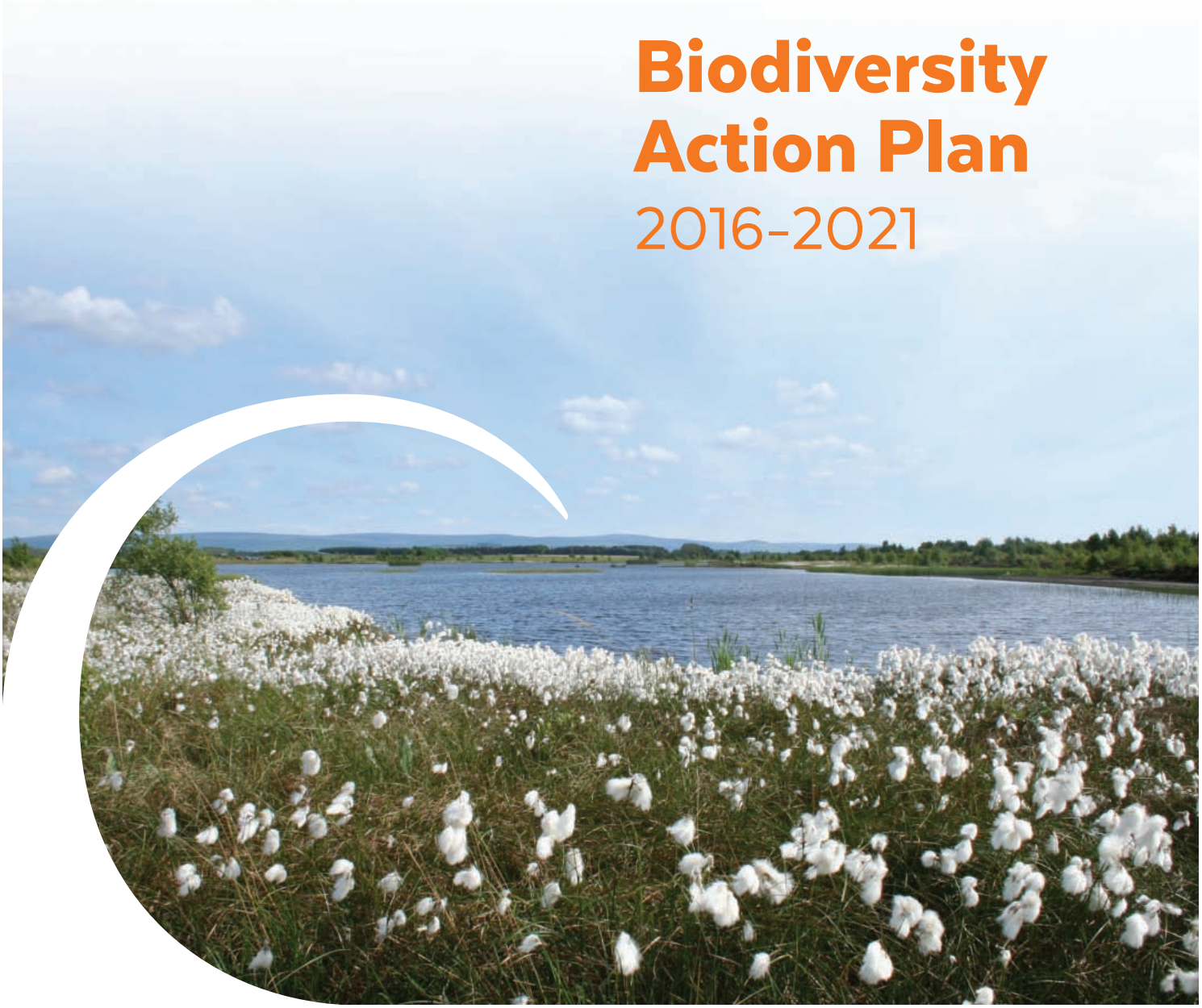
APPENDIX 4-13

Bord na Móna Biodiversity Action Plan 2016-2021

BORD NA MÓNA
Naturally Driven

Biodiversity

Biodiversity Action Plan 2016-2021



Contents

This page:
Finnamore's Lake

Cover photos:
Main image: Bog cotton at Lough Boora
Second row: Bumble Bee on Knapweed; Marsh Fritillary; Damselfly.
Third row: Mute Swans with chicks; regenerating cutover bog.

Foreword

The Biodiversity Action Plan 2016-2021 is an essential component of Bord na Móna's sustainability strategy which stands on the three pillars of people, profit and planet. This means whenever we are developing or delivering business solutions we ensure they are supported by all three sustainability pillars.

In practical terms, our strategy means making sure that, wherever possible, we do things that sustain a healthy natural environment. This includes driving down our carbon footprint, investing in renewables, developing environmentally friendly goods and services as well as rehabilitating bogs and enhancing biodiversity. This environmental aspect to sustainability, where we respect the planet we inhabit, has been an increasingly vital third element to our policy for many, many years.

In October 2015, we announced a significant change for Bord na Móna. To ensure we have a sustainable business means that between now and 2030 Bord na Móna will be in a process of profound transition. During this period we will be managing the move away from energy peat operations, into other businesses and land uses across the energy peat bogs that are part of our ca. 80,000 hectare acre landholding. This will involve the single largest change of use of land in modern Irish history. It will also mean a sizable reduction in our carbon footprint and a very substantial bog rehabilitation programme. We are confident that the investment and rehabilitation programme will collectively yield considerable environmental dividends for the people of Ireland.

Bord na Móna is an iconic State owned company so we are undertaking this transition in a way aimed at benefitting everyone in Ireland. We have also always been a 'community company' so it is important for us that our local communities and our employees will experience the tangible benefits of the new environmental goods and services that we are now developing. Delivering these benefits is a huge body of work. Indeed anyone familiar with the ecology of bogs, will understand that it will require patient work, significant investment and expertise to build this future over the period 2030 and beyond. I am confident that Bord na Móna possesses the skills, commitment and determination to achieve this ambition.

The bogs of Ireland hold a special place in the hearts and souls of Irish people. We in Bord na Móna recognise the privileged position we hold as stewards of state-owned bogs and peatlands. Our intimate appreciation of the complex value of the bogs means we understand the need to carefully plan to ensure positive, sustainable outcomes for our bogs. I am pleased that the Biodiversity Action Plan 2016-2021 developed by our Ecology Team, in consultation with a wide range of stakeholders, provides a very robust roadmap to this exciting new future for our bogs.

Mike Quinn
CEO Bord na Móna
March 2016

Executive Summary

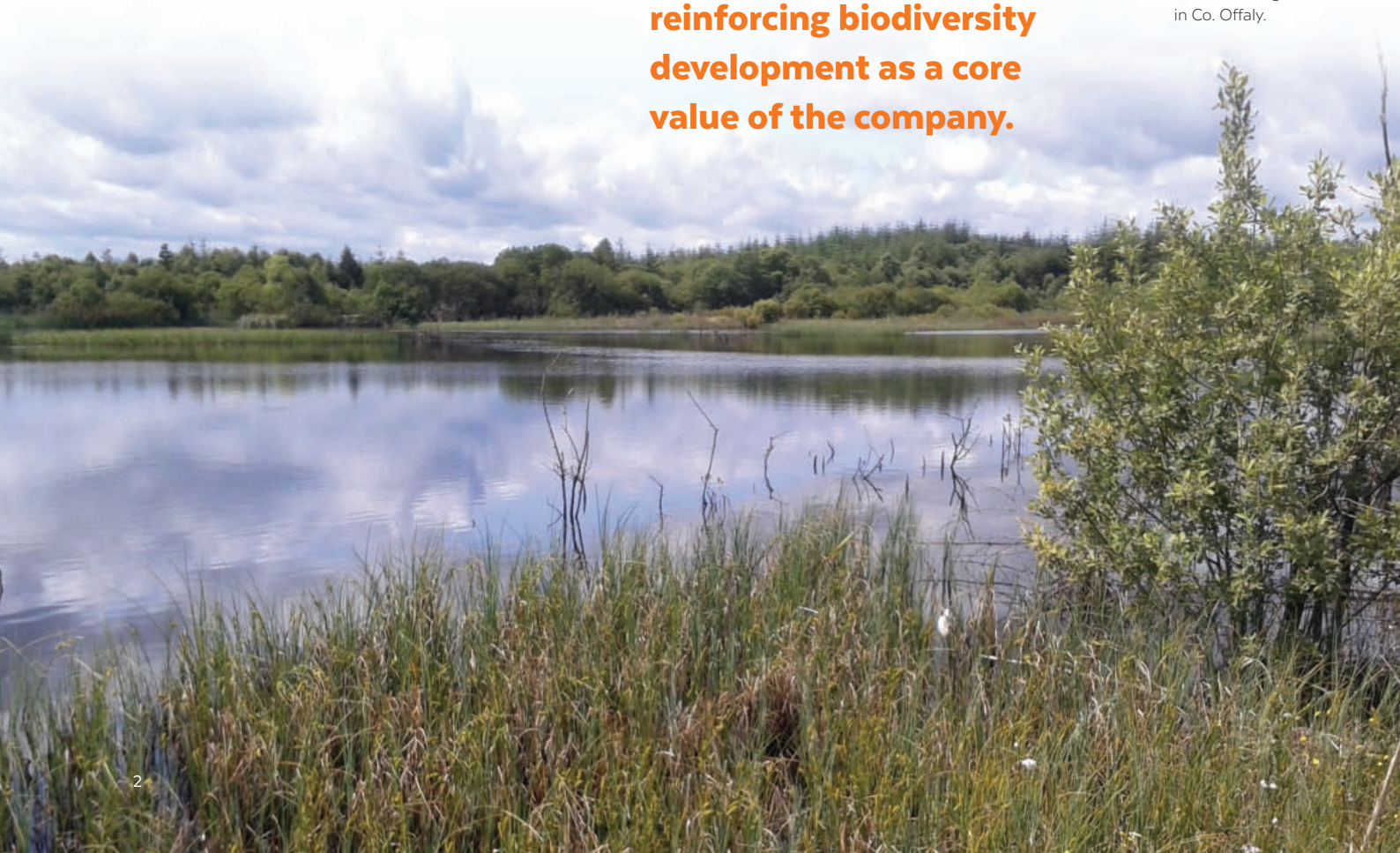
Bord na Móna launched its first Biodiversity Action Plan 2010-2015 in 2010, the first of its kind amongst corporate entities in Ireland, and is recognised as a significant initiative by Bord na Móna. This document outlines some of the successes and challenges of the 2010-2015 plan, and sets out the actions and KPIs for the Bord na Móna Biodiversity Action Plan 2016-2021.

The Bord na Móna Biodiversity Action Plan 2016-2021 builds on the foundation of the original core objectives and the actions set out in the 2010-2015 plan, reframing them in the current context and perspectives of peatland biodiversity management, restoration and conservation and also in the outlook for Bord na Móna as set out in the company's *Sustainability 2030* report launched in October 2015.

The company's *Strategic Framework for Future Use of Peatlands* sets out the range of current land uses active on the Bord na Móna landbank (approximately 80,000 hectares in total), the range of future uses that will be considered and the main factors influencing those uses. The framework highlights the most commercially viable after-uses for the cutaway bogs as including renewable energy projects (wind, solar, biomass), niche commercial opportunities, tourism and amenity, and biodiversity.

The Bord na Móna Biodiversity Action Plan 2010-2015 was developed under this framework by the Bord na Móna Ecology Team and comprised five core objectives underpinned by a range of actions. The objectives relate to policy and governance, understanding the baseline ecological condition of the Bord na Móna bogs, rehabilitating and restoring modified peatlands, communicating the value of biodiversity and raising awareness, and reviewing progress.

The Biodiversity Action Plan 2016-2021 will be integral to and strengthen our transition to sustainable and renewable businesses, reinforcing biodiversity development as a core value of the company.



Derryounce Lake near Portarlington in Co. Offaly.

Developments and Achievements 2010-2015

The complete outcomes of the 2010-2015 Plan are outlined in this document with some of the key features highlighted here:

- Biodiversity and ecology has been incorporated into the decision making processes and daily operations of the business units in Bord na Móna
- The baseline ecology work has significantly increased our knowledge and understanding of the Bord na Móna peatland resource
- Habitats and species with legal protection have been highlighted across the Bord na Móna bogs to ensure their preservation
- In the plan period, Bord na Móna has undertaken the restoration of over 1,000 hectares of raised bog habitat and begun the implementation of a range of rehabilitation works across cutaway bog areas
- In terms of rehabilitation and restoration, when we take account of previous work prior to 2010, more than 15% of the total area of land in Bord na Móna ownership has been rehabilitated and/or restored to date in line with International, EU and National 15% targets
- Increased knowledge as to the GHG balance of cutaway bog habitats (acidic and alkaline wetland)
- The level of awareness of the value of biodiversity has been significantly increased within the company and the communities bordering Bord na Móna lands

Key Action Areas 2016-2021

Building on continuing the actions outlined, and the success of the 2010-2015, the 2016-2021 plan maintains the core objectives and actions, while also incorporating new actions, relating to:

- Working with other State bodies to deliver on actions under the National Peatland Strategy
- Working with State nature conservation bodies and ENGOs under the *National Biodiversity Plan* to highlight biodiversity hotspots and work towards a sustainable network for nature in Ireland
- Promoting the concept of Natural Capital
- Developing a map of ecosystem goods and services for Bord na Móna lands
- Identifying information gaps in the baseline survey work to increase understanding of the biodiversity value of cutaway bogs and their future management
- Continuing with the long term rehabilitation of the cutaway bogs
- Adding to the restored raised bog network under the Bord na Móna Raised Bog Restoration programme
- Control and monitoring of invasive species
- Assimilation of the outcomes relating to rehabilitation and restoration on Bord na Móna bog areas to develop best practice guidelines that can be translated to a range of peatland types
- Supporting and working to develop GHG emission factors for Bord na Móna bog areas
- Promoting awareness and education of biodiversity on Bord na Móna bog areas through working with schools and communities
- Organisation of activities such as Bioblitz to encourage people to interact with and record biodiversity on Bord na Móna bog areas
- Prioritising actions and developing metrics to track progress over the course of the 2016-2021 plan

1.0

Introduction

Bord na Móna launched its first Biodiversity Action Plan in 2010. The plan covered a six year period spanning from 2010 to 2015. The development and promotion of the plan was the first of its kind amongst corporate entities in Ireland and is recognised as a significant initiative by Bord na Móna.

The 2010-2015 Biodiversity Action Plan set out in a comprehensive way why biodiversity is important to Bord na Móna and how it intends to build on the wealth of peatland management, rehabilitation, restoration and conservation that it has built up since its establishment in the 1940s.

...builds

on the foundation of the original core objectives and the actions set out in the 2010-2015 plan

Lough Boora Discovery Park Visitor Centre, officially opened in 2014.

The objectives and actions core to the Biodiversity Action Plan 2010-2015 were outlined under five key areas:

Objective 1

Policy and governance

Objective 2

Understanding the current baseline ecological condition of the Bord na Móna bog areas and the biodiversity present

Objective 3

Developing methods to rehabilitate and restore peatland areas in the post-production use phase

Objective 4

Engaging with the full range of stakeholders in relation to the management of biodiversity on Bord na Móna bogs and promoting awareness of the importance of biodiversity

Objective 5

Providing a mechanism whereby the delivery and progress of the objectives outlined within the Biodiversity Action Plan could be reviewed and assessed on an annual basis.

Each objective in the Bord na Móna Biodiversity Action Plan 2010-2015 was supported by a suite of actions and key performance indicators (KPIs) and for the greater part, all of the actions outlined in the 2010-2015 Biodiversity Action Plan have been acted upon, implemented and/or are in development. Over the course of the plan, priorities and focus changed as would be expected, but the key aspects of the plan remained relevant and continue to be relevant.

The Bord na Móna Biodiversity Action Plan 2016-2021 builds on the foundation of the original core objectives and the actions set out in the 2010-2015 plan, reframing them in the current context and perspectives of peatland biodiversity management, restoration and conservation and also in the outlook for Bord na Móna as set out in the company's *Sustainability 2030* report launched in October 2015. This document outlines some of the successes and challenges of the 2010-2015 plan, and sets out the actions and KPIs for the Bord na Móna Biodiversity Action Plan 2016-2021. While the actions build on the Bord na Móna experience to date, they are also ultimately a product of the views of the wider community as part of the engagement process carried out over the past six years, and particularly during the drafting of this Plan over the course of 2015.

Bord na Móna Land and Property and Ecology

Bord na Móna business units and structure

Bord na Móna is a large and diverse company with a central core of shared services that support each of the business units within the company. The main business units are Peat (all aspects of peat production for energy and horticulture), Horticulture (supply of horticultural peat and associated products such as green compost to the professional and retail markets), Powergen (electricity generation in power stations, wind farms and other renewable electricity developments), Biomass (sourcing and supply), Fuels (sales and development of low smoke and biomass fuels, distribution of briquettes, coal etc.), and Resource Recovery/AES (waste management). In association with these businesses there are a number of support services such as Finance, IT, Engineering, Procurement, Human Resources, Marketing and Communications and Business Transformation. One of the main support units is Land and Property which has a number of sub-units including the Board and Company Secretariat, Legal, Internal Audit, Commercial Land and Property, Land Title and Acquisition and Ecology.

Developing a Strategic Framework for Future Use of Peatlands

In 2011, the company published a framework that set out the range of current land uses active on the Bord na Móna landbank (approximately 80,000 hectares in total), the range of future uses that will be considered and the main factors influencing those uses. The *Strategic Framework for Future Use of Peatlands* recognises the limited agricultural and forestry potential and highlights the most commercially viable after-uses for the cutaway bogs as including renewable energy projects (wind, solar, biomass), niche commercial opportunities, tourism and amenity, and biodiversity. The framework essentially provides the context within which future developments by the company are considered. The framework is currently being reviewed and updated (2016), and it is expected that those uses identified previously will remain the core future uses.

The Bord na Móna Biodiversity Action Plan 2010-2015 was developed under this framework and the Bord na Móna Biodiversity Action Plan 2016-2021 must also be considered within the context of the *Strategic Framework for Future Use of Cutaway Bogs*. The strategic framework clearly highlights that biodiversity will be one of a number of the land-uses for the Bord na Móna bogs into the future. In practice, a number of land-uses can co-exist on any given bog area as evidenced by the wind farm developments at Oweninny and Mountlucas. At both of these locations where the wind farm footprints are relatively small within the total area of the sites, other commercial developments, as well as biodiversity and amenity are also land-uses at ground level. Tourism and amenity are recognised as having significant potential for the Bord na Móna bogs into the future as evidenced by the great success of the Lough Boora Discovery Park and the range of community led wetland projects and walking and cycle tracks developing across Ireland.

For more about the Bord na Móna amenity and tourism developments please visit our website **www.bordnamona.ie**

Bord na Móna Ecology

The responsibility for delivery of the Bord na Móna Biodiversity Action Plan 2016-2021 lies with the Bord na Móna Ecology Team. The Ecology Team was established in 2009 following the adoption of a formal corporate objective relating to biodiversity. This corporate objective is *"to promote the role of Bord na Móna in enhancing biodiversity and to create awareness of the values of cutaway bogs through wise-use management for biodiversity and carbon"*.

Since its establishment, the role of the Ecology Team and the services provided to the various businesses within the wider company, have become integral to the day to day business of Bord na Móna. Where required, the company also engages external ecological consultancy services and expertise, for example in relation to independent reviews for planning applications.

For more about the Bord na Móna Ecology Team please visit our website **www.bordnamona.ie**

Tom Barry and others in exhibition room, 1950s.

Bord na Móna and Bog Conservation in Ireland

Bord na Móna was established in the 1940s from its precursor The Turf Development Board with a mission to develop the peatlands of Ireland primarily as an indigenous fuel resource. Largely concentrated in the midlands of Ireland, the bogs were industrially developed for turf in the early years, and subsequently for milled peat from the 1950s onwards. The milled peat method took bog development to a scale not experienced before in Ireland, and work in the main focused on the largest, most extensive bog areas such as the Bog of Allen complex in Kildare, the Clonsast and Derrygreenagh Bogs in East Offaly, the Boora and Blackwater complexes in West Offaly and East Galway, the Mountdillon Bog complex in Longford/Roscommon along the River Shannon and the Littleton Bogs in North Tipperary. These areas still continue to be the main focus of peat production. Former production areas include the Oweninny Works in North West Mayo.

