Visitor Centre • Parking facilities • Toilets • Boardwalk	• Interactive multimedia exhibition • Audio visual facilities • Information Panels	Raised Bog	SAC 000572 and Nature Reserve
Connemara National Park, Connemara, Co. Galway.	• Visitor Centre • Parking • Toilets • Boardwalks • Café • Picnic area	• Exhibition on Peatlands • Education programmes	Blanket Bog	SAC 002031
Glenveagh National Park, Glenveagh, Co. Donegal.	• Visitor Centre • Parking • Toilets • Boardwalks • Cáfe	• Information Panels • Education programmes	Blanket Bog	SAC 002047

	• Picnic area			
Wicklow Mountains National Park, Glendalough, Co. Wicklow.	• Visitor Centre • Parking • Toilets • Boardwalks • Café • Picnic area	• Information Panels • Education programmes	Blanket Bog	SAC 002122
Ballycroy National Park, Ballycroy, Westport, Co. Mayo.	• Visitor Centre • Parking • Toilets • Boardwalks • Café • Picnic area	• Information Panels • Education programmes	Blanket Bog	SAC 000534
Killarney National Park, Killarney, Co. Kerry.	• Visitor Centre • Parking • Toilets • Boardwalks • Café • Picnic area	• Education programmes	Blanket Bog	SAC 000365

EPA Research Projects

EPA Funded Research Projects (ongoing):

2014-CCRP-MS.20: Vulnerability Assessment of Peatlands: exploration of impacts and adaptation options in relation to climate change - led by Dr Florence Renou-Wilson (UCD) - 20 month duration - total cost €150,504.80

Start date: 02/01/2015- Completion date: 31/07/2017- 30 Months duration-

Abstract:

This study aims to develop a deeper understanding among stakeholders of the likely vulnerability (sensitivity, exposure and ecological resilience) of peatlands to climate change (both gradual and extreme) in the context of current land use changes in Ireland. Understanding vulnerability is central to identifying adaptation needs and contributes to adaptation planning which is central to advancing actions on climate change. The VAPOR project investigated the sensitivity and adaptive capacity of the main ecosystem functions of peatlands and their potential feedback mechanisms across a range of peatland types and management approaches. By combining eco-hydrological and biogeochemical models, the project team examined the impact of changes in climatic variables such as temperature and moisture on the following health components of a peatland: hydrology; vegetation and carbon balance. A cost-benefit analysis of identified intervention strategies was carried out in order to further inform decision makers about prioritisation and potential opportunities. The above analyses will be integrated with an updated review of peatland exposure to current and predicted land use and climate pressures. Such integrated vulnerability assessment will provide information regarding which peatlands are likely to be more vulnerable or resilient given a combination of stressors.

2014-NC-MS-2: A framework for the restoration of degraded peatlands - led by Professor Laurence Gill (TCD) - 36 month duration -

Start date: 01/04/2015- Completion date: 30/03/2018- 36 Months duration-

Abstract:

The primary objective of the proposed research is to develop a framework that outlines the methodology and actions to be undertaken when attempting to restore peatland ecosystems to active peat-forming conditions. This research focuses primarily on quantifying the hydrological conditions necessary to sustain the vegetation that permits peat formation and carbon sequestration. Using this information, together with ecological and greenhouse gas data, the restoration framework will evaluate the range of ecosystem services peatland typologies can provide, the hydrological mechanisms and thresholds providing those services and the impacts of pressures on ecosystem functioning. Prioritisation of potential sites for restoration will be based on evaluating the value of the potential ecosystem services and the engineering practicalities of remediation.

A comprehensive literature review has been carried out and submitted in February 2017 detailing all aspects of peatland literature relevant to the project's aims and objectives. Originally, the review was to be concentrated on Irish research work but a wider review of international research was necessary to properly address the current states of knowledge with regard to peatland functionality and management.

While it is well established that degraded peatlands emit substantial volumes of carbon dioxide to the atmosphere, there is now an increased awareness that the magnitude of carbon losses in aquatic pathways are almost as significant. The reduction of this loss, in addition to surface emissions, with restoration work is currently not factored into land-use decisions or environmental policies and pricing. There is therefore an opportunity to address this loss as a means to further justify restoration work, particularly in non-designated peatland sites and contribute to the national carbon reporting inventory.