From the days of the preceding Turf Development Board in the 1930s, up until the 1960s, the focus of the company was firmly set on peat production, providing not only an indigenous fuel resource but creating great socio-economic benefit particularly in the Midlands region. At the same time, the cutaway bogs as they emerged from production were viewed primarily with an interest in creating highly productive agricultural lands to enrich the midlands – a vision that was not found to be feasible except in focal minority areas where sub-soils and conditions favoured production of 'good land'.

In the early 1970s one of Bord na Móna's staff Mr. Tom Barry (1915-1996), Peatland Environmental Officer, recognised and advocated the need to conserve and protect the best remaining examples of bogs for future generations. Tom championed the conservation of bogs in Ireland both on the national and the international stages. He identified the best remaining examples of bogs and persuaded the Board and Management of Bord na Móna to set aside a number of bog areas for conservation. Pollardstown Fen and a suite of other well-known sites were purchased by the company purely for the purpose of conservation. These areas are preserved today because of Tom Barry's vision and foresight. Following on from those bogs put forward by the company for conservation in the 1970s, a further series of bogs followed in the 1980s and 1990s, including Clara Bog, All Saint's Bog, Mongan Bog and Bellacorick Flush. These are now in the ownership and management of the National Parks and Wildlife Service, An Taisce and others. A number of additional sites, for example Killaun Bog near Birr in County Offaly and Abbeyleix Bog in County Laois, remain in Bord na Móna's ownership but are managed for biodiversity by the local communities.

Bord na Móna's commitment to bog conservation was founded on the knowledge of Tom Barry. Today that commitment is being followed through and built upon as evidenced by the investment in the previous and current Biodiversity Action Plans and the work of the Ecology Team.

For more on the heritage of Bord na Móna see the company's community website: **www.heartland.ie**

Common Blue butterfly, Lullybeg Reserve. Photo: Jesmond Harding BCI.

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International, European and National Policy Relating to Biodiversity

Since the writing of the initial Biodiversity Action Plan in 2010, there has been a number of changes and developments in terms of national, European and global biodiversity targets and policies. The main policy updates and the way in which Bord na Móna has responded are outlined here:

The Convention on Biodiversity

New Strategic Plan for the Convention 2011-2020 – *Living in Harmony with Nature*

In October 2010 the 10th Conference of the Parties to the United Nations Convention on Biodiversity (CBD) in Nagoya, Japan adopted the new strategic plan for the period 2011 to 2020. The theme of the strategic plan is *Living in Harmony with Nature*. All countries and partners who are signed up to the CBD (this includes Ireland and the European Union) were tasked with updating their own national plans according to the targets set out in the CBD strategic plan. The plan has a long-term vision for 2050, as well as a mission for 2020.

Living in Harmony with Nature – the vision and mission

The Strategic Plan is comprised of a shared vision, a mission, strategic goals and 20 ambitious yet achievable targets, collectively known as the Aichi Targets. The Strategic Plan serves as a flexible framework for the establishment of national and regional targets and it promotes the coherent and effective implementation of the three objectives of the Convention on Biological Diversity (CBD).

www.cbd.int

The CBD Vision: "By 2050, biodiversity is valued, conserved and restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people".

THE MISSION of the CBD Strategic Plan is to ensure a coherent implementation of the Convention on Biological Diversity and achievement of its three objectives by taking "effective and urgent action to halt the loss of biodiversity to ensure that, by 2020, ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life and contributing to human well-being and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach."

The CBD Mission has 20 headline targets for 2020, organised under five Strategic Goals which identify the different aspects of approaching the issue of biodiversity loss. These are:

- **Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society**
- **Reduce the direct pressures on biodiversity and promote sustainable use**
- **Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity**
- **Enhance the benefits to all from biodiversity and ecosystem services**
- **Enhance implementation through participatory planning, knowledge management and capacity building**

The goals and targets provide a framework for the establishment of national targets. The United Nations has also decided, in order to further drive progress, to designate the period 2011-2020 as the UN Decade on Biodiversity.

For more information see: **www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf**

The key targets of the CBD plan have been incorporated into the EU Biodiversity Action Plan and Ireland's National Biodiversity Plan (2011-2016). These include:

- **At least halve and, where feasible, bring close to zero the rate of loss of natural habitats, including forests**
- **Establish a conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas**
- **Restore at least 15% of degraded areas through conservation and restoration activities**
- **Make special efforts to reduce the pressures faced by coral reefs**

By 2050

biodiversity is valued, conserved and restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people

The cutaway bogs are home to a number of bird species including (above left) Wheatear and Lapwing (above right).

The EU Biodiversity Strategy to 2020

In May 2011, the European Commission adopted a new strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. The strategy is in line with the global commitments made in Nagoya in October 2010, in the context of the Convention on Biological Diversity (outlined previously).

EU Vision and Headline Target

The EU has articulated its long-term vision as

"by 2050 EU Biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided".

The EU has also published its Headline Target for progress by 2020 as *"to halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss"*. The EU Commission published, in 2011, a communication on the new EU Biodiversity Strategy, entitled *"Our life insurance, our natural capital: an EU biodiversity strategy to 2020"*. This Communication identifies 6 main targets (supported by 20 actions):

Full implementation of the nature directives (Habitats and Birds)
Maintain and restore ecosystems and their services
Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity
Ensure the sustainable use of fisheries resources
Combat invasive alien species
Help avert global biodiversity loss

For more information see: **www.eur-lex.europa.eu**

It is the role of individual countries to develop national plans for biodiversity, but they must reflect the targets set out in the EU Biodiversity Strategy. The key aspects for delivering targets on biodiversity are the Directives relating to Habitats, Birds, Water, Marine and EIA.

Ireland's National Biodiversity Plan
Actions for Biodiversity 2011–2016

As a member of the European Union, Ireland contributes to the work of conserving biodiversity in the entire territory of the 27 Member States. Since Ireland's policies and legislation on biodiversity are strongly influenced by the EU, this Plan addresses not just national but also wider European issues. Ireland's National Biodiversity Plan has been developed in line with the EU and International Biodiversity strategies and policies. The 2011-2016 plan builds on the initial plan developed for 2002-2006 and is set out in terms of an overall vision and overarching target, underpinned by strategic objectives and actions.

Ireland's Vision:

"That biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally".

The Overarching Target of the plan, based on the actions which follow is: *"That biodiversity loss and degradation of ecosystems are reduced by 2016 and progress is made towards substantial recovery by 2020".*

The measures that Ireland will take in the overall strategy are presented in a series of objectives as follows:

- **To mainstream biodiversity in the decision-making process across all sectors**
- **To substantially strengthen the knowledge base for conservation, management and sustainable use of biodiversity**
- **To increase awareness and appreciation of biodiversity and ecosystems services**
- **To conserve and restore biodiversity and ecosystem services in the wider countryside**
- **To conserve and restore biodiversity and ecosystem services in the marine environment**
- **To expand and improve on the management of protected areas and legally protected species**
- **To substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services**

The National Biodiversity Plan is currently being prepared for review and update (2016).

For more information see: **www.npws.ie**

Cloonshannagh raised bog remnant (bog restored in 2014).

Bord na Móna surveyors Tommy Higgins and Ray Carroll working on Paul's Lough Bog (bog restored 2014).

Conserve and restore

biodiversity and ecosystems in the wider countryside

Ireland's National Biodiversity Plan 2011-2016

Bord na Móna's contribution

In terms of Bord na Móna's input to the National Biodiversity Plan (2011-2016), the company was part of the initial consultations carried out in 2008 and continued to input to the plan up to its final publication in 2011. The key specific inputs were in relation to Objective 4, Target 10 and its component actions:

Objective 4: To conserve and restore biodiversity and ecosystems in the wider countryside

Target 10: Continued rehabilitation or restoration of biodiversity elements

Actions

10.1	**Identify areas of biodiversity value, or biodiversity hotspots, within Bord na Móna lands by 2015**
10.2	**Continue ecological surveys, preparation of habitat maps and planning of rehabilitation for all Bord na Móna bog areas**
10.3	**Continue to develop a network of biodiversity areas within Bord na Móna sites**

Indicators and outcomes

Number of habitat maps and rehabilitation plans for all Bord na Móna bog areas

To date, Bord na Móna has delivered on each of the actions and will work with the National Parks and Wildlife Service to build on these actions for the next national biodiversity plan which is currently in development (2016).

Kilberry Wetlands, created in 2013 on cutaway bog.

Other aspects of the National Biodiversity Plan (2011-2016) have also been incorporated into the day to day business activity in Bord na Móna such as:

1. **Biodiversity and ecology**
   Biodiversity and ecology has been incorporated into the decision making processes and daily operations of the main business units in Bord na Móna

2. **Baseline ecology work**
   The baseline ecology work has significantly increased our knowledge and understanding of the Bord na Móna peatland resource

3. **Habitats and species**
   Habitats and species with legal protection have been highlighted across the Bord na Móna bogs to ensure their preservation

4. **Restoration and rehabilitation**
   In the plan period, Bord na Móna has undertaken the restoration of over 1,000 hectares of raised bog habitat and begun the implementation of a range of rehabilitation works across cutaway bog areas

5. **More than 15% rehabilitated and/or restored**
   In terms of rehabilitation and restoration, when we take account of previous work prior to 2010, more than 15% of the total area of land in Bord na Móna ownership has been rehabilitated and/or restored to date in line with International, EU and National 15% targets

6. **Increased knowledge**
   Increased knowledge as to the GHG balance of cutaway bog habitats (acidic and alkaline wetland)

7. **The value of biodiversity**
   The level of awareness of the value of biodiversity has been significantly increased within the company and the communities bordering Bord na Móna lands

8. **Biodiversity Action Plan**
   Bord na Móna has developed its second Biodiversity Action Plan building on the work achieved to date

Each of these aspects is highlighted in the company's

Sustainability 2030

report (2015) and will continue to be developed over the course of the Biodiversity Action Plan 2016-2021.

A National Peatlands Strategy for Ireland

Another significant policy development in relation to Irish peatlands in general is the development of the National Peatland Strategy. In April 2011 the Irish government decided to draw up a national strategy on peatlands conservation and management. It was developed in consultation with bog owners and other stakeholders, to deal with long-term issues including: turf cutting, land management and development, restoration, conservation, tourism potential, carbon accounting and community participation in managing the resource. The government also established a Peatlands Council to assist it in drawing up the strategy and to advise it on issues related to the management of peatlands.

Drafting of the strategy was led by the Department of Arts, Heritage and the Gaeltacht in conjunction with the Peatlands Council (which consists of the relevant Public Bodies). The Peatlands Council also assisted in preparing a succession of drafts, and two rounds of public consultation were held. The strategy, entitled *Managing Ireland's Peatlands* will be published in due course. The main sections of the strategy deal with traditional and changing views of Irish peatlands; principles, policies and actions in managing peatlands; and an implementation structure for the strategy. The actions relating to Bord na Móna include promotion of the use of biomass for power generation, development of guidelines and approaches to responsible peatland management in general and due regard to after-use, rehabilitation and restoration of cutaway bogs.

Bord na Móna made a number of submissions during the course of the strategy development and the company is represented on the Peatlands Council and the Peatlands Strategy Implementation Group. The Strategy represents a new approach to peatland management in Ireland, considering the full range of peatland types and uses.

For more information see: **www.npws.ie**

The Strategy represents

a new approach

to peatland management in Ireland, considering the full range of peatland types and uses.

Bord na Móna wetland areas are important sites for breeding wetland birds.

Governance.

3.0 Review of Biodiversity Action Plan 2010-2015 Objectives and updated actions for 2016-2021

3.1 Objective 1

Carry out all works in line with best practice guidelines and relevant legislation across all Bord na Móna Bogs

This objective underpins all of the other objectives outlined in the Bord na Móna Biodiversity Action Plan. Bord na Móna is a diverse company and in relation to the environment, there are a number of legislative regulatory mechanisms that Bord na Móna adheres to.

The primary regulation mechanism relating to the environment and in particular peat harvesting activities is Integrated Pollution Control (IPC) licensing. IPC licensing is granted, implemented and monitored for compliance by the EPA. It is noted however that at the time of writing (March 2016) the regulation of peat harvesting activities is under review by the Department of Environment and Local Government.

There are also a number of areas regulated under Waste Licensing (such as Srahmore Peat Deposition Area and Associated facilities, Drehid Landfill, Kilberry Composting Facility) and conditions related to planning under the Planning and Development Act (such as Mountlucas and Bruckana Wind Farms). Compliance with regulatory mechanisms is reviewed and monitored by the EPA and the relevant planning authorities.

In the period 2010-2015 a number of research projects that focused on developing best practice for management and regulation of activities on peatlands were completed. This included the EPA BOGLAND project (results published in 2011) and a suite of Greenhouse Gas monitoring projects. These projects informed the development of policy documents relating to peatlands. One of the more significant developments in the area of policy has been the development of the *National Peatlands Strategy*. Another area which has grown is the integration of the concepts of *Natural Capital* and *Ecosystem Goods and Services*. Bord na Móna participated in and contributed to all of these projects and policy documents and initiatives and will continue to contribute to their implementation.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

- Founding member of the *Irish Forum on Natural Capital* and member of the IFNC steering committee (2014 to present)
- Member of the EU *Business and Biodiversity (B@B) platform* (2015 to present) and the Irish business network *Business in the Community* (BITC)
- Direct input to the *National Peatland Strategy* and members of the Peatlands Council and Peatland Strategy Implementation Group (PSIG)
- Direct ongoing involvement in the *National Raised Bog Scientific Review* Steering Committee (2012 to present)
- Direct input to the development of the *National Biodiversity Action Plan* 2011-2016
- Participation in BirdWatch Ireland *Action Plans for Raised Bog Birds 2011-2020* and *Upland Birds 2011-2020* and support for the development of BirdWatch Ireland *Bird Sensitivity Map for Wind Farm Developments* (2015)
- Direct input to the *National Pollinator Plan* co-ordinated by the National Biodiversity Data Centre (launched in September 2015)
- Direct input of Ecology Team to planning applications for a range of Bord na Móna developments including Oweninny, Mountlucas and Bruckana wind farms (design and mitigation)
- Facilitation of discussions and development of the International Peatland Society *Strategy on Responsible Peatland Management*
- Direct input to the BOGLAND project (vegetation survey and qualitative assessment of BOGLAND project sites)
- Compliance with IPC licensing and regulation

Art and biodiversity meet at Lough Boora Discovery Park.

Building on this work the following actions can be outlined for the period 2016-2021. ***Note**: New Actions to the Biodiversity Action Plan 2016–2021 plan period are highlighted in green shading throughout.*

Actions

Ensure organisational awareness of changes and developments
in relevant policies and strategies, in particular those arising from the outcome of the *National Peatland Strategy* and the *Irish Forum on Natural Capital*

Further encourage best practice within Bord na Móna
in terms of all aspects of the environment, from ongoing operations to future developments. This will require continued awareness of relevant environmental legislation: including EIA and SEA Directives, Habitats and Birds Directives, Water Framework Directive and other such instruments of Irish legislation such as Planning and Development Act 2010

Ensure responsible environmental management
in terms of operational aspects of all Bord na Móna businesses through continuation of best practice in terms of IPC Licensing (and future regulatory mechanisms as they are developed in coming years) and other similar instruments such as Waste Licenses and Waste Permits

These actions will require ongoing work including:

Continue to deliver on actions set out in the *National Peatland Strategy*
through working on the *Peatland Strategy Implementation Group* and the *National Raised Bog Scientific Review* steering committee

Work with the *Irish Forum on Natural Capital*
to promote accounting of ecosystem goods and services as part of an EU wide approach

Develop a natural capital accounting system for Bord na Móna

Continue to work with business and biodiversity initiatives
such as the EU B@B and Business in the Community to promote good practices in relation to biodiversity at corporate levels

Continue to work with other initiatives
such as the *National Biodiversity Action Plan* (currently under review) to ensure integrated planning for Bord na Móna biodiversity focus areas

Ensure responsible environmental management in terms of operational aspects of all Bord na Móna businesses

Track developments in national and international policies
relating to biodiversity and peatlands in general; interact with relevant bodies and interest groups to share knowledge and contribute to policy development

Provide input to any planning applications for developments within Bord na Móna bogs
by contributing data and/or providing advice on best practice in terms of rehabilitation, biodiversity management and conservation

Contribute updates on rehabilitation and biodiversity projects
to Annual Environmental Reports on IPC Licenses to the EPA

Above left: Basil thyme growing next to the railway line at Ballycon Bog.

Above: The cutaway bogs are home to a wide diversity of spiders and other creepy crawlies.

Key Indicators of Success

The key indicators of success of these actions will be:

Awareness and compliance with relevant legislation and policy documents into daily operations

Increased awareness of the value of peatlands nationally and the benefits of investing in peatland natural capital as part of Bord na Móna's ongoing contributions in terms of restoration and rehabilitation

Good design and planning of proposed developments followed by implementation for Bord na Móna bogs in terms of biodiversity

Facilitation of ongoing core businesses and other proposed projects through continued responsible management and compliance with environmental regulatory mechanisms, present and future

Bord na Móna Ecology Team talking to delegates of the Natural Capital Conference in April 2014 about the value of peatlands.

Natural Capital, the economics of Nature and the Irish Forum on Natural Capital (IFNC)

Natural Capital: An Introduction

Natural capital is the world's stocks of physical and biological resources, including air, water, minerals, soils, fossil fuels and all living things. These stocks work together to deliver ecosystem goods and services that in turn provide benefits to society. These benefits include harvestable products like food, materials and fuel, clean water for people to drink and for industry to use, purified air to breathe, the natural decomposition of wastes, the conservation and recycling of essential nutrients like nitrogen and phosphorus, medicine, pest control, pollination, flood and drought regulation and beautiful places to visit. These services matter to people because they give us things we need. But because they are 'free', we don't value them in the same way we value things we have to pay for.

Natural Capital Accounting: Making Nature Count

A rapidly-evolving method for addressing the economic invisibility of nature is 'natural capital accounting'. This involves attributing a measurable value to our natural capital in economic terms (such as euros or dollars) and/or in ecological terms (such as the number of species in an area). Natural capital accounting is something that all EU member States have to do by 2020 (Source: EU Biodiversity Strategy to 2020), and in Ireland the process is already underway through the Mapping and Assessment of Ecosystem Services (MAES) project.

The Irish Forum on Natural Capital

The Irish Forum on Natural Capital (IFNC) brings together a diverse range of organisations and individuals from academic, public, private and NGO sectors who are interested in the development and application of the natural capital agenda in Ireland. The Forum is structured as a broad representative group, led by a Steering Committee and administered by a Secretariat.

The IFNC emerged through the work of the Natural Capital Committee, a voluntary group that came together to organise Ireland's Hidden Wealth – the first national conference on natural capital, held at the National Botanic Gardens, Dublin, in April 2014. Further meetings and workshops were held in 2015 for members to input to the work plan for the forum.

The IFNC vision is *"for an Ireland in which natural capital and ecosystem goods and services are valued, protected and restored".*

The IFNC mission is, *"through the collaboration and leadership of our diverse members, to help to value, protect and restore Ireland's natural capital and ecosystem services. We will do this by supporting the adoption of natural capital concepts in public policy and corporate strategy, promoting informed public and private sector decision-making and assisting in the establishment of a national natural capital accounting standard".*

Bord na Móna is one of the founding members of the Natural Capital movement in Ireland and sits on the steering committee of the IFNC. The key actions relating to Natural Capital listed in this plan are:

- Develop a natural capital accounting system for Bord na Móna - to be based on the protocol currently being developed by the Natural Capital Coalition
- Develop a map of the ecosystem goods and services of Bord na Móna lands
- Continue to work as part of the Irish Forum on Natural Capital steering committee

For more information see: **www.naturalcapitalireland.com** and **www.naturalcapitalcoalition.org**


Understand.

3.2

Objective 2

Monitor biodiversity areas and identify and survey further biodiversity hotspots within Bord na Móna Bogs

Bord na Móna is a major land owner in Ireland, with a significant area of peatland making up the most of the 80,000 ha in its stewardship. Understanding the ecological status of those peatland areas is critical to informing how these lands can be rehabilitated into the future.