2015-CCRP-MS.30: AUGER: peat land properties influencing greenhouse Gas Emissions and Removals -led by Dr Florence Renou-Wilson (UCD) - 36 month duration - total cost €299,955.90-

Start date: 01/04/2016- Completion date: 01/04/2019- 36 months duration-

Abstract:

Greenhouse gas (GHG) fluxes in peatlands are spatially and temporally variable and highly sensitive to natural and anthropogenic perturbations. Over 80% of peatlands in the Republic of Ireland have been modified to some extent and their climate footprint is strongly dependent on their management. Pristine peatlands are generally net sinks for carbon dioxide and sources of methane. However, land use change produces radical changes in the magnitude and direction of these fluxes, which are driven by a range of variables (e.g. hydrology, vegetation, soil properties etc.). This research will:

- ✓ review the requirement for C stock and GHG flux monitoring capacities on peatland sites,
- ✓ review current models/tools used to assess peatland status and the importance of properties and management in modelling GHG emissions,
- ✓ characterise peatland types and associated soil/ecosystem properties, identify potential information gaps by a nationwide peatland survey of physical, chemical and ecological parameters of peatlands and peat soils (and overall assessment condition),
- ✓ support on-going field observations and modelling of GHG emission/removals at 2 core peatland sites and
- ✓ model anthropogenic impacts on GHG emissions/removals through development of ECOSSE model.

2015-NC-MS-5: Quantification of blanket bog ecosystem services to water (QUBBES) - led by Dr Raymond Flynn (QUB) - 36 month duration - total cost €330,820.46

Start date: 01/04/2016- Completion date 31/07/2019- 40 Months duration-

Blanket bogs underlie a large area of Ireland and make an important contribution to its natural capital. Although acting as important biodiversity reserves, they also influence water quality and hydrological processes. However, the link between blanket bog ecosystem services and water remains poorly quantified. The proposed research aims to develop numerical models that link ecohydrological processes operating within bogs with flow and water quality in surface water. Model development will be informed by high resolution integrated catchment monitoring in areas of blanket bog with contrasting land use, ranging from intact sites to those which have been altered by human activity, including those where blanket bog vegetation is restoring. Integrated hydrological modelling, drawing on outputs from GIS based ecohydrological models and rainfall-runoff models, will when combined with outputs of field studies, define critical source areas where conservation and /or restoration measures may be best focused. High resolution quantitative outputs from modelling will permit economic analysis of the impact of contrasting land use activities in terms of water treatment and flood prevention. Application of the approach to ungauged sites using nationally available datasets will define the confidence with which the approach may be applied across the country.

EPA funded Research Projects at final report stage/nearing completion:

2012-CCRP-MS.9: Survey of GHG emission and sink potential of active and degraded blanket peatlands in Ireland - led by Professor Gerard Kiely (UCC) - 24 month duration - total cost €79,991.30

Start date: 01/01/2013- Completion date: 31/12/2014- 24 Months duration-

Abstract:

This research conducted a survey to identify the extent of active and degraded blanket peatlands in Ireland and to carry out GHG flux measurements at a pristine blanket peatland in Glencar, County Kerry and at two differently degraded blanket peatlands in County Kerry. Specifically the research included:

Glencar, County Kerry is the site of a pristine Atlantic Blanket Bog. In the summer of 2002, the Hydromet Research Group in UCC set up the first Eddy Covariance Flux tower in Ireland for the purpose of measuring the fluxes of CO2, CH4 and DOC. The work is ongoing and the research reports on 10 years of measurements. For the 10 years, 2003 to 2011, the annual flux of CO2, known as the Net Ecosystem Exchange (NEE) ranged from -0.32 to -0.79 TC-CO2/ha/yr with a mean annual of -0.5 TC-CO2/ha/yr (i.e. as uptake or sink). For the 6 years, 2003 to 2008, the annual flux of CH4, ranged from +0.036 to +0.046 TC-CH4/ha/yr with a mean annual of +0.041 TC-CH4/ha/yr (i.e. as a source). For the 6 years, 2003 to 2008, the annual flux of DOC ranged from +0.131 to +0.165 TC-CH4/ha/yr with a mean annual of +0.140 TC/ha/yr (i.e. as a source). Summing the three components of the carbon budget over the six years, we found that for four of the six years, the site was a sink for carbon in the range of -0.241 to -0.656 TC/ha/yr and in the two source years the magnitude was +0.028 and +0.086TC/ha/yr. The six year average annual carbon uptake at Glencar was -0.297TC/ha/yr which compares to -0.215TC/ha/yr at Mer Bleu (Canada) and to -0.271TC/ha/yr at Degero Stormyr (Sweden).