One of the key objectives of the original Biodiversity Action Plan 2010-2015 was to establish a baseline of the ecological condition of the full extent of the Bord na Móna peatland area. This has been successfully completed and habitat maps of each of the bog areas have been drawn up using GIS. By combining the basic habitat information with extra information such as LiDAR (a remote sensing technique that illustrates contours in an area) data, aerial photography and peat depth data from GPR (Ground Penetrating Radar), it is possible to get an indication of how each bog area will develop upon cessation of peat production and rehabilitation. Based on all of the information available, the Ecology Team has developed predictive maps, incorporating the necessary rehabilitation measures (targeted drain blocking etc.) which outline how each of the bog areas will be stabilised post peat production. Each bog is unique in terms of hydrological regime (gravity or pumped drain), peat depth and type and other influencing factors from adjoining lands which will result in its own particular future. The data has also been used to identify core biodiversity areas and/or hotspots. The work of the Ecology Team on the baseline ecological condition of the bogs has become an essential tool in managing the Bord na Móna Bogs and it will be maintained and updated as part of ongoing operations.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

- Publication and launch of the Bord na Móna Biodiversity Action Plan 2010-2015 (left) in November 2010
- Development of a comprehensive habitat classification system for the Bord na Móna bogs to account for the variability in cutaway habitats (pioneer to complex habitats)
- Habitat mapping for the full range of Bord na Móna bogs – including a general ecology report for each site in conjunction with a species list and mapping
- Development of predictive habitat maps (following from current habitat maps) to indicate the potential extent of wetland, woodland and open habitats (grassland, heathland etc.) on cutaway areas post peat production and rehabilitation phases
- Identification of core biodiversity areas for habitats and species
- Development of an indicative biodiversity map based on data collated has been developed and is accessible to all businesses in Bord na Móna
- Input to the Bord na Móna *Strategic Framework for Future Use of Peatlands*
- Direct input to the MAES (*Mapping and Assessment of Ecosystems and their Services*) project for Ireland
- Identification of Raised Bog areas with active raised bog habitat and sites with good potential for restoration
- Identification and survey of important focal points for wintering and breeding birds, particularly those of conservation interest such as Whooper Swan, Red Grouse, Lapwing, Curlew and Hen Harrier
- Identification of important focal points for other species of conservation interest such as Marsh Fritillary and White-Clawed Crayfish
- Identification, survey and targeted management of areas identified as problematic in terms of invasive species such as Japanese Knotweed
- Sharing of species data with the *National Biodiversity Data Centre* and other interest groups
- Monitoring of biodiversity hotspots to assess status of habitats and species

The National Peatlands Council visited the restored Cuckoo Hill Bog in July 2013.

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Update the baseline habitat survey of all Bord na Móna bogs

Support and develop surveys
to update the knowledge base where required – particularly for species and habitats of conservation interest

Monitor existing and identify additional areas
to be managed primarily for biodiversity into the future taking into consideration targeted habitat (primarily woodland and wetland) and species management, as well as management for pollinators

Strengthen and enhance the network of biodiversity areas
that connect with other recognised areas of high biodiversity value outside of the Bord na Móna bogs and explore the potential for wildlife/green infrastructure corridors

Develop a map of the ecosystem goods and services of Bord na Móna bogs

Monitor existing and identify additional areas to be managed
primarily for the eradication and control of invasive species now into the future

These actions will require ongoing work including:

Continue the baseline ecology survey
initiated in 2009; adding extra layers of data from targeted surveys and ongoing updates

Maintain the GIS database of habitat maps
and continue to update predictive mapping as peat production continues and cutaway areas develop

Continue the baseline ecology survey... adding extra layers of data.

Input to the Bord na Móna *Strategic Framework for Future Use of Peatlands*
(to be reviewed 2016) to identify suitable areas to be zoned for biodiversity now and in the future

Carry out targeted surveys in appropriate areas for species of conservation interest
– for example butterfly and other invertebrate surveys at high biodiversity value sites; continue to work with groups such as Butterfly Conservation Ireland to inform targeted management for butterflies, moths and other invertebrates

Explore how volunteers and citizen science, and new technologies
such as the use of unmanned aerial vehicles (UAVs) and remote sensing methods, can be incorporated into the monitoring of Bord na Móna bogs

Re-assess the information gaps for future surveys
of cutaway bog and other habitats for breeding waders, similar to the survey of Bord na Móna bog areas for breeding Curlew initiated in 2014-15

Support the BirdWatch Ireland breeding wader 5-year monitoring survey
at Boora and other established annual surveys of Bord na Móna bogs such as the International Swan Census and I-WeBS counts at Boora



Above left: Rosebay willow herb and funnel-spider webs (above right) are commonly seen on the cutaway bogs.

Above centre: *Sphagnum squarrosum* on cutaway bog at Derryclure.

Carry out a synthesis of ecology data gathered to date
including ecology data collated by other parties relating to Bord na Móna bogs to determine current and possible future patterns in habitat and species distribution, considering also the potential impacts of climate change

Where Bord na Móna bogs are adjacent to nature conservation designated areas and/or undesignated areas of high biodiversity value
(such as *Coillte* Biodiversity Areas) work with relevant bodies to connect and mutually enhance adjoining areas

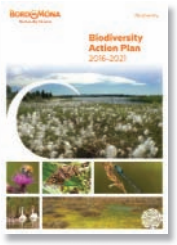
Work with national initiatives to develop Green Infrastructure

Develop a map of the ecosystem goods and services of Bord na Móna bogs
to be based on current methods used in EU MAES project

Continue to monitor and implement control measures for invasive species,
working with local authorities and nature conservation groups

Key Indicators of Success

The key indicators of success of these actions will be:



Publication of the Bord na Móna Biodiversity Action Plan (following consultation with relevant bodies and interest groups); to be launched and distributed in 2016

Updated baseline ecology survey for all bogs

A current and relevant biodiversity knowledge base from which to plan for biodiversity management and conservation across the wider Bord na Móna bogs

Database and distribution maps of species of conservation interest as well as invasive species on Bord na Móna bogs; continue to share these with the National Biodiversity Data Centre

A map of potential biodiversity networks using GIS to link up Bord na Móna bogs with other high value biodiversity areas

A map of the ecosystem goods and services of Bord na Móna bogs

A zoning map of Bord na Móna bogs showing core areas of biodiversity interest with potential for biodiversity management in line with zoning for other potential uses

Long-term monitoring of habitats and species within biodiversity areas, including invasive species

Mapping the Bord na Móna bogs

In 2009, Bord na Móna commenced the development of a habitat classification system for the industrial cutaway and modified bogs of Ireland. While there is a recognised habitat classification system in use in Ireland, this system assigns all habitats on cutover/cutaway bog to PB4 Cutover Bog (Fossitt 2000). While this classification is useful for relatively small areas of cutover on the margins of larger intact peatland complexes it does not account for the huge variability and diversity in habitat across the 80,000 ha of Bord na Móna bogs. In response to this the Ecology Team developed a classification system (based on established systems) that would reflect the variability in habitats and different successional phases on the Bord na Móna bogs.

Above: Ballycon Bog,showing wetland and woodland areas. Above right: Birch woodland at Turraun.

The baseline habitat survey itself was a significant undertaking and by 2012 all bog areas had the initial survey completed. Since then the maps have been updated on an ongoing basis (2013, 2014 and 2015) to reflect changes and developments in the cutaway bog areas in particular. The results of the baseline survey can be described under a number of main categories of land-use, within which there are a number of habitats. A general overview of the habitats and characteristics is presented in the table in Appendix II.

ACTIVE PRODUCTION AREAS: this currently accounts for up to 55% of the bog area owned by Bord na Móna and is the active footprint of peat production plus associated transport and access facilities, workshops and hardstand areas. The main habitats are bare peat, bare ground and built habitats. Hotspots for biodiversity in this category are the active railway lines which are home to a diversity of grassland species and rare plant species such as Blue Fleabane and Basil Thyme (both of which form part of the 'weed' flora recorded).

CUTAWAY BOG AREAS: this category currently accounts for up to 30% of the total Bord na Móna bog area and can comprise scattered sections that are out of production located amongst large parcels and/or more extensive cutaway areas such as those around Boora and the Oweninny bogs. These areas range from species-poor to species-diverse depending largely on the drainage and length of time out of peat production. The habitats can range from pioneer (wet/dry) to more complex such as diverse poor fen and rich fen habitats to established birch woodland cover. The biodiversity value is also variable as species poor areas with some cover of bare peat can be ideal habitat for feeding wintering Whooper Swans and breeding Lapwing, while more mature wetland habitats have a rich flora and are ideal for roosting Whooper Swans, breeding Teal and reed-bed habitat. Species rich grassland and wetland habitats are generally hotspots for a range of invertebrate species. This category also includes areas in other after-uses such as areas planted by Coillte, and other commercial developments.

BOG REMNANTS AND MARGINAL AREAS: this category accounts for up to 12% of the bog area and largely comprises areas of bog remnant (i.e. degraded raised bog with supporting habitats as well as some patches of active raised bog on larger bog remnants such as Cloonshannagh, Mostrim and Clynan) together with patches of birch woodland and cutover bog on the margins of larger active peat production areas. These areas can be of variable biodiversity value and viability, with the larger areas acting as refugia for peatland species (flora and fauna) and considered to form a significant component of the Bord na Móna biodiversity network. These remnants and margins can be local biodiversity hotspots for species of conservation interest such as breeding Curlew and *Sphagnum pulchrum* on bog remnants, Marsh Fritillary butterfly and the plants Alder Buckthorn (on cutover edges) and Basil Thyme (on marginal ground).

DRAINED RAISED BOGS: during the baseline survey a number of bog areas (<3% of total bog area) never developed fully for peat production were identified as being of high conservation value nationally. Some of these bogs still retained active raised bog habitat and all showed good potential for restoration of active and degraded raised bog habitat. These bogs now form the core of the Bord na Móna Raised Bog Restoration programme which has effected the restoration of over 1,000 ha of raised bog across the Irish Midlands. Most of these sites are now being considered for designation as SAC or NHA as part of the National Raised Bog Conservation review while some are relatively small and considered as bog remnants of local ecological importance. It is planned to continue this work on similar areas in coming years.

Below left: Bog pool, Ballydangan Bog. Below right: Drain blocking at Knock Bog.

Derries
2000
Derries Bog near Pollagh in Co. Offaly: aerial photo showing that bare peat dominates.

Derries
2011
Aerial photo showing that as peat production decreases, vegetation increases. With targeted rehabilitation the cutaway is stabilised and biodiversity increases.

The Bord na Móna bogs dataset

An important aspect of the baseline habitat survey was to create a GIS database to illustrate the extent of the habitats present on each site and across the full range of the bogs. For each bog area there is a current habitat map and a land use map showing the basic uses within each bog production unit (access, watercourses etc.). Following from the habitats maps, and using Lidar data which reflects topography and surface levels, indicative maps were developed to illustrate how each bog area may develop post peat production and rehabilitation. Species distribution maps are also a work in progress and updated as new records are taken. All mapping data is available to review by request.

For each bog area there is a current habitat map and a land use map showing the basic uses

Derries Habitat Map (right)

2013

Key changes to note from 2009 map: Reduced bare peat, increased vegetation cover, dominant habitats are birch/wetland mosaic.

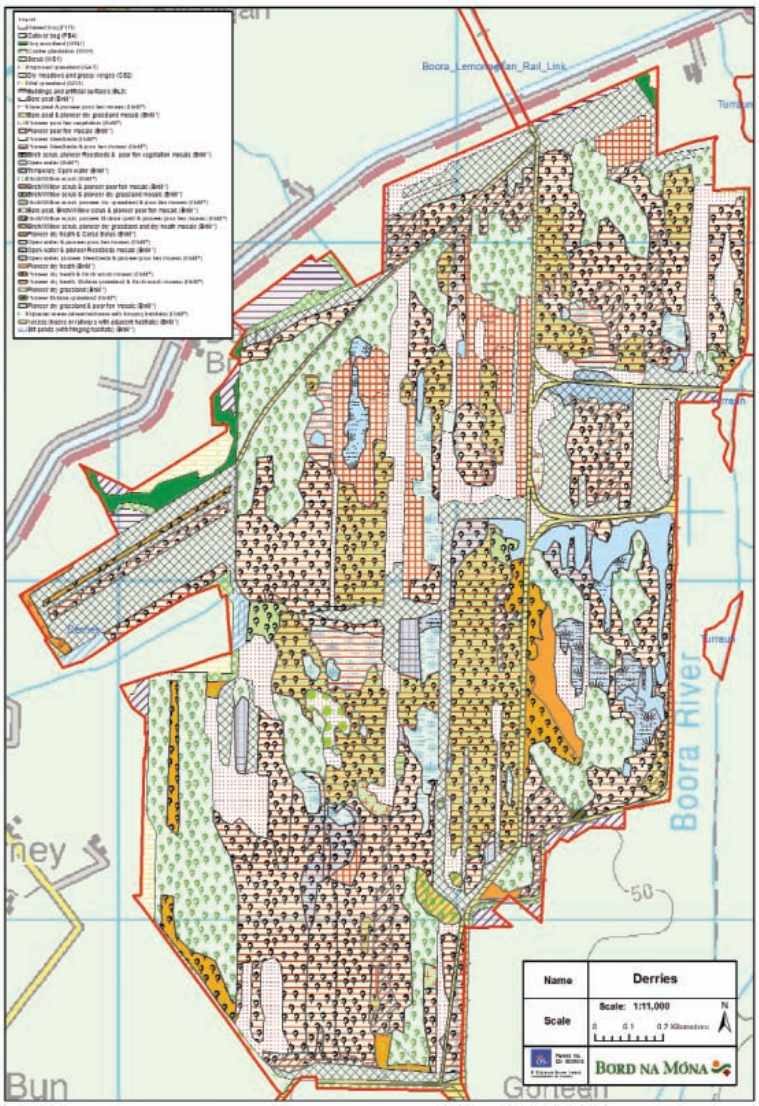
Derries Habitat Map (below)

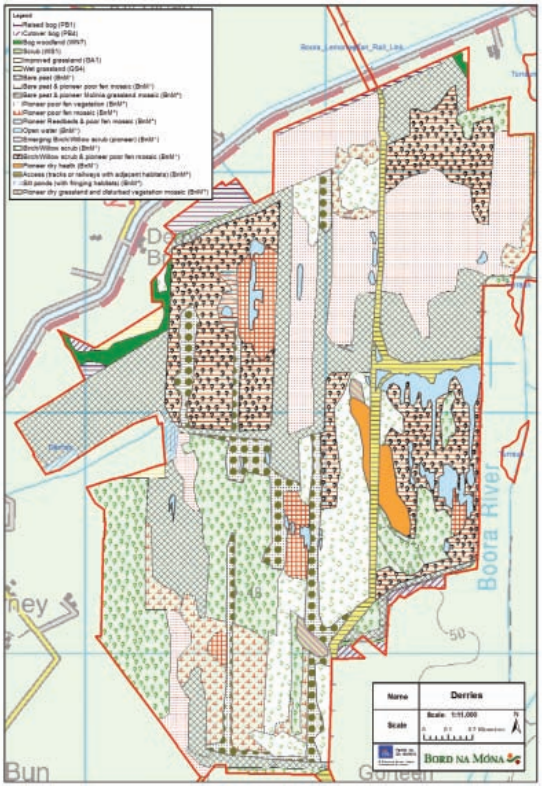
2009

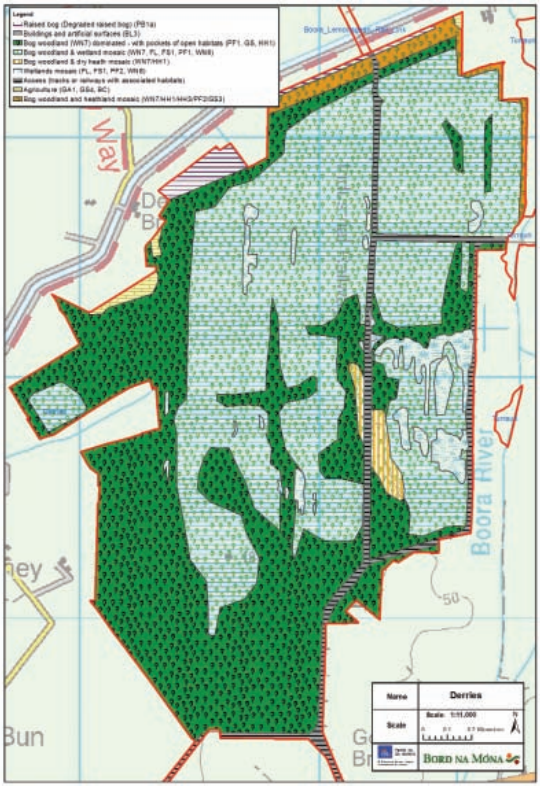
Derries Habitat Map (below right)

Future

It is predicted that birch/wetland mosaic will develop further, dominating the site.







Habitat creation and management on cutaway bogs

The baseline habitat survey has resulted in a significant body of data which outlines the range of habitats present on each bog as well as an informed projection as to how sites will develop post peat production and rehabilitation. While there are a number of habitats developing, it is likely that in the future the main habitats emerging on the cutaway bogs will comprise wetland and woodland types, in a mosaic pattern across each site overlain with a mix of activities such as amenity and renewables. These cutaway areas will be fringed by existing bog remnants, birch woodland and grassland habitats, the majority of sites being linked by the extensive Bord na Móna rail link.

Wetland Habitats

Up to 50% of the Bord na Móna bogs will revert to wetland habitats post rehabilitation. These wetlands will predominantly be peatland habitats given that there will be a layer of peat remaining in the majority of sites. The wetland areas will form a mosaic with other habitats such as scrub and wet woodland, often with small patches of wet grassland and heathland intermittent, reflecting the heterogeneity within any given site.

In the future the main habitats emerging on the cutaway bogs will comprise wetland and woodland types, in a mosaic pattern across each site

The main aim of rehabilitation will be to rewet former production areas as much as possible without impacting on adjoining lands to maximise the benefits for biodiversity and carbon. Where fen peat remains, this will result in the development of fen habitats. Fens are influenced by groundwater and by their nature, are peat-forming, representing the precursor of ombrotrophic or rain fed peatlands such as bogs. The dominant fen type will be poor fen mixed with reed-swamp and tall herb vegetation, such as at Ballycon Bog.

Within these areas there is some open water but this will not be extensive in the future. Fens will become extensive in those areas that are currently pumped for peat production. There are some patches of rich fen habitat emerging, such as at Lullymore Wetlands, although this habitat is limited in the extent recorded to date.

Where ombrotrophic conditions (acidic peat) remains, rewetting of these areas will result in the development of bog habitats. These will range from wet heathland to 'embryonic' bog habitats – that is, habitats that comprise peat forming vegetation. They will have a number of vegetative features similar to raised bog habitats but lacking the structure and classic hydrological and vegetative character, which is likely to re-develop in the long-term.

Woodland Habitats

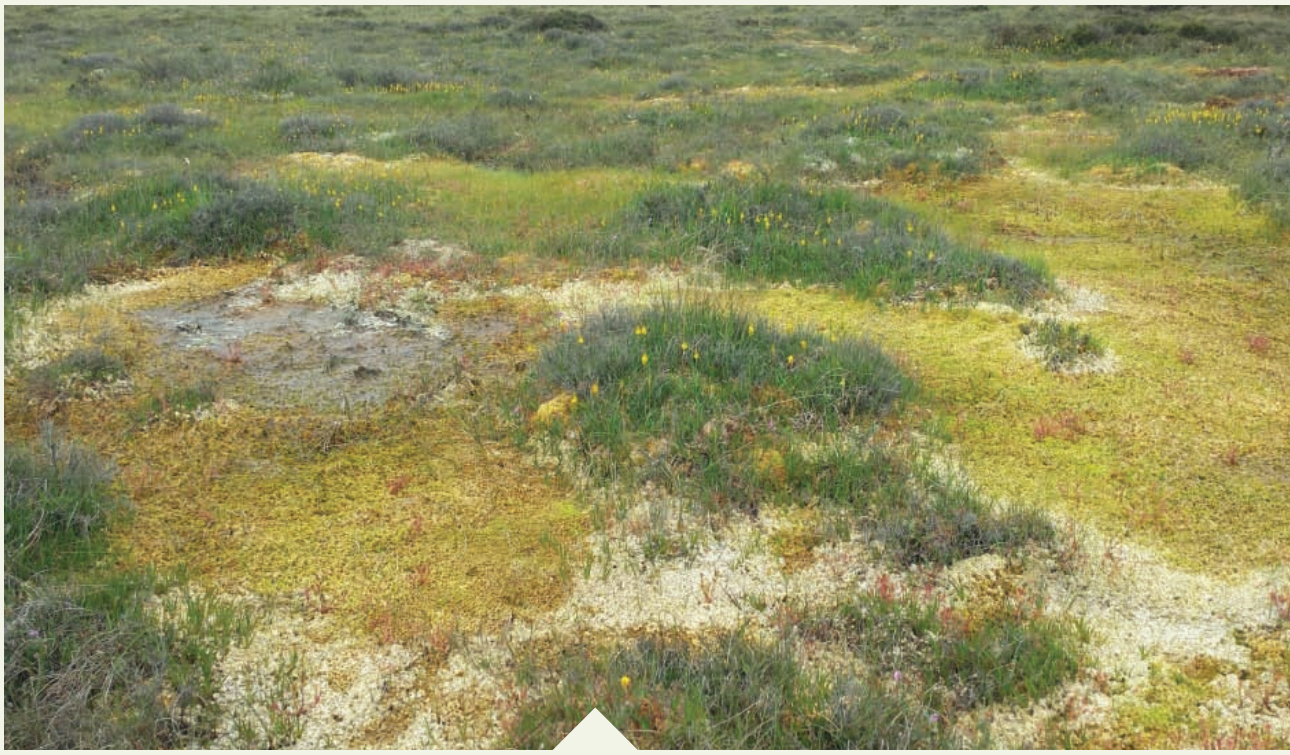
The remaining 50% or so of the Bord na Móna bogs will revert to scrub/woodland habitats. Again, these areas will be largely underlain by peat soils and will be dominated by birch in the main, with patches of willow and pine emerging. The woodland areas will vary from site to site, forming mosaics with wetland areas and patches of other less abundant habitats such as grassland and heath.

The development of these woodlands will vary, determined by the local conditions. Where wet peat soils remain, the birch exhibits patchy growth and the ground flora is dominated by wetland species. Dry birch areas are generally denser in growth and develop a closed canopy, such as at Turraun. Their long-term development will be monitored.

The future management of these woodland habitats will be of national importance, particularly given the scarcity of native woodland in the Irish countryside. Bord na Móna has already undertaken two Native Woodland Scheme projects under the guidance of Woodlands of Ireland and the Forest Service, and there is significant potential to add to these areas. While scattered areas of the Bord na Móna cutaway bog areas have also been planted by Coillte in the past with a view to commercial development of these stands, these areas are deemed largely commercially unviable. Management of these Coillte stands in will also contribute to the national native woodland resource in the future.

Woodland/wetland mosaics will dominate the cutaway bogs into the future.

Bord na Móna biodiversity areas and hotspots



Regenerating active raised bog on restored Bord na Móna bog.

Over the course of the baseline habitat survey and as a result of the ongoing rehabilitation of cutaway bog areas since the 1990s, a number of areas of high biodiversity value have been identified. These can be categorised as:

Raised bog areas with potential for restoration

This includes a range of raised bog areas including those prioritised for restoration under the Bord na Móna Raised Bog Restoration programme 2009-present. The first site restored was Abbeyleix Bog and this was very much a collaborative project with the local community and others including the National Parks and Wildlife Service, the Irish Peatland Conservation Council (IPCC) and Laois County Council. Following from that initial project the Bord na Móna Raised Bog Restoration programme has focused on clusters of raised bog sites with clear potential for restoration in East Galway and Roscommon.

The main conservation interest on these sites is the potential to create conditions favourable for the re-establishment of *active* raised bog habitat, a priority habitat listed under the EU Habitats Directive, by means of drain blocking and rewetting. During the baseline survey, these areas were identified with restoration potential for *active* raised bog habitat as well as having other features of biodiversity interest and nature conservation value such as use by Red Grouse, Curlew, rare plant species etc. It was subsequently agreed by all in Bord na Móna that these sites should be restored. In the interim, the National Parks and Wildlife Service has reviewed the condition of the bogs and selected the majority of the Bord na Móna sites for designation as SAC and/or NHA habitats.

The future of these bog areas will be determined by changes in climate, but for now they are clearly earmarked for biodiversity within the Bord na Móna network. The sites are monitored using the standard ecotope monitoring method employed by the National Parks and Wildlife Service.

An example of the ecotope mapping work for Abbeyleix Bog is shown overleaf.

An example of the ecotope mapping work for Abbeyleix Bog is shown here to demonstrate how conditions can respond to drain blocking over a relatively short period of time (five years).

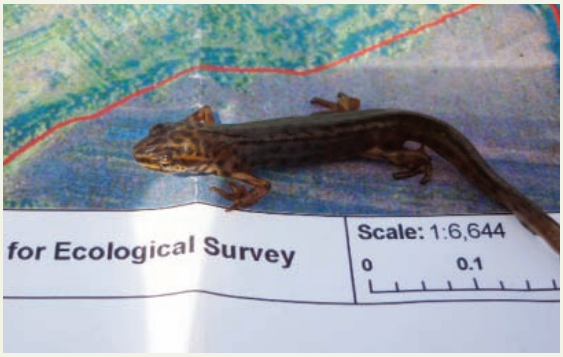
Abbeyleix Ecotope Map (right)

2014

Key changes to note from 2009 map: the area of sub-central ecotope (orange) which is characterised by increased cover of *Sphagnum* species, has increased on both sides of the bog.

Abbeyleix Ecotope Map (below)

2009



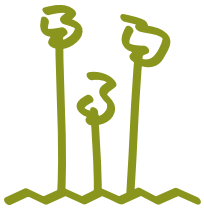
A curious newt helping out with the survey work.

Legend

- Raised bog PB1 - Facebank ecotope
- Raised bog PB1 - Marginal ecotope
- Raised bog PB1 - Marginal ecotope with sub-marginal patches
- Raised bog PB1 - Sub-marginal ecotope
- Raised bog PB1 - Sub-central ecotope
- Raised bog PB1 - Inactive flush
- Raised bog PB1 - Sub-central ecotope with Sub-marginal patches
- Raised bog PB1 - Facebank/marginal mosaic

Bord na Móna Raised Bog Restoration programme 2009 to present

	Year of Restoration	Name	County	Comment	High bog area ha	Total site area ha
1	2015 -ongoing	Knock Bog (Ballydangan North)	RO	Also contains small wetland areas with fen and transition mire	129	187
2	2015	Mostrim Bog remnant	LO		41	41
3	2015	Cranberry Lough Bog	RO	Also contains small lough and associated fen habitat	76	98
4	2014	Cloonshannagh Bog remnant	RO		36	36
5	2014	Paul's Lough Bog	GY		118	132
6	2014	Lenareagh Bog	GY		90	112
7	2013	Ballydangan Bog	RO	Leased to Moore Gun Club; Red Grouse project; breeding Curlew present	215	240
8	2012	Moyarwood Bog	GY	Marsh Fritillary site	171	197
9	2011	Cuckoo Hill Bog	RO	Also contains regenerating lagg zone/ secondary fen habitats	60	145
10	2009	Abbeyleix Bog	LS	Leased to local community; important lagg zone habitat	104	190
Total restored to date					**1040**	**1378**
11	2016+	Clera Island Bog	RO		157	179
12		Killeglan Bog cluster	RO	Red Grouse present	334	440
13		Clonwhelan Bog	LO/WH	Part-leased to local gun club	132	162
14		Glenlough Bog	LO/WH		262	329
15		Cornaveagh Bog remnant	RO		21	21
Earmarked for restoration 2016+					**906**	**1131**
Total (overall)					**1946**	**2509**



the future

of these bog areas will be determined by changes in climate, but for now they are clearly earmarked for biodiversity within the Bord na Móna network.

Rehabilitated cutaway bog areas with high biodiversity value

Since the 1990s, Bord na Móna has been actively carrying out research into rehabilitation of cutaway bogs for the purposes of promoting biodiversity. This has resulted in an extensive network of cutaway bog with a range of established habitats. These cutaway bog areas illustrate how former peat production areas can be rehabilitated with a combination of natural regeneration and targeted rehabilitation to return relatively quickly to species diverse areas.

The network of rehabilitated bog areas to date includes the Lough Boora Discovery Parklands complex of bogs (c.2,500 ha cutaway bog habitats – wetland, woodland, grassland, heathland, riparian etc.), the Oweninny bog complex (~6,500 ha rehabilitated acidic cutaway with regenerating peat-forming habitats), Ballycon wetland rehabilitated in 2006 (~240 ha, fen and birch woodland habitats) and Lullymore wetland (~250 ha, rich fen and birch woodland habitat).

Further areas added to this network in the period 2010-2015 include Kilberry wetlands, Bunahinly rewetted bog and Derrycashel and Cavemount wetlands. Each of these areas are outlined in the following tables and presented on the accompanying map (pages 40 and 41).

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	**County**	**Target Habitats**	**Rehabilitation/ Management**	**Comments**	**Year**	**Area** ha
1	Corlea cutaway – Wetlands Heritage Ireland	LD	Poor fen, scrub, wetland	Wetland creation, amenity	Lease agreement in development with local community	ongoing	16
2	Cavemount	OY	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2015	47
3	Cavemount	OY	Wetland	Wetland creation, outfall blocking, Overflow management	Hydrological management	2015	9
4	Lullymore	KE	Wetland, poor fen, scrub, woodland	Outfall blocking and maintenance	Wetland enhancement	2015	< 1
5	Clooniff	RN	Wetland	Berm creation, vegetation translocation	Coolumper Reedbed trial	2015	< 1
6	Mountlucas Windfarm	OY	Wetland, poor fen, scrub, grassland	Wetland creation, overflow management, re-profiling, gravel pit rehabilitation	Rehabilitation of windfarm area	2015	26
7	Bruckana Windfarm	TY	Wetland, poor fen	Wetland creation, overflow management	Rehabilitation of windfarm area	2015	14
8	Srahmore	MO	Poor fen, embryonic *Sphagnum* vegetation	Hydrological management, deep peat re-vegetation, *Sphagnum* inoculation	Rehabilitation of peat deposition area	2010-2015	34

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
9	Lullymore	KE	Wetland, poor fen, scrub, woodland	Wetland creation, drainage re-alignment	Lease agreement with Lullymore Heritage & Discovery Centre; includes 3 ha of broad-leaved woodland on mineral island	2014-2015	17
10	Rathvilla Gravel Pit (Cloncreen)	OY	Grassland, open water, scrub	Re-profiling, retention of important ecological features	Gravel quarry rehabilitation	2014-2015	9
11	Lough Boora Visitor Centre	OY	Building, Amenity	Construction	Building, landscaping	2014	2
12	Derryhinch	OY	Poor fen, scrub	Tree planting, fertiliser application	Buffer zone along motorway	2014	5
4	Lullymore	KE	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2014	13
13	Mountlucas	OY	Poor fen, scrub	Fertiliser treatment	Rehabilitation of bare peat areas	2014	5
14	Derrycashel	RN	Wetland, poor fen	Berm construction, outfall blocking	Wetland creation	2014	56
15	Cloonroosk Bog	OY/KE	Raised bog	Field-drain blocking	Restoration of bog remnant	2014	56
16	Ballivor	WM	Poor fen, *Sphagnum*-dominated vegetation	Wetland creation, drain-blocking	Old sod peat cutaway; embryonic peat-forming *Sphagnum*-dominated area	2014	9
17	Kilberry	KE	Wetland, poor fen, scrub	Field-drain blocking, outfall blocking	Wetland creation	2013-2014	38
18	Ballycon	OY	Poor fen, scrub	Fertiliser treatment	Regenerating bare peat headland (former travel path)	2013	7
19	Boora	OY	Heath	Heather seeding	Heather brash trial	2013	<1
18	Ballycon	OY	Heath	Heather seeding	Heather brash trial	2013	<1
20	Erenagh	RN	Wetland, poor fen	Wetland creation, berm construction, hydrological management	Wetland creation	2013	1
21	Drumman	OY	Poor fen	Grass seed nursery crop	Nursery crop trial	2013	1
17	Kilberry	KE	Poor fen, Embryonic peat-forming *Sphagnum*-dominated vegetation	*Sphagnum* plot inoculation	Kilberry *Sphagnum* trial	2012-2013	2
21	Drumman	OY	Poor fen, scrub	Fertiliser treatment	Regenerating bare peat areas	2012	14

Bord na Móna cutaway bog rehabilitation 2010-2015

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
22	Drinagh	OY	Wetland, poor fen	Landscaping, wetland creation, scrub removal	Drinagh breeding wader habitat trial	2010-2011	31
23	Bunahinly	OY	Regenerating raised bog	Field drains blocked	Deep peat cutaway rehab trial	2010	2
24	Kilmacshane	GY	Poor fen	Fertiliser & nursery crop trials	Kilmacshane fertiliser and nursery crop trials	2010	1
21	Drumman	OY	Poor fen, scrub	Fertiliser, lime & nursery crop trials	Drumman fertiliser and nursery crop trials	2010	12
25	Lullybeg	KE	Grassland, poor fen, scrub	Conservation management, scrub control	BCI Management agreement; diverse grassland; Marsh Fritillary site	2010-ongoing	9
Sub-total (rehabilitation 2010-2015)							**436**

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
	Lough Boora Discovery Park	**OY**	**Outlined below**	**Mixed (outlined below)**	**Developed as a complex of several sites, paths and trackways around Boora (listed below are sub-sites)**	**1990s -ongoing**	**Total: 2,257**
26	Loch Clochan and wetlands (LBDP)	OY	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, angling, wetland creation	Area developed for local amenity; lease agreement with local fishing club	1990s	45
27	Finnamores Wetlands (LBDP)	OY	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, landscaping, wetland creation	Area developed for local amenity; lease agreement with local fishing club; Rich floral diversity	1990s	37
28	Lough Boora Lakes (LBDP)	OY	Lake, grassland, scrub	Lake creation, landscaping, amenity	Area developed for local amenity, angling	1990s	30
29	Leabeg wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland creation, amenity, outfall blocking	Area developed for local amenity, important waterbird area	1990s	70
30	Tumduff wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland enhancement, amenity, outfall blocking, managing outflows	Area developed for local amenity; cutaway bog regenerating since 1990s; diverse range of habitats, used by Whooper Swans	1990s	104
31	Drinagh Lake and wetlands (LBDP)	OY	Lake, wetland, scrub	Wetland creation, outfall blocking, managing outflows	Diverse mosaic of dry and wetland habitats important waterbird area	1990s	236

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
32	Derries wetlands (LBDP)	OY	Wetland, poor fen, scrub	Wetland creation, outfall blocking, managing outflows, amenity	Diverse mosaic of dry and wetland habitats cycle-track	1990s-ongoing	171
33	Turraun (LBDP)	OY	Lake, wetland, woodland, grassland, heath	Wetland creation, outfall blocking, amenity, path maintenance	Diverse mosaic of dry and wetland habitats; diverse flora and fauna, cycle-track development	1990s - ongoing	176
34	Clongawney (LBDP)	OY	Lake, wetland	Lake creation, outfall blocking	Acidic lake; colonising naturally	1990s	44
35	South Boora wetlands (LBDP)	OY	Wetland	Wetland creation, outfall blocking	Developing wetland area	1990s	23
	Various (LBDP)	OY	Conifer plantation, other broad-leaved plantation,	Conifer & broad-leaved plantation on cutaway, amenity	Plantations associated with LBDP	1980 - 1990s - ongoing	772
36	Sculpture Park & Amenity trails (LBDP)	OY	Amenity, cultural	Landscaping	Sculpture Park; cycle-track development	1990s-ongoing	53
37	Blackwater	OY	Wetland	Wetland creation, berm construction, drain-blocking	Important waterbird area	1990s	24
38	Blackwater	OY	Lake, wetland, grassland	Lake creation, amenity	Area developed for local amenity	1990s	15
39	Doire Bhile	TP	Lake, wetland, poor fen, grassland, scrub	Lake creation, amenity development, angling lake, walkway, wetland creation	Lease agreement with local community; Marsh Fritillary site	1990s	42
40	Derryounce	OY	Lake, wetland, poor fen, scrub, embryonic peat-forming *Sphagnum* vegetation	Lake creation, wetland creation, angling lake, walkway	Lease agreement with local community; Managed as fishery	1990s - ongoing	32
1	Corlea Trackway Visitor Centre	LD	Degraded raised and cutover bog	Bunding of bog remnant,lagoon creation, amenity	Managed as part of preservation of wooden track-way at Corlea Centre	1990s	16
41	Clonfinlough (Blackwater)	OY	Wetland, rich fen, scrub	Wetland creation, berm construction, drain blocking	Adjacent to Finlough SAC area	1990s	33
42	Lismanny	GY	Raised bog	Amenity	Lease agreement with local community; boardwalk; local BnM biodiversity area	1990s	15
43	Killaun	OY	Cutover bog, fen, woodland	Amenity	Lease agreement with local community; boardwalk; local BnM biodiversity area	1990s	8

Pre 2009

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
44	Oweninny	MO	Acidic wetland, poor fen, embryonic peat-forming vegetation	Mixed	Mixed use; Bellacorick windfarm	2001 - 2003	6,500
45	O'Boyle's Bog	MO	Blanket bog	Deep-peat drain blocking	Regenerating blanket bog adjoining Knockmoyle-Sheskin Nature Reserve	2003	350
9	Lullymore	OY	Wetland, poor fen, scrub, woodland	Wetland enhancement, outfall blocking	Regenerating cutaway bog, *Cladium* fen development	2006	70
46	Ballycon wetlands	OY	Wetland, poor fen, scrub	Wetland enhancement, berm construction, drain blocking, outfall management	Important waterbird site; site utilised by Whooper Swans	2006	226
47	Turraun	OY	Woodland	Tree planting (Oak & Scot's Pine)	Native Woodland Scheme	2008	5
48	Clongawney	OY	Woodland	Tree planting (Oak & Scot's Pine)	Native Woodland Scheme	2008	5
49	Derraghan woodland	LD	Birch woodland	Naturally developing cutaway woodland	Local biodiversity area	/	84
Sub-total (pre-2009)							**9,682**

Woodland remnants zoned for biodiversity

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
50	Derries woodlands, Clongawney Bog	OY	Oak-Ash-Hazel woodland	Mature woodland	Mature woodland on glacial mounds surrounded by cutaway; local biodiversity area	/	6
51	Derrylesk Island woodland – Mountlucas Bog	OY	Oak-Ash-Hazel woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area	/	19
52	Derrynabroune Island	TY	Oak-Ash-Hazel woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area; archaeological site	/	3
53	Derryarogue Island	LD	Calcareous grassland, scrub, woodland	Naturally developing woodland	Mineral island surrounded by cutaway bog; local biodiversity area	/	12
Sub-total (woodland remnants)							**40**

Raised bog remnants zoned for biodiversity

	Bog Name	County	Target Habitats	Rehabilitation/ Management	Comments	Year	Area ha
54	Cloneragh Bog	LS	Raised bog remnant	/	Undeveloped raised bog remnant; breeding Curlew site	/	43
55	Derryhogan Bog	TY	Raised bog remnant, peat-forming *Sphagnum*-dominated vegetation	/	Breeding Curlew site; local biodiversity area	/	75
56	Cloncannon Bog Remnant (Ticknevin)	OY	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	40
57	Clonavoe Bog Remnant (Clonsast Bulge)	OY	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	61
58	Bracklin Bog Remnant	WH	Raised bog	/	Undeveloped raised bog remnant; local biodiversity area	/	19
Sub-total (raised bog remnants zoned for biodiversity)							**238**

Designated for nature conservation

	Overlap with other SAC, SPA, NHA sites		Various	No management	Overlap along rivers, bogs, canal etc.	/	**821**
Sub-total (designated for nature conservation)							**821**

Forestry development on cutaway (commercial stands and trials)

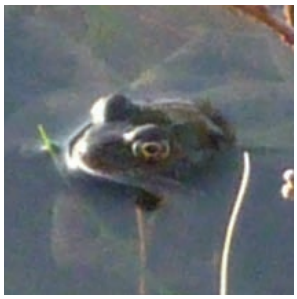
	Conifer plantation			Tree-planting, forestry development	Leased to Coillte, other conifer plantation	/	3,269
	Other forestry plantation			Tree-planting, forestry development	Biomass trials, BOGFOR trials	/	139
Sub-total (forestry)							**3,408**

Overall Total	**14,625**

Irish Hare

Long-eared Owl chick

Bumble Bee on Heather



Common Frog

These cutaway bog areas illustrate how former peat production areas can be rehabilitated with a combination of natural regeneration and targeted rehabilitation to return relatively quickly to species diverse areas.