Relative to other ecosystems, this blanket bog has an NEE of ~-0.5TC-CO2/ha/yr by comparison with an NEE in Irish grasslands of ~3TC-CO2/ha/yr and an NEE in Irish forestry of the order 10TC-CO2/ha/yr. To enable the protection of pristine blanket peatlands, a deeper understanding is required of the dynamics of the components of the carbon budget with a view to model future climate change impacts.

2012-CCRP-PhD.2: Greenhouse gas balances in rewetted peatland forests - led by Dr Kenneth Byrne (UL) - 36 month duration - total cost € 73,499-

Start date: 01/01/2013- finish date: 31/12/2016- 36 Months duration-

Abstract:

Natural peatlands are important sinks of carbon (C) and vital in the global C cycle. Despite covering just 3% of the earth's land mass, they store as much C as all terrestrial biomass. Drainage for forestry alters the hydrology and chemical reactions in peatlands, converting them from sinks to sources of carbon dioxide (CO2) and nitrous oxide (N2O), while reducing methane (CH4) emissions. Rewetting is considered an important tool in climate change mitigation and is utilized in addition to other management tools such as Sphagnum introduction to return the C sink function of peatlands and re-establish peat forming conditions in degraded peatlands.

The first aim of this study was to investigate the controls on CO2, CH4 and N2O dynamics in two rewetted former peatland forest sites in Ireland; one blanket peatland eight years after rewetting (Pollagoona) and one raised peatland three years after rewetting (Scohaboy), produce annual greenhouse gas (GHG) balances for both peatlands and compare them with natural and forested systems. The second aim was to compare the chemical and physical properties of natural, drained and rewetted peatlands in order to assess the effect of both drainage and subsequent rewetting on peatland properties. Gas fluxes were measured using the chamber method. Micro sites comprising the dominant vegetation at the study site were established and gas balances produced for one year.

2012-B-MS-9: Greenhouse gas emissions and sink potential of Irish peatlands- total cost- €285108.54

Start date: 01/01/2013- Completion date: 30/06/2015 –24 Months duration- Final report under review-

Abstract

Natural peatlands are a high priority for biodiversity conservation as species and habitats of international importance depend on the waterlogged conditions. Rewetting of drained peatlands and organic soils aims to return these conditions and set the system on a trajectory that will lead to biodiversity levels characteristic of natural peatlands. In addition, future land use of rewetted peatlands and organic soils should contribute to the reduction of greenhouse gas (GHG) emissions, being in line with not only climate change conventions but also sustainability demands (Renou-Wilson et al. 2011).

This research informs on the delivery of sustainable management of one of the last natural resources in Ireland, as envisioned in the National Peatlands Strategy, as well as facilitating legal requirements under many European Union (EU) Directives, notably: Habitats Directive, Birds Direct

ive, Water Framework Directive and Landscape Directive as well as aiding in the mitigation of climate change impacts.

This research describes a field-based study that simultaneously quantified both biodiversity and climate mitigation benefits (i.e. GHG fluxes) across a rewetted peatland land use category network (NEROS). The land use categories (LUCs) monitored were forestry (on nutrient poor soils), grassland and peat extraction (domestic cutover and industrial cutaway on nutrient poor and nutrient rich soils). Drained sites were also monitored for comparison purposes.

EPA funded Research Projects due to commence:

2016-W-LS-13: EcoMetrics -Environmental supporting conditions for Groundwater Dependent Terrestrial Ecosystems - led by Professor Laurence Gill (TCD) - 36 month duration - total cost approximately €500,000-

Start date: 31/03/2017- Completion date: 31/03/2020- 36 Months duration-

Abstract

The development of environmental supporting condition metrics for water bodies supporting the Groundwater Dependent Terrestrial Ecosystems (GWDTE) is a prerequisite for undertaking assessments under the WFD characterisation process. These metrics can relate to the quality or quantity of groundwater on which the GWDTE ecology depends and are applied in the underlying groundwater body. The metrics can also be used as a mechanism to screen the groundwater body supporting these GWDTE, to determine if there is a risk of the groundwater body failing WFD objectives. The aim of the research is therefore to define appropriate metrics for the different GWDTEs - fens, raised bogs and turloughs. Existing geospatial data will be collated in order to develop an initial draft “potential” GWDTE dataset for turloughs, raised bogs and fens that will help to inform the future formation of a national register. This will be complemented by activities which will use remote sensing techniques to further identify GWDTEs. A combination of existing data and some additional field study where required will then focus on raised bogs, turloughs and fens respectively by identifying appropriate metrics that characterise the environmental supporting conditions for these wetlands. These metrics will then be tested back on the wetlands.

Ends