Above left: Marsh Helleborine.
Above right: Reed.
Right: Meadow Brown Butterfly.


ROSCOMMON
LONGFORD
WESTMEATH
OFFALY
LAOIS
GALWAY
TIPPERARY
Legend
Bog Restoration Site
Rehabilitation Site

Hotspots for species

Because of the extensive environmental variability presented by the Bord na Móna bog areas, there is a huge diversity of species to be found. A full list of species of conservation concern recorded on Bord na Móna bog areas to date is presented in Appendix IV.

A few of these species are highlighted below to demonstrate the importance of the Bord na Móna sites to their national populations. The species have been recorded often on discrete areas of bog that have been identified as valuable for species of conservation interest such as Littleton Bog for breeding Curlew (an area of regenerating cutaway), Lullymore and Clongawney Bogs for Marsh Fritillary (marginal areas of regenerating cutaway), as well as a number of Hen Harrier roosting sites (regenerating cutaway and bog remnants). In some cases the areas are relatively small, or they are areas with ongoing activity. These areas are managed in conjunction with the National Parks and Wildlife Service, local community groups and ENGOs. Specific site detail and information for species of conservation concern is not presented here.

> **“ Because of the extensive environmental variability presented by the Bord na Móna bog areas, there is a huge diversity of species to be found ”**

Marsh Fritillary

Marsh Fritillary (*Euphydryas aurinia*) is considered threatened/vulnerable in many countries including Ireland. This butterfly species relies heavily on wet grassland sites where the presence of the main food plant devil’s bit scabious is essential as this is the only food plant of the larvae (caterpillars). Habitat loss has led to the decline in this species. Bord na Móna Ecology continues to identify new sites in order that appropriate habitat management can take place. Butterfly Conservation Ireland in collaboration with Bord na Móna manage an important site for this species on a cutaway bog in Co. Kildare. A further area in Kildare was transferred in the early 2000s to, and is now managed by the IPCC. The Bord na Móna bog areas currently monitored for Marsh Fritillary include Lullymore (Co. Kildare), Carrickhill (Co. Laois), Doire Bhile (Littleton, Co. Tipperary), Moyarwood (Co. Galway), Clongawney (Co. Offaly). A local community group at Ballivor Bog (Co Meath) recorded a new site for Marsh Fritillary in 2015.

Otter

The Otter (*Lutra lutra*) is one of Ireland’s iconic wetland mammal species. They spend much of their life in and around waterbodies such as lakes, ponds, rivers and our coastline, where they eat a variety of fish. They will also eat birds’ eggs. Otter has declined across most of Europe, however their numbers appear to have remained stable in Ireland. The Otter is a shy creature and is rarely seen, however they leave distinctive signs that they have visited a site in the form of footprints and spraints (droppings). Silt ponds, streams, drainage channels and wetlands in Bord na Móna bogs are attractive for Otter and there has been widespread recording of this species across the Bord na Móna estate.

Serrated wintergreen

In February 2015 serrated wintergreen (*Orthilia secunda*) was first observed in Ballydangan Bog, Co. Roscommon during the annual Biodiversity Action Plan review day field trip. Up until recently, this species was thought to be extinct on raised bog habitats across the Republic of Ireland, with only two small populations remaining in Co. Fermanagh. This plant is approximately 65cm tall and flowers in the summertime, with all of the flowers located on one side of the flower stem. Serrated wintergreen are semi-parasitic and rely on root interactions with mycorrhizal fungi in order to exist in the harsh environment of the bog. Bord na Móna restoration work in Ballydangan Bog was completed in 2013 and the site is home to the Ballydangan Bog Red Grouse Project. The discovery of serrated wintergreen highlights the importance of these restoration programmes in this bog and other similar bogs.

Lapwing

Lapwing (*Vanellus vanellus*) is a species that has undergone a severe reduction in numbers in recent times and is now Red Listed as a breeding species in Ireland. They are a ground nesting bird and select open sites with low vegetation. Several Bord na Móna rehabilitated sites (such as Drinagh Bog) are used as breeding sites for Lapwing and specific rehabilitation techniques aimed at making cutaway bogs more attractive to Lapwing and other waders are in development. It is important that their breeding sites are open, without trees and scrub and that the surrounding areas contain habitats with an abundance of insects, which both the adults and chicks eat. Ballycon, Lullymore, Cavemount. Blackwater and the Lough Boora complex are all important Bord na Móna sites for breeding Lapwing.

Curlew

Curlew (*Numenius arquata*) was once a widespread breeding species, when its haunting call was heard all over Ireland. In recent years a decline of almost 80% has been observed in the Irish breeding population. Curlew are ground nesting birds and favour wetland sites for nesting, they eat insects which they extract from the soil using their long, curved beak. Bord na Móna has a number of sites where the breeding success of Curlew is monitored in a joint project with BirdWatch Ireland which commenced in 2015. These include Ballydangan Bog (Co. Roscommon), Derryhogan Bog (part of Littleton Bog, Co. Tipperary), Blackriver Bog (Co. Kildare) and Cloneragh Bog (Co. Laois). Each of these sites in being monitored for breeding Curlew and future management measures will be developed and implemented under the continued guidance of BirdWatch Ireland as part of the rehabilitation planning for the sites.


Groundwork.

3.3

Objective 3

Develop and Promote Best Practice in Terms of Rehabilitation for all Bord na Móna Bogs to Stabilise Former Peat Production Areas and Enhance Biodiversity

Almost all peatlands in Ireland have been modified to some degree and require some level of management to prevent further degradation and/or improve and enhance their condition. There is a growing recognition that investment in restoration and rehabilitation of peatlands can have enormous benefits for society both in terms of social and natural capital.

As part of Condition 10 of IPC Licensing Bord na Móna is required to develop rehabilitation plans for all the bogs areas within the licensed areas. While it is not possible to develop final rehabilitation plans for bog areas that are still in peat production as the final drainage plan and peat depths are not yet known, in the interim, using Lidar data and peat resource data we can develop draft rehabilitation plans based on the expected future character of the bog. Final rehabilitation plans have been developed for bog areas that were never in full production and currently being restored, such as the Derrydoo Woodlough Bog cluster in Galway. And also for bog areas that are completely out of production such as the Oweninny Bog complex in Mayo.

Trials and research into best practice inform the rehabilitation measures and a number of rehabilitation measures have been tested over the period 2010-2015.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

Draft rehabilitation plans detailed and lodged with the EPA for all bog areas. Each (draft) plan outlines the starting point (current baseline condition), sets clear aims and objectives to stabilise and rehabilitate the area, the necessary rehabilitation work based on best practice and research to date, a timeframe for completion, and the outcome of consultations with statutory and other relevant bodies to date

Final rehabilitation plans developed and implemented (completed or ongoing) for the Oweninny Bogs complex (Mayo, 2005 to 2013), Abbeyleix Bog (Laois, 2009), the Derrydoo-Woodlough bog cluster in East Galway (2012-2015) and the Clonboley Bog cluster in South Roscommon (2009 to present)

Field trials to determine effective approaches to biodiversity enhancement established at a number of bogs

Aspects of rehabilitation plans being trialled where possible such as in Boora Bog (Offaly – 1990s to present), Ballycon Bog (Offaly - 2006 to present), Mountlucas Bog (Offaly – 2014) and Templetuohy (Bruckana) Bog (Tipperary 2015; area under wind farm development footprint) (a complete list of areas rehabilitated is outlined in the previous section under Table X)

Field trials to determine effective and efficient approaches to biodiversity enhancement on cutaway bogs established at a number of bogs; these include drain-blocking, seeding (native and nursery species), fertiliser, reed transplant and seeding, and heather brash spreading trials

A *Sphagnum* inoculation field trial established at Kilberry Bog (2012)

An area of cutaway in Drinagh bog (31.2 ha) was developed to enhance breeding success of waders with a focus on Lapwing (2010).

Large scale rehabilitation trials established on Kilberry bog (rewetting – 38 ha in 2013) and Drumman (fertiliser and seeding approx. 30ha in 2010, 2011)

Targeted rehabilitation was carried out in parts of Derrycashel Bog (rewetting of ca. 20 ha in 2014)

Rehabilitation of the Srahmore Peat Deposition and Associated Facilities near completion

Restoration of raised bog areas identified during the baseline survey - to date 1,000 ha of raised bog has been restored (2009 to present)

Three Greenhouse Gas monitoring projects were established and funded by Bord na Móna on rewetted acidic cutaway (Oweninny), rewetted alkaline cutaway (Blackwater) and restored raised bog (Moyarwood). These projects were part of an EPA funded project – NEROS (*Network monitoring Rewetted/restored peatlands and Organic Soils for climate and biodiversity benefits*) - of which Bord na Móna was a member of the steering committee

Facilitation of a number of Masters research student projects and work experience for a number of Transition Year secondary school students

The wetlands at Finnamore's have attracted rare bird species such as Red-necked Phalarope.

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Continue to update draft rehabilitation plans for all bog areas,
with a view to final plans being developed and implementation in line with areas of cutaway bog available

Establish further rehabilitation field trials
and build on existing knowledge in relation to habitat management and GHG emissions

Continue to implement the Bord na Móna Raised Bog Restoration programme

Finalise rehabilitation of the Srahmore PDA in Co. Mayo

Develop habitat and species management guidelines
to be based on rehabilitation and restoration work carried out on Bord na Móna bogs which can be translated to other peatland areas

These actions will require ongoing work including:

Update draft rehabilitation plans bi-annually
to reflect updates in baseline survey and/or other targeted surveys, as well as changes in peat harvesting projections/requirements and/or different land uses proposed

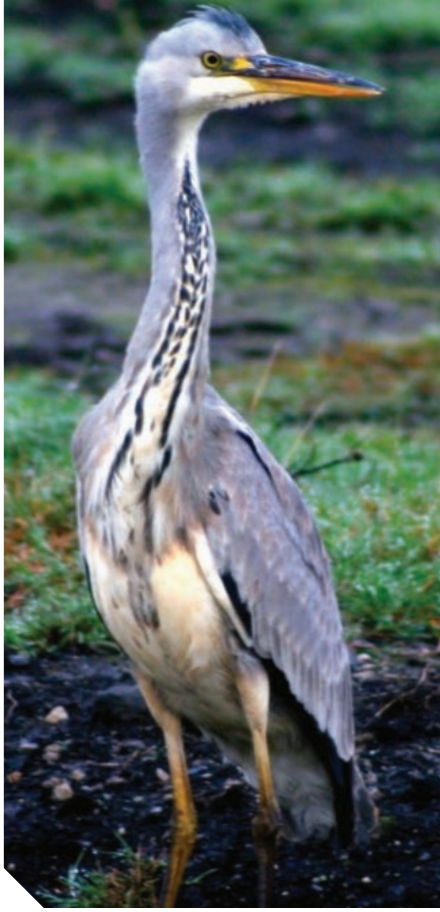
Consider the rehabilitation plans in the context of adjoining land-uses,
hydrology including ground water dependant terrestrial ecosystems (GWDTESs), national policies such as the National Landscape Strategy and relevant EU Directives including Habitats, Birds, EIA and Water Framework Directives

Finalise rehabilitation plans in consultation with statutory and non-statutory consultees
and carry out implementation as areas come available; carry out Appropriate Assessment screening for completed rehabilitation plans in accordance with EPA licensing requirements

Establish further rehabilitation trials on cutaway bog areas:
trials outlined for 2016-2021 include an additional *Sphagnum* inoculation trial, different establishment methods for reed and other peatland species and controlled water run-off (sluice control); establish trials specifically for targeted species and habitat management; support biomass trials as well as other potential commercial trials on appropriate cutaway bog areas

Continue to investigate the potential for breeding wader habitat
across Bord na Móna cutaway bogs, continuing to focus on the Drinagh trial site





Above left:
Fly Agaric Mushroom.
Centre: Hawkbit and Common Centaury.
Above right:
Grey Heron.

Develop habitat management measures particularly for Curlew,
building on the results of the 2015 and 2016 breeding Curlew survey

Selection of additional research trial sites and establishment of trials
to determine effectiveness of other potential management options for rehabilitation; facilitation of potential funding sources such as EU LIFE, LEADER and other research grants; communicate with potential project partners such as BirdWatch Ireland, Irish Peatland Conservation Council, Butterfly Conservation Ireland, National Parks and Wildlife Service, Inland Fisheries, and second and third level education and research institutions

Continue to monitor GHG emissions from restored raised bog
at Moyarwood Bog (Derrydoo Woodlough complex) up to 2018

Support and work to develop GHG monitoring projects
on woodland habitats developing on cutaway bog

Work with the research team in Trinity College Dublin
on the EPA funded project *"A framework for the restoration of Irish peatlands"* and continue to work with National Parks and Wildlife Service on the restoration practices for the NATURA 2000 raised bog network; this will include hydrological assessment of rehabilitation measures and options for cutaway bog areas

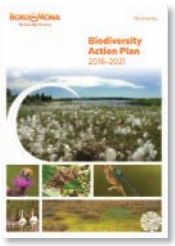
Continue restoration work in Clonboley and Killeglan Bog cluster;
continue with restoration work in other bogs and bog remnants identified as high conservation sites

Monitor rehabilitation in Srahmore PDA
and implement final rehabilitation phases

Following on from all of the rehabilitation and restoration work,
assimilate the data and outcomes to inform best practice guidelines for cutaway bogs and associated peatland habitats; promote the ecosystem services approach in relation to trials, rehabilitation and restoration projects

Key Indicators of Success

The key indicators of success of these actions will be:



Acceptance of rehabilitation plans on submission to EPA
and other consultees

Implementation and completion of rehabilitation plans
where possible and monitoring programme established

Successful establishment of further research trials and projects
showcasing a range of rehabilitation and management options for species and habitat management and/or conservation within Bord na Móna bogs; increased area of raised bog restoration

Established projects and successful funding applications
for a range of projects with relevant project partners

inform best practice guidelines for cutaway bogs and... promote the ecosystem services approach

Increased knowledge of GHG balance of cutaway bogs and restored bogs

Habitat and species management guidelines
for Bord na Móna bogs to be based on outcome of all rehabilitation trials and monitoring

Launch of Abbeyleix boardwalk in 2014. This community-inspired project is nationally and internationally renowned.

Increased knowledge
of GHG balance of cutaway bogs and restored bogs

Rehabilitation and the Bord na Móna Bogs

IPC License Condition 10

The rehabilitation planning process within Bord na Móna has developed considerably over the last ten years to address the complexity of the process itself and the changing nature of the bogs as peat production continues. Condition 10 of each of the nine Bord na Móna IPC licenses relates to decommissioning and permanent rehabilitation of all bog areas. The main features of the process and how each aspect of Condition 10 has been addressed is outlined in the following sections.

It is important to recognise that peat production is an ongoing and long-term activity and will continue at a number of Bord na Móna bog areas for several years to come. During this time, the bog drainage and physical character will also change. Until then broad rehabilitation outlines can be drawn under draft rehabilitation plans, with definitive plans not being developed until peat production is within 1-2 years of cessation date. In the lead in time, there are (at minimum) annual updates with all Peat Production Managers in licensed bog areas and an ongoing baseline survey and continued research into rehabilitation methods and outcomes.

In 2013, the Ecology Team submitted draft rehabilitation plans for each of the Bord na Móna bogs. Following updates to the baseline survey and further rehabilitation trials, the plans were updated in 2015. The plans will continue to be reviewed on a bi-annual basis. The main elements required for rehabilitation post peat production are stabilisation of former bare peat areas largely attained through natural processes of revegetation which may require enhancement by targeted management such as fertiliser/seeding; surface manipulation and/or hydrological management (drain/outfall blocking). These basic features are outlined in the Bord na Móna *Biodiversity Action Plan 2010-2015* with an update on trials and methods presented here.

Extensive research has also been carried out on potential commercial development of the cutaway bogs (agriculture, forestry, renewable energy (biomass, wind farms etc.) and eco-tourism). The outcome of this work is outlined in a number of publications including the recent Bord na Móna *Biodiversity Action Plan 2010-2015* and the Bord na Móna *Strategic Framework for Future Use of Peatlands* document (currently being updated, 2016).

Terminology

It should be noted that the terms relating to restoration, rehabilitation and after-use can be defined as follows:

RESTORATION: the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. www.ser.org

REHABILITATION: refers to the primary objective of environmental stabilisation of the former peat production areas or cutaway bogs. This usually involves some form of management to ensure the revegetation of former peat production fields and/or habitat creation/enhancement (as outlined in Bord na Móna Biodiversity Action Plan 2010-2015). It may also include reclamation for agriculture and/or forestry, and/or amenity use.

REHABILITATION PLAN: outlines the current baseline condition of the bog on cessation of peat production and the proposed work plan, time frame and costing of work required to implement appropriate rehabilitation and monitor its effectiveness. The development and implementation of a rehabilitation plan for each bog area is an assurance that when Bord na Móna withdraws from industrial peat production at any site that it will do so in an environmentally responsible way. The rehabilitation plan will take consideration of other potential after-uses (such as renewable energy projects) that are proposed for any given bog area.

CRITERIA FOR SUCCESS OF REHABILITATION UNDER CONDITION 10 OF IPPC LICENSING: following cessation of peat production the main criteria are stabilisation of the former peat production areas (generally comprising bare peat fields and associated travel and transport and drainage infrastructure) and mitigation of silt run-off. These basic criteria are largely achieved by natural processes of revegetation with targeted rehabilitation work identified and implemented where required. While each cutaway bog area is rehabilitated in a manner appropriate to the environmental conditions of the site, the general rehabilitation approach is to facilitate the rewetting of cutaway where possible. Not all cutaway areas will have the capacity to be re-wetted due to environmental conditions on the site (some of the cutaway will be naturally dry and develop woodland in the future), and land-use in adjoining areas. All rehabilitation measures will have a positive impact on biodiversity in general, with some areas becoming habitat and species hotspots according to local characteristics.

OTHER AFTER-USES: In practice a number of after-uses may be proposed for rehabilitated peat production areas. These after-uses would generally require some form of manipulation of the site for a proposed commercial development (such as the Drehid Landfill Facility on Timahoe South Bog; the Mountlucas Wind Farm development); development of a biodiversity area for targeted species or habitats (such as at Drinagh) or an amenity area such as Lough Boora Discovery Park (walkways, cycle-paths etc.). In reality, all sites will comprise a mix of after-uses given the scale and potential of the bogs in relation to mixed use and multiple benefits, as in the case of the Oweninny Bog Group.

A number of after-uses have already been developed on parts of the Bord na Móna bogs. These include:

Coniferous Forestry:
areas leased to Coillte for forestry (up to 4,000ha across the land holdings); trial areas established in 2010/2012 at Killinagh and Derrybrennan (Allen Group)

Aggregates:
Derryarkin Sand and Gravel project, Co Westmeath (leased to Roadstone) (Derrygreenagh Group)

Resource Recovery:
Drehid Landfill, Composting Plant and Landfill Gas Generating Unit, (Timahoe South Bog) Co. Kildare (Allen Group)

Composting:
Kilberry Composting Facility, Kilberry Bog, Co. Kildare (Kilberry Group)

Waste:
Ash repositories for: EPL – Cloncreen, Co. Offaly (Allen Group); WOP – Area 3, Blackwater Bog, Co. Offaly. (Blackwater Group); LRP – Derraghan Bog, Co. Longford (Mountdillon Group)

Peat Deposition:
Srahmore Peat Deposition Area and associated facilities, Oweninny Bogs, Co. Mayo (Oweninny Group)

Niche commercial opportunities:
biomass trials (1980s-2000s); aquaculture trials (2014-2016)

Wind Farms:
Mountlucas Wind Farm, Co. Offaly (Allen); Bruckana Wind Farm, County Tipperary (Littleton); Oweninny Wind Farm, Co. Mayo (Oweninny)

Amenity:
Lough Boora Discovery Park, Co. Offaly (Boora); Loch Doire Bhile, Littleton (Littleton); Derryounce Walkway, Portarlington (Derrygreenagh); Mountlucas Wind Farm walkways

Biodiversity:
for example all bog areas restored under the Bord na Móna Raised Bog Restoration programme (2009-present), Lullymore wetlands and Butterfly Conservation Ireland site; parts of the Oweninny Bog Group and Mountlucas Wind Farm sites

Any proposed after-uses implemented to date are generally covered by specific planning and mitigation conditions and/or appropriate licenses, such as the Srahmore Peat Deposition Area (part of the Oweninny Bog Group) which is covered by Waste Licence W199-2. *The Strategic Framework for Future Use of Peatlands* (2011) sets out the range of after-uses that may be considered on any bog area and the general requirements relating to each option.

All rehabilitation measures will have a positive impact on biodiversity in general, with some areas becoming habitat and species hotspots according to local characteristics.

Triggers for Final Rehabilitation Plans and Implementation

Each Bord na Móna IPC licensed area reports on progress of cutaway rehabilitation and potential future work as part of the Annual Environmental Reports (AERs) for each licensed area. This is carried out annually. Since completion of the baseline ecological work under the Biodiversity Action Plan 2010-2015 draft rehabilitation plans have been developed for all Bord na Móna sites and will be reviewed bi-annually. In terms of finalising rehabilitation plans a series of triggers can be outlined as follows:

1. **Isolated areas of cutaway bog emerge but are dispersed within larger production areas**
Even though extensive peat extraction is ongoing, at this stage a general impression of what conditions will remain on cessation of peat extraction can be attained and possible rehabilitation and after-uses identified (preliminary outline of after-uses noted). At this point a draft rehabilitation plan can be developed, outlining main features that will be assessed. Annual reviews to identify newly cutaway bog areas are carried out each January and those areas are updated on a map on the Bord na Móna GIS system (Land-Use Maps).

2. **The final peat drainage infrastructure is installed**
and a decision is taken on the timeframe for cessation of peat production within the bog unit, i.e. what further depth of peat will be extracted, what acreage of bog will be required to meet market demands, etc. Generally at this stage the operations in the bog would be winding down and/or a realistic time-plan established for closure of the bog unit. At this stage the draft rehabilitation plan will be reviewed and activated for the cutaway bog, ideally incorporating time frames, cost estimates and realistic objectives. Consultation with interested parties is conducted. This phase is represented in a number of bog areas such as the Oweninny Bogs (2003) and sites never developed fully for peat production such as Abbeyleix Bog (2009), Derrydoo-Woodlough Bog cluster (2013), and the Clonboley Bog cluster (2015).

3. **Hydrologically isolatable units of bog are available**
Rehabilitation can now commence within discrete areas of cutaway bog. For example, the Boora Parklands complex and Lullymore Bog (part of the Allen Ballydermot cluster of bogs).

4. **The entire bog out of peat production**
Only at this point can the complete rehabilitation plan be implemented, as well as decommissioning procedures for workshops and workstations. For example, the Oweninny Bog Group.

These stages and triggers will continue to apply as peat production continues in all licensed areas for all bog units in Bord na Móna ownership. Within this framework, the most appropriate rehabilitation and/or after-use is based on the most up to date research and trials conducted and the conditions required for each potential after-use, while taking all primary and secondary factors into consideration.

Ballycon wetland (rehabilitated in 2006).

Case Study: Oweninny Bog Group (1950s to 2015)

Peat production in the Oweninny Bog Group began in the 1950s, supplying milled peat to the ESB peat-fired station adjoining the production areas at Bellacorick in North West Mayo. Bord na Móna developed two distinct bog areas – one at Bellacorick and one adjacent to Bangor Erris – which collectively covered 6,500 hectares of blanket bog. When the decision was reached to close the ESB power station in 2005, this led to the development of the Oweninny Bogs Rehabilitation Plan (2003). The plan was based on research on the emerging cutaway blanket bog carried out between 1996 and 2001 and the establishment of a number of site specific rehabilitation trials between 2001 and 2003.

Spreading *Sphagnum* on the Srahmore PDA in Co. Mayo.

A draft rehabilitation plan was circulated to consultees in 2001, with the final agreed plan in 2003. Implementation of the rehabilitation plan was carried out between 2003 and 2005, once the final drainage plan and site conditions were established. This involved an extensive programme of drain blocking and other targeted rehabilitation, carried out by the former peat production staff using the appropriate machinery.

In tandem with the rehabilitation, planning permission for an extensive wind farm was granted for the site in 2003, complementing the existing wind farm which had been built on the Bellacorick site in 1992, with a further planning application under review by the planning authorities. Furthermore, the Srahmore Peat Deposition Area and Associated Facilities was established in 2004/5 on 65 ha of the Bangor site to accommodate the spread and stabilisation of 450,000 tonnes of peat from the nearby Bellanaboy Gas Terminal site. Other more recent developments include GHG monitoring from the rehabilitated cutaway (2008-2013), the lease of 1,000 ha of the Bangor bogs to the National Parks and Wildlife Service in 2010 for the purpose of Red Grouse management, and ongoing projects with the local communities in relation to amenity use (walkway developments) of the sites.

A number of mixed uses – wind energy, peat deposition and storage, nature conservation, amenity, turf cutting, blanket bog restoration, GHG monitoring - have been developed successfully for the Oweninny Bog Group

Because of the scale of the site a number of mixed uses – wind energy, peat deposition and storage, nature conservation, amenity, turf cutting, blanket bog restoration, GHG monitoring - have been proposed and developed successfully together for the Oweninny Bog Group. The Ecology Team continues to monitor the rehabilitation outcomes at the site.

Rehabilitation Trials 2010-2015

A range of rehabilitation measures have been trialled on the cutaway bogs in the period 2010-2015. In most cases the aim has been to accelerate revegetation in areas slow to colonise, although there have been species specific measures also carried out. Some of the trials are outlined here in detail.

Drinagh: rehabilitation of cutaway bogs for breeding waders

Bord na Móna and BirdWatch Ireland established a trial area in 2010 on Drinagh Bog (Boora complex) in County Offaly with a view to developing management techniques for breeding waders on cutaway bog in Ireland. These techniques have been used in other countries in wet grassland and other wetland habitats.

The main objectives of this trial project were to investigate rehabilitation techniques to enhance the value of cutaway bog in the midlands for breeding waders and wintering water-birds, and where possible, to increase breeding wader numbers.

The main rehabilitation techniques included:

Re-profiling of drains and drain margins:
Bord na Móna production bog is generally laid out in a series of long fields 15 m wide, separated by drains of < 1 m wide. When production ceases, drains with vertical edges that are sometimes quite deep (< 1.5m) are still present. These drains can act as a physical barrier to unfledged chicks. Re-profiling the edges of fields and infilling drains allows chicks to move from dry areas down to wetland vegetation to forage without difficulty.

Scrub removal:
Maintenance of open areas and the management of scrub encroachment is also required to benefit these ground nesting bird species as they avoid any areas with emergent scrub, preferring open areas with lower incidence of predatory species such as Grey Crow.

Wetland enhancement by drain blocking:
The introduction of wetland habitats provides valuable foraging areas for wader chicks. Raising water-levels can also have the additional impact of limiting scrub re-growth, controlling scrub encroachment and maintaining large open areas.

The main work of scrub clearance, re-profiling and drain blocking was carried out over 30 ha between 2010 and 2011. The site has been monitored annually since. Rehabilitation management has had a significant initial visual impact on the overall landscape of the trial area, creating a large open landscape comprising a mosaic of emergent wetland vegetation, drier exposed bare peat areas and some open water. Drain-blocking has also been successful and water-levels are generally higher, with larger areas being inundated for longer periods of time. This is in contrast to the previous landscape with scattered scrub and fields with high margins.

RESULTS 2011: A total of 10 wader pairs were recorded in the trial area in 2011 compared to 2 pairs in 2010, prior to any rehabilitation management. Nearly all of the waders were recorded within the area cleared of scrub in 2010. The breeding wader population in 2011 comprised of Lapwing (4 pairs) (following numbers indicate pairs), Snipe (3), Redshank (2) and Ringed Plover (1). This compares to 2010 when the same area had Lapwing (1 pair) and Snipe (1 pair).

RESULTS 2014: The 2014 survey found that the new wetland area was still providing important bird habitat. Twenty-Eight breeding bird species were recorded in the wetland including six Red-listed Birds of Conservation Concern in Ireland (BoCCI) species, Meadow Pipit (6 territories); Black-headed Gull (5), Tufted Duck (2); Lapwing (2); Redshank (1) and Woodcock (1) were recorded, and a further five Amber-listed BoCCI species: Snipe (6 territories); Little Grebe (4); Water Rail (4); Skylark (5) and Robin (12).

The new wetland habitats developing in Drinagh are most important for a range of species of conservation concern including breeding waders and other water-bird species such as Little Grebe and Water Rail. However, factors such as predation are preventing breeding wader numbers from increasing since 2011.

The wetland area also attracts a range of wintering bird species with species recorded in the past few years including Whooper Swan, Greylag Goose, Teal, Mallard, Lapwing, Golden Plover, Tufted Duck, Merlin and Hen Harrier.

Drumman Bog: rehabilitation of cutaway bogs for colonisation of bare peat

During the baseline survey it was noted that while natural colonisation progresses relatively quickly on cutaway bog once peat production ceases, some sites are slow to revegetate and can remain bare. A number of trials were carried out on Drumman Bog (Derrygreenagh complex) in County Offaly to investigate measures to enhance vegetation.

The main rehabilitation techniques included:

Application of fertiliser to bare peat:
This involved applying fertiliser to bare peat and establishing whether this was sufficient to kick-start seed germination and plant establishment.

Seeding bare beat with nurse species:
Species such as Trticale are used as nurse species to promote revegetation, dying back as native plants establish.

Seeding bare peat with wetland/biomass crops:
Reed canary grass is a known biomass crop and wetland species, and if established could provide a similar nurse crop function for other wetland species to establish.

The work on each trial was carried out in 2010 and monitored annually. Based on the work to date, it was concluded that a once off low-level fertiliser application to bare peat is sufficient to kick-start revegetation. This approach has been applied successfully on a number of sites now, with the focus on travel paths that tend to dry out in summer periods and areas generally slow to revegetate.

The use of a nurse species was successful for stabilisation of bare peat but it is generally accepted that nutrient levels (such as phosphorus) is the main limiting factor. The trial areas continue to be monitored. Since establishment of the trials there has been ongoing pioneer habitat succession with birch colonisation leading to scrub development in places of former bare peat areas.

This trial has formed the basis for further targeted rehabilitation work on Ballycon Bog (2013), Lullymore (2014) and Cavemount (2015).

Kilmacshane Bog: rehabilitation of cutaway bog and establishment of wetland species

Kilmacshane Bog contains large areas of former production bog that are subject to the seasonal fluctuations of the River Shannon. The trial areas selected within Kilmacshane Bog are representative of the future cutaway bogs along the Shannon corridor that will be prone to seasonal inundation. The site is sufficiently dry during the growing season but wet during the winter months. A number of trials have been instigated here with the main aim of establishing vegetation cover on bare peat.

Three main trials were used here:

Crop trials (2010):
Crop trials were developed using the "nurse crop" principle where a crop is sown and fertilised in order to provide shelter for more naturalised vegetation to become established. Reed Canary Grass and Triticale were both selected as the nurse crops and received a once off application of fertiliser similar to the work in Drumman.

Reed trials (2013):
Reed trials where reed seed (reedmace, *Typha latifolia* and common reed *Phragmites australis*) was collected from established wetlands offsite and stored before being sown at the correct time of year.

Seed trials (2013):
Seed was collected along the high water mark on established wetland sites and then spread on the cutaway bog. The seed mix comprised many wetland species including sedges, reed and rushes.

Results have been mixed to date with vegetation becoming established on former areas of bare peat. The crop trials worked best with the nurse crops allowing the establishment of wetland vegetation species including marsh arrow grass, mint and bulbous rush. The reed trials have not established widespread vegetation cover, possibly due to the site drying out during the summer months and/or seed viability. Issues that have been highlighted include control of the water levels to allow more water to stay on site during drier periods, grazers such as Irish hare have also had an impact on the developing vegetation. It should be noted that Kilmacshane Bog is host to large numbers of Whooper Swans in the winter months with the highest numbers in Ireland recorded from the bog in the winter period 2014/2015.

These trials have provided a great deal of information in relation to developing vegetation in difficult environmental conditions and they will continue to be monitored into the future.

Kilberry Bog:
Sphagnum farming

There has been significant interest in recent years in a number of countries in farming *Sphagnum* to produce sustainable growing media for horticulture and other applications such as *Sphagnum* inoculation during bog restoration to increase diversity, re-establish peat bog vegetation and enhance restoration outcomes. A wide range of research has been carried out in several countries including Canada, Germany, UK and Estonia.

Sphagnum can be grown in suitable environmental conditions in degraded peatlands such as cutaway peatlands using paludiculture methods (production under wet conditions) as shown in Canada and Germany. With this in mind, the Bord na Móna Ecology Team established a trial at Kilberry Bog in County Kildare with the Bord na Móna Innovation Team to investigate the ability of different *Sphagnum* species to colonise and grow in suitable Bord na Móna deeper remnant peat cutaway.

Two different *Sphagnum* growth trials were set up in 2012 and 2013. Both trials implemented similar techniques as used in Canada and Germany to inoculate *Sphagnum* on cutaway bog. This involved site preparation (re-wetting), *Sphagnum* collection from a donor site, spreading *Sphagnum* fragments on the trial site and spreading straw mulch over the *Sphagnum* fragments to help water retention and protection of fragments from desiccation during colonisation. Care was taken to attempt to mimic the conditions of pioneer *Sphagnum*-dominated communities that have developed naturally in Bord na Móna cutaway thorough site selection.

The 2012 trial was set up with 24 5 m x 5 m plots in total. Five different *Sphagnum* species (*S. capillifolium, S. papillosum, S. magellanicum, S. subnitens* and *S. cuspidatum*) were used (and one blank plot). In addition there were 2 treatments, plots with straw and plots without straw. Fourteen plots were set up in 2013 (2.5m x 2.5m in size) testing 6 species (*S. capillifolium, S. subnitens, S. magellanicum, S. papillosum, S. cuspidatum* and *S. palustre*) with one blank and one replication ((6 + 1) x 2). All plots were covered in straw mulch.

Inundation during summer 2012 eventually destroyed half (12) of the original plots set up in 2012. Growth and establishment in the remaining 2012 plots has been relatively slow and only half of the plots with straw established some *Sphagnum* cover. The overall *Sphagnum* cover has also been quite low (generally < 1% with 2 plots reaching about 5% in 2015). Other vegetation has been colonising the plots (Bog Cotton, Rushes, weeds from the straw etc.) and some plots are now quite well vegetated (50-80% vegetation cover). Only 1 out of 12 plots in 2013 did not have some *Sphagnum* colonisation in 2015. However, general percentage *Sphagnum* cover values were relatively low (< 1% - 4%) in 2015. One plot (*S. palustre*) was the exception with relatively good colonisation and growth after the first year (10% cover) and continued relatively high cover in 2015 (~20% cover).

Summer inundation in 2012 and winter inundation in 2012/13 and 2013/14 has probably been the biggest constraint hindering the initial establishment of plots. Inundation acted by washing away the inoculating fragments of *Sphagnum* and the protective straw mulch. Relatively dry and hot periods such as in summer 2013 have also meant that the water levels dropped significantly, which is likely to have had a negative impact on colonisation and growth, although some *Sphagnum* has been able to survive and grow. Other environmental constraints to *Sphagnum* establishment at this site include the environmental characteristics of the residual peat. The average pH of the ground-water in the dip-wells was 6.0 in the initial dipwells and 5.3 in the newer dipwells with the average electrical conductivity being 104 µS. Sites with higher pH tend to be suited to development of poor fen and other habitats.

It would seem that the residual peat at the site in Kilberry is somewhat too decomposed and has a relatively high pH indicating that it is not optimally suited for raised bog *Sphagnum* restoration. The relatively high pH and conductivity is likely to be due in part to influence of the underlying limestone-based gravel sub-soils and the exposed fen peats. The site at Kilberry reflects the type of environmental conditions and constraints that would be found at some other potential deeper peat Bord na Móna cutaway sites. However, these sites have relatively variable remnant peat depths and environmental characteristics due to site variability, intensity of peat production etc.

Further trials will be established using a different sites in the period 2016-2021.

Understanding the GHG balance in restored and rehabilitated peatlands

Peatlands are globally important in terms of greenhouse gas (GHG) emissions as it is estimated that they comprise up to 30% of the total global soil carbon pool*. As peatlands develop, the build-up of plant and animal remains creates a store of carbon in a waterlogged and anoxic environment. Because of this waterlogged condition, there is limited scope for microbes to break down the peat and release carbon dioxide.

When peatlands are drained, carbon is released mainly in the form of carbon dioxide and is also lost as dissolved organic carbon (DOC). This is also true for Irish peatlands and the role of managing Ireland's peatlands has been highlighted in the National Peatlands Strategy (2015) as being important for future carbon accounting at a national level.

Most of the Bord na Móna bogs have been drained at some point. Where possible Bord na Móna is restoring raised bogs to peat forming conditions – stopping further release of carbon dioxide and in time restoring the carbon sequestration function of the bog. Bord na Móna is also funding research into determining the rate at which this switch occurs, and a project monitoring GHG emissions from a restored bog (Moyarwood in East Galway) was established in 2013, and is expected to continue to 2018.

Two GHG monitoring projects have also been carried out to inform rehabilitation measures on cutaway bogs – one in the rehabilitated Oweninny Bogs and one in a rehabilitated cutaway bog in Blackwater Bog (West Offaly). Both studies show that rewetting of the cutaway and establishment of wetland habitats such as poor fen and reed bed, reduces carbon dioxide emissions and leads in time to carbon sequestration.

Each of the studies has informed national carbon accounting measures carried out by the EPA, and Bord na Móna's Carbon Working Group established in 2009, tracks policy developments and accounting approaches in consultation with the EPA Climate Action team.

Monitoring GHG at Blackwater reed bed (2011-2015).

Dr David Wilson monitoring GHG at Moyarwood Bog, (bog restored 2012).

The key actions relating to GHG monitoring listed in this plan are:

*__Continue to monitor GHG emissions__ from restored raised bog at Moyarwood Bog (Derrydoo Woodlough complex) up to 2018

*__Support and develop GHG monitoring projects__ on woodland habitats developing on cutaway bog

*__Work with the research team in Trinity College Dublin__ on the current EPA funded project "A framework for the restoration of Irish peatlands" and continue to work with National Parks and Wildlife Service on the restoration practices for the NATURA 2000 raised bog network; this will include hydrological assessment of rehabilitation measures and options for cutaway bog areas

*The total amount of carbon stored in global peatlands and in global soils are both subject to considerable uncertainty and wide ranges of estimates. Estimates of soil carbon range up to 3,000 Gt C, but most recent estimates are in the range 1500-2000 Gt C. Estimates of carbon in peatlands stretch up to 600 Gt C, but International Peatland Society and Wetlands International figures are probably in the range 400-450 Gt C.

Peatlands are globally important in terms of greenhouse gas (GHG) emissions as it is estimated that they comprise up to 30% of the total global soil carbon pool


Conversation.

3.4

Objective 4

Raise Awareness and Create a Greater Appreciation of the Biodiversity and Natural Heritage of Bord na Móna Cutaway Bogs and Associated Lands

A considerable part of the Bord na Móna Biodiversity Action Plan 2010-2015 has focussed on communication and creating awareness of the value of biodiversity, and the benefits of rehabilitation and restoration of the Bord na Móna bogs. This work will continue under the next planning phase and ranges from local to international levels.

The work to date of the Ecology Team and in particular the interaction with the wider Bord na Móna community has demonstrated the significant role that biodiversity and rehabilitation plays in our day to day business.

This interaction ranges from regular updates to senior management, peat operations managers and regular contributions to the employee magazine and company intranet.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

NATIONAL

Organisation of annual Biodiversity Action Plan review days incorporating presentations and field trips to rehabilitated sites (November 2011 Ballinasloe and Cuckoo Hill Bog; January 2013 Lough Boora Discovery Park; December 2013 Tullamore and Mountlucas wind farm; February 2015 Athlone and Ballydangan Bog)

Input to Irish Peatland Society annual events (Abbeyleix Bog 2009, *Peatlands – a new conversation* 2015) and other national conferences (such as *Natural Capital – Ireland's Hidden Wealth* 2014, *Environment Ireland* 2014)

Key Performance Indicators (continued)

Organisation and co-ordination of Lough Boora Bioblitz 2012 and associated biodiversity events over a 24 hour period (May 2012); support of Abbeyleix Bioblitz 2013

Development of a leaflet about the Bord na Móna Raised Bog Restoration programme outlining how the bogs are restored and the extent of the sites (2015)

Input to national media focusing on biodiversity projects – print (Bord na Móna *Source* magazine for employees, *Irish Times*, *Independent*, regional newspapers), radio (*Mooney Goes Wild*, regional and local stations) and television (Nationwide, Eco-Eye, RTÉ news, TG4 news)

Circulation of Bord na Móna Biodiversity Action Plan 2010-2015 to statutory and non-statutory consultees and to local and regional libraries; development of Bord na Móna Biodiversity webpages as part of the company website.

delivery of ecology training programme to peat production managers and those involved in bog operations

Input to Heritage Plans – national and county levels - through active participation on heritage fora; input and participation in other groups such as Woodlands of Ireland, Chartered Institute of Ecology and Environmental Management (CIEEM), etc.

Development of signage for selected biodiversity area (ongoing)

Direct ecological input to development of Lough Boora Discovery Park centre and provision of website material

INTERNAL

Co-ordination and delivery of an annual ecology training programme to Bord na Móna peat production managers and those involved in bog operations

Regular contributed articles to company magazine *Source*, input to annual and sustainability reports and online company intranet

INTERNATIONAL

Presentations about Bord na Móna Biodiversity Action Plan at seminars and workshops at international levels (includes International Peat Congress 2012 in Stockholm, IPS Annual Assemblies Finland 2010, Quebec 2011, Netherlands 2013, Riga 2014; Society of Ecological Restoration meetings France 2010, Finland 2014 and UK 2015, IUCN Peatlands event Inverness 2014)

Contributions to Food and Agriculture Organisation of the United Nations (FAO) and IUCN UK Peatland project publications on peatland restoration and biodiversity

COMMUNITY

Presentations and field trips with primary, secondary and third level education classes.

Organisation of biodiversity walks and talks for Biodiversity weeks 2010-2015, Heritage weeks 2010-2015, Offaly Naturalists' Field-club, Dublin Naturalists' Field-club and a range of other communications at local level

Development of Lullymore wetlands in association with Lullymore Heritage and Discovery Park, Co. Kildare

Co-ordination and chairing of Abbeyleix Bog Technical Advisory Group (TAG)

Member of Ballydangan Red Grouse project stakeholders group (South Roscommon) – sponsorship of project as well as ongoing practical assistance

Working with special interest groups such as Butterfly Conservation Ireland, Wetlands Heritage Ireland and community groups such as local game clubs to facilitate access to Bord na Móna bogs and develop partnership agreements

Member of the Community Wetlands Forum (2015 to present)

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Develop and promote a biodiversity awareness-raising campaign within Bord na Móna
and to the wider public of the biodiversity value of the Bord na Móna bogs

Identify and promote further accessible sites of biodiversity conservation interest
on Bord na Móna bogs

Promote increased participation in the conservation of our natural heritage
by supporting community-led biodiversity projects such as the Lullymore Heritage and Discovery Park, Ballydangan Red Grouse project, Wetlands Heritage Ireland, Abbeyleix Bog project and/or other walkways/amenity projects

Consult with relevant bodies and interested parties on a regular basis
to communicate updates in the biodiversity work programme and also to identify potential partnership projects within the Bord na Móna bog and adjacent lands

These actions will require ongoing work including:

Promote community engagement
in relation to the full range of Bord na Móna's business activities, highlighting biodiversity and eco-tourism aspects

Continue to organise an annual seminar and/or workshop with a field trip
to present updates on the Bord na Móna biodiversity work programme outlined in the Biodiversity Action plan to relevant bodies and interested parties

Circulate the next Biodiversity Action Plan 2016-2021
to all relevant bodies and interested parties; make an electronic copy available on-line

Re-develop the Bord na Móna website biodiversity pages
with an overview of all projects carried out to date with information and details on access to sites

Develop a Bord na Móna Biodiversity Facebook page
to share photos and updates on survey and rehabilitation work

Work with other agencies to develop fact sheets and best practice guidelines
based on the biodiversity of the Bord na Móna bogs, but also with a view to the wider national biodiversity resource

As new biodiversity sites are identified, establish appropriate signage
at biodiversity areas with information on biodiversity features, management and projects at each site

Promote Bord na Móna policy of wildlife conservation/protection
on Bord na Móna bog areas


Butterfly orchid


Bee orchid


Fragrant orchid


Spotted orchid

Facilitate areas where people can **access** the Bord na Móna bogs

Walking trail at Lough Boora Discovery Park.

Participate in Heritage fora organised by local authorities
and other biodiversity working groups for the counties within which Bord na Móna operates

Contribute articles to local and national media;
participate and present in workshops and conferences relating to heritage, biodiversity and other areas of relevance

Contribute biodiversity related articles to Bord na Móna media,
such as the company magazine (*Source*) and the intranet; arrange biodiversity awareness days and training opportunities in the form of workshops for bog operatives and managers; develop a biodiversity factsheet for all Bord na Móna employees

Organise field trips and workshops for the public

Continue to engage with relevant bodies and interested parties including:
Government Departments, National Parks and Wildlife Service, National Biodiversity Data Centre, Environmental Protection Agency, Fishery Boards, County Councils, Coillte, Irish Farmer's Association, Heritage Council, BirdWatch Ireland, Irish Peatland Conservation Council, Butterfly Conservation Ireland, Irish Peatland Society and Woodlands of Ireland, and other NGO's, local and national media, research and educational institutions (primary, secondary and third level) as well as the local landowners and communities that live in close proximity to the bogs

Interact with local communities and schools to identify potential local needs
and projects in terms of amenity, education and/or biodiversity areas

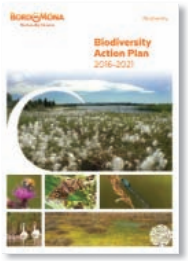
Organise field trips and workshops for the public in conjunction with
established Biodiversity and Heritage programmes; explore the development of a Bord na Móna Bioblitz event annually to highlight biodiversity in different bog areas

Facilitate areas where people can access the Bord na Móna bogs
and selected biodiversity areas, such as Lough Boora Discovery Park and other walkways initiatives

Develop a primary schools biodiversity education system
promoting awareness of biodiversity across Ireland which will include biodiversity on Bord na Móna lands (PILOT running Jan – June 2016, with further roll-out to 150 schools in Sept 2016 and building over a 5 year period)

Work with the An Taisce Green Schools initiative
This will involve corporate sponsorship of the Biodiversity section of the first Green Schools Expo in February 2016, as well as providing peatland biodiversity expertise at the expo for schools (general peatland biodiversity information and careers advice)

Key Indicators of Success



The key indicators of success of these actions will be:

Increased awareness of biodiversity within Bord na Móna and in the wider local and national community

Archive of biodiversity related articles submitted to all relevant media to be included on Bord na Móna biodiversity website

An established and mapped network of selected biodiversity areas and walking and/or cycling routes with signage and relevant printed information about Bord na Móna and biodiversity

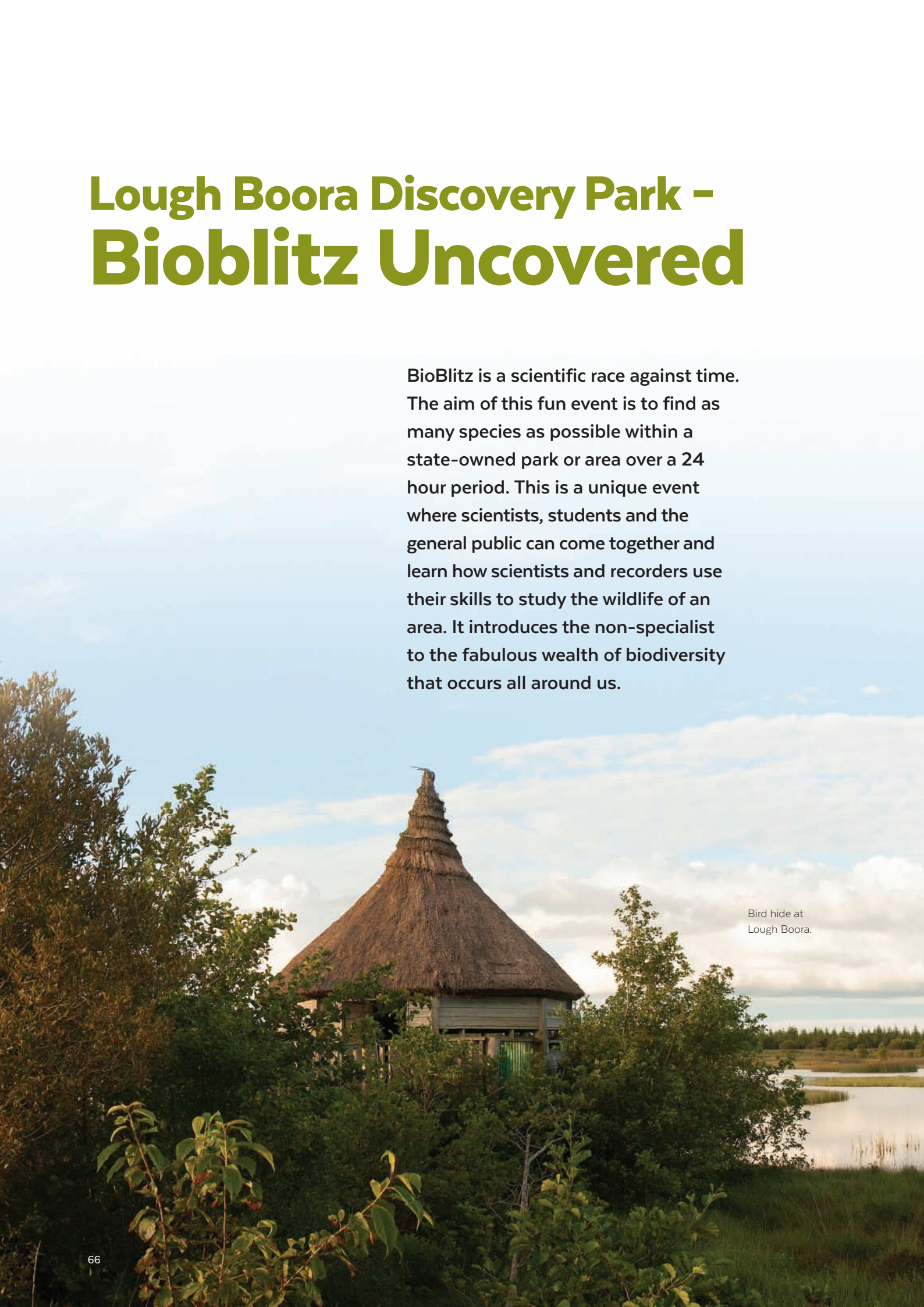
Increased access and visits to selected Bord na Móna biodiversity areas

Biodiversity awareness projects established with local schools and communities and/or other interest groups

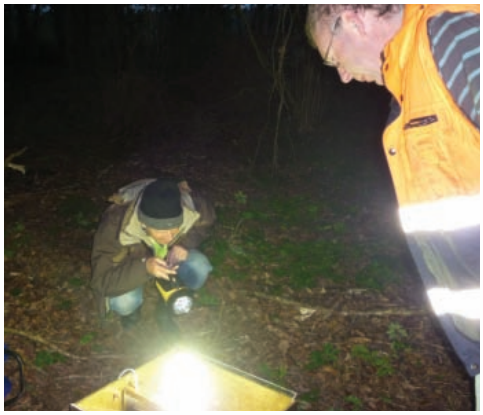
Ongoing consultation with relevant bodies and interested parties

Lough Boora Discovery Park – Bioblitz Uncovered

BioBlitz is a scientific race against time. The aim of this fun event is to find as many species as possible within a state-owned park or area over a 24 hour period. This is a unique event where scientists, students and the general public can come together and learn how scientists and recorders use their skills to study the wildlife of an area. It introduces the non-specialist to the fabulous wealth of biodiversity that occurs all around us.



Bird hide at Lough Boora.



The Lough Boora BioBlitz 2012 was a great success with many more species recorded than had been expected, with a huge turnout of professional scientists and high public participation. Nine hundred and forty species were recorded on the day, including 334 vascular plant species which was more than any other BioBlitz 2012 site. The success of the event was largely due first and foremost to the biodiversity of the rehabilitated cutaway but also to the close collaboration and hard work of a number of organisations including Bord na Móna staff from a range of businesses, the National Biodiversity Data Centre, Offaly County Council, National Parks and Wildlife Service, Coillte, Bat Conservation Ireland, Butterfly Conservation Ireland, Moths Ireland, BirdWatch Ireland, BSBI, Irish Wildlife Trust, Inland Fisheries Ireland, staff and members of NUI Galway and a number of independent ecologists.

Some of the public events over the 24 hour period included a Bat Walk on the Friday night, a Dawn Chorus led by BirdWatch Ireland, a mammal identification workshop, a moth capture demonstration, a display of aquatic creatures by Inland Fisheries Ireland and a schools wildlife art competition for primary school students local to the area.

For more information see:
www.bioblitz2012.biodiversityireland.ie

Following the success of the 2012 Bioblitz, and a similar event held on Abbeyleix Bog in 2013, Bord na Móna will explore the development of a Bord na Móna Bioblitz event annually to highlight biodiversity in different bog areas

Nine hundred and forty species were recorded on the day, including 334 vascular plant species which was more than any other BioBlitz 2012 site.

Community-Led Wetland Projects

Local communities living on the edges of the Bord na Móna bogs are the inspiration for a range of projects and initiatives. In the period 2010-2015, a number of community-led biodiversity and wetland projects have come to fore and Bord na Móna has provided support where possible. Projects such as the work of Wetlands Heritage Ireland and the Abbeyleix Bog Conservation Project have been significant developments and continue to develop with time.

Wetlands Heritage Ireland is led by the local Keenagh community in County Longford and their interest is largely focussed on the area around the Corlea Trackway Interpretive Centre. Bord na Móna is working with the group to develop further educational and experiential facilities around the existing centre and these will progress in the period 2016-2021. This community project is aligned with the Mid Shannon Wilderness project currently being developed by Longford County Council and partners.

Abbeyleix Bog Conservation project in County Laois is led by local Abbeyleix community representatives. After completion of a comprehensive drain blocking programme in 2009, Bord na Móna leased the site to the local community and continues to provide support to the community through chairing of the bog Technical Advisory Group in conjunction with staff from the National Parks and Wildlife Service, Laois County Council and IPCC. The project is viewed nationally as a best practice case study for the future successful management of bog conservation and restoration sites in Ireland.

Two projects with potential for development between 2016 and 2021 are the Ballivor Bog project in County Meath (bog conservation and amenity) and the new IRD Duhallow (Barna Bog – Hen Harrier conservation) project in County Kerry.

Lullymore Wetlands

Lullymore Heritage and Discovery Park is a community run project near Rathangan in County Kildare. The Park was officially launched in 1993 and tells the story of Lullymore and the bog which surrounds it through guided tours, interactive displays and exhibits. The story moves from bog formation to the arrival of Mesolithic settlers, to early Christian times through to the Irish Famine and Rebellion period, and also to the development and heritage of Bord na Móna and the boglands.

Since 2010, the Ecology Team has worked with the local Bord na Móna staff to develop a wetland area to provide a local educational resource for the group allowing them to tell their story and expand their tourism and amenity offering to national and international groups alike. This has resulted in a partnership project whereby a rehabilitated wetland and a typical Bord na Móna railway track has been laid and is now operated by the local staff. The site also supports a café and an indoor play area that encourages school children and parents to visit throughout the year.
www.lullymoreheritagepark.com

The Lullymore wetlands area itself is a larger area and is developing great interest locally and nationally from environmental groups such as Kildare BirdWatch Ireland branch and Butterfly Conservation Ireland (BCI). Part of the site is managed specifically for butterflies by BCI and is now established as a nationally significant site for butterflies and moths. Bord na Móna has zoned the site for biodiversity and it will continue to be monitored to document and inform future management.

Above: "Charlie's Boardwalk" at Lullymore.
Photo courtesy of Lullymore Heritage & Discovery Park.

Ballydangan Red Grouse Project

Red setters are used to count Red Grouse numbers on Ballydangan Bog.

Ballydangan Bog in County Roscommon is a midlands raised bog owned by Bord na Móna and is one of the sites included in the company's Raised Bog Restoration Programme (2009-present). Drainage ditches were installed on the 218 ha site in the early 1980s in preparation for industrial peat production, but no further work carried out as the bog was deemed surplus to requirements.

While Red Grouse numbers have remained stable since the project began, three pairs of Eurasian Curlew *(Numenius arquata)* have successfully bred on the site.

In 2009 the local community groups living around the bog became aware that the local population of Red Grouse (*Lagopus lagopus hibernicus*) centred on Ballydangan Bog and neighbouring bog areas had dramatically declined and was on the brink of a local extinction. The Ballydangan Red Grouse project was established in 2009 and started with the local community leasing Ballydangan Bog from Bord na Móna. Following on from the production of a Red Grouse Management Plan the Department of Social Protection employed four full time local staff to facilitate the work which includes predator control, heather cutting and habitat management.

In September 2013 Bord na Móna began restoring the raised bog habitat, in tandem with the community efforts to maintain the local Grouse population. This involved a comprehensive drain blocking programme to rewet the site and over 3,744 peat dams were installed. The aim of the restoration work is to raise the water levels and facilitate the development of *active* raised bog areas. The rewetting will also improve the overall habitat for typical peatland bird species including the Red Grouse.

While Red Grouse numbers have remained stable since the project began, three pairs of Eurasian Curlew (*Numenius arquata*) have successfully bred on the site. Translocation efforts to relocate Red Grouse birds from a stable population in another county to Ballydangan were attempted in 2014 and 2015 with little success to date.

Below: Ballydangan Bog is frequently used by local schools.

Measurement.

3.3

Objective 5

Monitor the Progress of the Bord na Móna Biodiversity Action Plan

One of the many highlights for the Ecology Team over the course of delivering on the Bord na Móna Biodiversity Action Plan 2010-2015 has been the annual review days. From humble beginnings in the Tullamore Court Hotel at the launch of the plan by the late Éamon de Buitléar (1930-2013) in November 2010, the annual review days now attract academics, scientists, planners, practitioners, consultant ecologists, local community members and Bord na Móna employees from a range of interests.

Each day presented an opportunity to present the work of that year and to outline the course of work for the coming year, with the participation of consultees and interested parties.

The Biodiversity Action Plan 2016-2021 covers a six-year period that will be updated in 2021. In terms of monitoring the outputs of the plan this will be carried out in a similar way – with an annual review and an update of the Biodiversity Action Plan in the period 2020 to 2021 for the next planning phase. As with any plan over a six year period, at varying times aspects within the plan will be prioritised, coming to the fore while also new aspects are identified. This reflects the importance of the annual review to ensure that new perspectives, new approaches and new concerns – locally, nationally and internationally - are incorporated into the plan.

Key Performance Indicators

Some of the key performance indicators in the period 2010-2015 were:

To date, all of the actions outlined in the Bord na Móna Biodiversity Action Plan 2010-2015 were acted upon and implemented, or are currently in development and carried over into the next planning phase

Organisation of the annual Biodiversity Action Plan review days provided an opportunity for a wide range of consultees to query the ongoing activities and the progress being made against each of the objectives. This allowed for the Ecology Team to amend and/or adjust focus as views and perspectives change

A rigorous process has been adopted for the development of the 2016-2021 plan including internal, external and public consultation phases to ensure all relevant opinions and experience are considered

Building on this work the following actions can be outlined for the period 2016-2021.

Actions

Evaluate compliance by Bord na Móna with relevant legislation and development of biodiversity policy

Evaluate outcome of actions relating to ecology baseline survey and other surveys

Evaluate outcome of actions relating to rehabilitation plans,
trials and implementation of rehabilitation plans

Evaluate the outcome of actions relating to the awareness raising objective

Evaluate the process of developing the next Biodiversity Action Plan
and integrate lessons learned from each planning cycle

The Biodiversity Action Plan Review Day in 2015 involved a number of workshops centred on the new plan for 2016-2021.

Measurement and monitoring the progress of the Biodiversity Action Plan:

Each action of the Bord na Móna Biodiversity Action Plan is underpinned by indicators of success and these will be used to measure the effectiveness of the work and indicate how new objectives and actions can be added to the next Biodiversity Action Plan(s).

The key indicators of success outlined for each of the four objectives will be measured by answering a number of questions such as: Were each of the stated actions carried out? How were they carried out? What was the outcome? Has there been advancement in expertise in terms of knowledge base, management practice and effectiveness of work carried out? Is there an increased awareness of biodiversity in Bord na Móna? Are the biodiversity web-pages being accessed by the public? Are people visiting the selected visitor access biodiversity areas?

Were each of the stated actions carried out? How were they carried out? What was the outcome?

*Develop specific targets, timeframes and metrics of success for each action where possible (based on temporal, qualitative and quantitative measures), and present at each annual Biodiversity Action Plan review day; consider an interim review of the progress halfway through the set timeline of the Biodiversity Action Plan 2016-2021

Review objectives and actions annually to reflect the increasing knowledge database and other trends in best practice and policy, re-prioritising as necessary.

Provide annual updates to relevant bodies and interest groups by means of seminars and workshops

*Commission an independent review of the delivery of the Objectives and Actions prior to the development of the next Biodiversity Action Plan 2022-2027

Key Indicators of Success

The key indicators of success of these actions will be:

A clear overview of the outcome of the Biodiversity Action Plan 2016-2021

An updated Biodiversity Action Plan for the period 2022-2027 with clear and measurable objectives building on the success of the Biodiversity Action Plan 2016-2021

Proven expertise in effectively carrying out rehabilitation work and managing Bord na Mona with best outputs for biodiversity

Site visits form an enjoyable part of the review days.
Photo courtesy of Irish Peatland Conservation Council.

4.0

Changing Landscapes and Changing Perspectives

In October 2015 Bord na Móna took a significant step in outlining its vision for a sustainable and profitable business for 2030. This vision is built upon changing perspectives and a continually changing landscape in terms of priorities and targets. A sustainable business is built by recognising equally the three pillars of sustainability – people, planet and profit.

From its initial development over 80 years ago, Bord na Móna has been a major driver of social and economic development in the midlands of Ireland and indeed the west of Ireland. The move to sustainable business now means that Bord na Móna is determined to further build on its longstanding support for communities. At the local community level it will be the un-tethered vision of communities living on the edges of the bog that will ignite the inspiration and creativity for the local attractions – spaces like the Lough Boora Discovery Park in County Offaly and other community led wetland projects. These projects and initiatives require sustained energy and commitment from Bord na Móna working closely at the same time with the communities involved.

A sense of what is already happening in terms of biodiversity is reflected in the numbers of species – 940 in total – recorded at the Lough Boora Bioblitz event in 2012. As well as that the huge popularity of the Lough Boora Discovery Park - where annual visitor numbers are now approximately 100,000 – reflects the widespread appreciation of that biodiversity and the space that the cutaway bogs provide. In terms of the ecosystem goods and services provided by just this one area, we are only beginning to understand how to value this rich natural capital and judge how we can continue to do so in areas where the returns support the necessary investment. Bord na Móna can set the standard in terms of how nature and economy can sustain each other, keeping local communities vibrant, but also keeping the species and habitats upon which we rely at sustainable population levels. Initiatives like the Natural Capital Coalition, the EU Business and Biodiversity platform, and Business in the Community play a role in leading businesses to value biodiversity and ensuring it is part of their annual accounting systems. Inclusive decision making, innovation in sustainable commercial activity and constantly endeavouring to increase our positive ecological footprint will be key to any sustainable business.

With all the knowledge and experience built up since the 1990s, the company is now a major driver in terms of peatland rehabilitation and restoration, and in valuing natural capital. As the company switches progressively to renewable energy, the need for the intensive and industrial production of peat will steadily decline. This will result in a significant land use change in Ireland, in both local and national terms. As soon as peat production stops in an area, natural processes coupled with targeted rehabilitation and informed management, work to transform the former bare peat to a rich tapestry of habitats. These areas can progress relatively quickly towards valuable assets for Ireland with multiple potential uses – habitats for species marginalised in the Irish landscape today, carbon stores and sinks to help reduce and offset national carbon emissions, space for renewable energy projects and niche commercial opportunities, rich cultural landscapes for artists and observers to be inspired and to create, and a platform for amenity and tourism facilities for people to enjoy these new landscapes. The Green Infrastructure will provide a lifeline for many critically endangered and vulnerable habitats and species, and provide mutual benefits for the people using these wonderfully biodiverse areas.

Each of these aspects of rehabilitation and management of the Bord na Móna bogs – ensuring environmental stabilisation of former peat production areas, creating self-sustaining habitats for viable species populations, connecting habitat and species networks, enhancing biodiversity, understanding the GHG implications for different habitats – will be addressed over the course of this biodiversity action plan.

Conclusion

The Biodiversity Action Plan 2010–2015 was a pioneering plan that delivered a number of key actions for Bord na Móna and biodiversity. The plan has been a key driver in determining the use of Bord na Móna's lands, and has succeeded in promoting and enhancing biodiversity while also creating awareness of the importance of this core value.

The Biodiversity Action Plan 2016–2021 builds on these significant achievements, and in the context of Bord na Móna's *Sustainability 2030* report, expands on our overall vision for biodiversity and related areas including natural capital, eco-tourism and greenhouse gas management. Part of this future will involve the integration of these activities with commercial and community use of the land within an overall strategic framework. This overall approach reflects the importance of the three pillars of sustainability - people, planet and profit - and Bord na Móna's role as stewards of the assets entrusted to it by the State.

Bord na Móna is fully committed to a sustainable approach to land use and will continue to work, with all its stakeholders, to deliver its strategic aims in accordance with this Plan.

The Biodiversity Action Plan 2016-2021 expands on our overall vision for biodiversity and related areas including natural capital, eco-tourism and greenhouse gas management.

Walking on the bog: Ballydangan Bog field trip (2014).
Photo courtesy of Irish Peatland Conservation Council.

Appendix I

List of Consulting Organisations

A

Abbeyleix Bog Community Group

An Taisce

B

Ballydangan Red Grouse Project

Barrow Trust

Bat Conservation Ireland

BCI: Butterfly Conservation Ireland

Bord na Móna: internal

BSBI: Botanical Society of the British Isles

Burren Beo Trust

BWI: BirdWatch Ireland

C

CELT

CIEEM: Chartered Institute of Ecology and Environmental Management

Coillte: Irish Forest company, semi-state company

Consultant Ecologists

Consultants: EACS, Earthy Matters, McCarthy Keville O'Sullivan, RPS, Tobins and others.

Countryside Alliance

Crossmolina Community Group

D

Dublin City Council

Dublin Naturalist's Field Club

E

EPA: Environmental Protection Agency

EU DG Environment

UN FAO

F

Forest Service

G

GET: Golden Eagle Trust

Girley Bog Group

Government Departments: Agriculture, Arts Heritage and Gaeltacht, Social Protection

H

Heritage Council: Local Heritage Officers

I

IFNC: Irsih Natural Capital Forum

Inland Fisheries Ireland

IMCG: International Mire Conservation Group

IPCC: Irish Peatland Conservation Council

IPS: International Peat Society

Irish Grey Partridge Conservation Trust

Irish Red Grouse Association

Irish Rural Link

IUCN

IWT: Irish Wildlife Trust

IT: GMIT, Limerick, Sligo, Waterford

K

Kildare Regional Gun Club

Kilteevan Community Council

L

Lanesborough Community

Local authorities (Councilors & Planners)

Lullymore Heritage and Discovery Park

M

Meath Westmeath Bog Group

Moore Gun Club

Mote Park Conservation Group

N

NARGC: National and Regional Gun Club

National Universities of Ireland: DCU, UCC, UCD, UCG, TCD, Maynooth

NBDC: National Biodiversity Data Centre

NBG: National Botanic Gardens

Newtowncashel Community Group

North Midlands Wilderness Park

NPBR: Irish National Platform for Biodiversity Research

NPWS: National Parks and Wildlife Service (Regional and Scientific staff)

Q

Queens University Belfast

T

Taghmaconnell Community Group

Teagasc

V

Vincent Wildlife Trust

W

WHI: Wetlands Heritage Ireland

Wetlands International

Wetlands Survey Ireland

WI: Waterways Ireland

Woodlands of Ireland

Others:

Monica de Bath
Artist

David Bellamy
Environmentalist

Michael Casey
Sculptor

John Feehan
Author and Environmentalist

Dick Warner
Journalist and Environmentalist

Paddy Woodworth
Author and Journalist

Appendix II

An Overview of the Bord na Móna Habitat Classification

General Pioneer Community	Pioneer Community	BnM Habitat Code	Nearest Phytosociological Syntaxa	Fossitt 2000 Classification	
	Bare peat (0-50% cover)	BP		Spoil and bare ground	ED2
Embryonic bog	Pioneer *Eriophorum angustifolium* community (acidic) *	PBa	Oxycocco-Sphagnetea	Bog	PB
	Sphagnum cuspidatum-Eriophorum angustifolium community*	PBb	Oxycocco-Sphagnetea	Bog	PB
	Embryonic bog community (somewhat more diverse and developed) *	PBc	Calluno-Sphagnion	Bog	PB
Poor fen	Pioneer *Campylopus* dominated community	pCamp	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus effusus* community	pJeff	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Eriophorum angustifolium* community (poor fen)	pEang	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus bulbosus* community	pJbulb	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Triglochin palustris* community	pTrig	Caricion curto-nigrae	Poor fen	PF2
	Pioneer *Juncus* with *Sphagnum**	pJunc	Sphagneto-Juncetum	Poor fen	PF2
Rich fen	Pioneer rich fen community with *Schoenus nigricans* (rudimentary rich fen)	Pschon	Caricetalia davallianae	Rich fen	PF1
	Pioneer *Carex viridula*/brown moss community (rich fen)	pVir	Caricetalia davallianae	Rich fen	PF1
	Pioneer *Cladium* community	pCladium	Caricion davallianae	Rich fen	PF1
Emergent wetland communities	*Carex rostrata* community (poor fen)	pRos	Cariculion rostratae	Poor fen	PF1
	Carex paniculata community	pPan	Caricetum paniculatae	Reed and large sedge swamps	FS1
	Phragmites australis community*	pPhrag	Scirpo-Phragmitetum	Reed and large sedge swamps	FS1
	Typha community*	pTyp	Typhetum latifoliae	Reed and large sedge swamps	FS1
	Schoenoplectus community	pSch	Scirpo-Phragmitetum	Reed and large sedge swamps	FS1
Open water/aquatic	Permanent pools and lakes	OW	Isoeto-Litorelletea	Dystrophic lakes	FL1
	Permanent pools and lakes	OW	Isoeto-Litorelletea	Acid-oligotrophic lakes	FL2
	Charaphytes	pChar	Charetea	Limestone/Marl lakes	FL3
	Temporary open water	tOW			
Woodland and scrub	Emergent *Betula*-dominated community (A)	eBir	Salici-Betuletum pubescentis	Scrub	WS1
	Open *Betula*-dominated community (B)	oBir	Salici-Betuletum pubescentis	Scrub	WS1
	Closed *Betula* scrub community (C)	cBir	Salici-Betuletum pubescentis	Scrub	WS1
	Ulex-dominated community	eGor		Scrub	WS1
	Betula-Salix woodland	BirWD	Salici-Betuletum pubescentis	Bog woodland	WN7

General Pioneer Community	Pioneer Community	BnM Habitat Code	Nearest Phytosociological Syntaxa	Fossitt 2000 Classification	
Heathland	Dry *Calluna* community	dHeath	Calluno-Ulicetalia	Dry heath	HH1
	Wet Heath community	wHeath	Narthecio-Ericetum	Wet Heath	HH3
	Dense *Pteridum*	dPter	Rhamno-Prunetea	Dense Bracken	HD1
Grassland	Dry calcareous grassland	gCal	Centaureo-Cynosuretum	Dry calcareous and neutral grassland	GS1
	Antoxanhthum-Holcus-Equisetum community	gAn-H-Eq	No close affinities to Irish syntaxa	Dry calcareous and neutral grassland	GS
	Dactylis-Arrhenatherum community	gDact-Arr	Arrhenatheritum elatioris	Dry meadows and grassy verges	GS2
	Molinia caerula-dominated community	gMol	Junco conglomerati-Molinion	Wet grassland	GS4
	Marsh - *Filipendula* and other tall herbs	Mar	Filipendulion ulmariae	Marsh	GM1
Disturbed	*Tussiligo*-dominated community (vegetation > 50%)	DisCF	Tussilaginetum	Recolonising bare ground	ED3
	Epilobium-dominated community (vegetation > 50%)	DisWil	Tussilaginetum	Recolonising bare ground	ED3
General	Riparian areas (streams or drains with associated edge habitats)	Rip			FW2/4
	Access (tracks or railways with associated edge habitats)	Acc			BL3

*indicates potentially peat forming habitat

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Appendix IV

Habitats and species of nature conservation value recorded from Bord na Móna sites

Table 1.
List of EU Habitats Directive Annex I habitats that have been found on Bord na Móna property.

Most habitats are found in cSACs/pNHAs already recognised for their conservation value and have already been listed as qualifying interests for these conservation sites (part owned by Bord na Móna)

Habitat	Fossitt Code	National	International	Examples
* Active Raised bogs (7110)	PB1	ECHR	EU HD Annex I	Clera Island Bog in Co. Roscommon (Clonboley Group); Townparks Bog (Daingean Bog NHA).
Degraded raised bogs still capable of regeneration (7120)	PB1	ECHR	EU HD Annex I	Clera Island bog in Co. Roscommon (Clonboley Group); Killamuck Bog (Abbeyleix Bog), Co. Laois.
Blanket Bog (*if active bog) (7130)	PB3	ECHR	EU HD Annex I	O'Boyle's Bog (Co. Mayo)
Depressions of the peat substrates of the Rhynchosporion (7150)	PB1	ECHR	EU HD Annex I	Several sites within bog remnants to margins of production areas.
*Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (7210)	PF1	ECHR	EU HD Annex I	Overlap with Fin Lough cSAC (Co. Offaly)
*Alkaline fens (7230)	PF1	ECHR	EU HD Annex I	Overlap with Fin Lough cSAC (Co. Offaly); some regeneration at Lullymore Bog, Co. Kildare
Transition mires and quaking bogs (7140)	PF3	ECHR	EU HD Annex I	Cranberry Lough bog (Cranberry Lough pNHA, Co. Roscommon)
*Bog woodland (91D0)	WN7	ECHR	EU HD Annex I	Clera Island Bog in Co. Roscommon (Clonboley Group)
*Petrifying springs with tufa formation (Cratoneurion) (7220)	FP1	ECHR	EU HD Annex I	Derryarogue Island in Co. Roscommon (Mountdillon Works)
Atlantic salt meadows (*Glauco-Puccinellietalia*) (1330)	CM1/CM2	ECHR	EU HD Annex I	Margins of Bangor-Ballycroy (Tullaghan Bay NHA, Co. Mayo)
Mediterranean salt meadows (*Juncetalia maritimi*) (1410)	CM2/CM2	ECHR	EU HD Annex I	Margins of Bangor-Ballycroy (Tullaghan Bay NHA, Co. Mayo)
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)	GS1	ECHR	EU HD Annex I	Likely to be present at Derryarogue Island in Co. Roscommon (Mountdillon Works)
* Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-padion, Alnion incarne, Salicion albae) (91E0)	WN4	ECHR	EU HD Annex I	Potential to be present on some riparian zones (not recorded yet)
European dry heaths (4030)	HH1	ECHR	EU HD Annex I	Present on some bog remnants

* Priority habitat - habitat types in danger of disappearance and whose natural range mainly falls within the territory of the European Union (Commission of the European Communities 2003)

Table 2.
List of EU Habitats Directive Annex II species that have been found on Bord na Móna property to date.

Species	National	International	Details
Soprano Pipistrelle (*Pipistrellus pygmaeus*) 1	ECHR, RDB (LC) & WA	EU HD Annex IV & Bern (II)	Large bat roost at Bord na Móna works, Boora, (Co. Offaly), Activity noted at other locations.
Common Pipistrelle (*Pipistrellus pipistrellus*)	ECHR, RDB (LC) & WA	EU HD Annex IV & Bern (II)	Activity noted around Bord na Móna property (Co. Offaly).
Leislers Bat (*Nyctalus noctula*)	ECHR, RDB (NT) & WA	EU HD Annex IV & Bern (II)	Roost in the Derrygreenagh bog group with activity noted around other Bord na Móna properties (Co. Offaly).
Daubenton's Bat (*Myotis daubentonii*)	ECHR, RDB (NT) & WA	EU HD Annex IV & Bern (II)	Activity noted around Bord na Móna property (Co. Offaly).
Otter (*Lutra lutra*)	ECHR, RDB (NT) & WA	EU HD, Annexes II, IV & Bern (II)	Frequently seen within Lough Boora Parklands. Activity at several other sites, including Lullymore, Lullybeg, Mayo bogs and others.
Pine Marten (*Martes martes*)	ECHR, RDB (LC) & WA	EU HD, Annexes II, IV & Bern (II)	Signs recorded at most sites.
Irish Hare (*Lepus timidus hibernicus*)	ECHR, SAP, RDB (LC) & WA.	EU HB Annex V & Bern (II)	Frequent user of cutaway and production bog. Regularly seen.
Red Squirrel (*Sciurus vulgaris*)	RDB (NT) & WA	Bern (III)	Recorded at numerous sites in counties Roscommon, Galway, Offaly and Kildare.
Hedgehog (*Erinaceous europaeus*)	RDB (LC) & WA	Bern (II)	Observed in some midland cutaway sites (Likely to be regular user of the cutaway and production bog).
Badger (*Meles meles*)	RDB (LC) & WA	Bern (III)	Frequent user of cutaway, production bog and intact bogs. Signs regularly recorded.
Fallow Deer (*Dama dama*)	RDB (LC) & WA	Bern (III)	Frequent user of cutaway, production bog and intact bogs.
Red Deer (*Cervus elaphus*)	RDB (LC) & WA		Frequently recorded in the Oweninny area.
Amphibians and Reptiles			
Common Frog (*Rana temporaria*)	RDB (II) & WA	EU HD, Annex V & Bern (II)	Frequent user of cutaway bog. Regularly recorded.
Common Newt (*Triturus vulgaris*)	RDB (LC), WA		Recorded at Lough Boora Discovery Park (Turraun), Lullymore/Lullybeg
Viviparous Lizard (*Lacerta vivipara*)	RDB, WA		Recorded at Lough Boora Parklands, Mayo bogs and intact bogs in Roscommon and Galway.
Invertebrates			
Marsh Fritillary (*Euphydryas aurinia*)	RS, VU	EU HD, Annex I	Butterfly species is using part of Lullybeg (Co. Kildare). Site managed by Butterfly Conservation Ireland, also located on a number of other sites across the midlands.
Large Heath (*Coenonympha tullia*)	RS, VU	EU HD, Annex I	Butterfly species using some areas of remnant raised bog.
Dingy Skipper (*Erynnis tages*)	RS, NT	EU HD, Annex I	Butterfly species using some cutaway sites, such as in Lough Boora Discovery Park.
White-clawed Crayfish (*Austropotamobius pallipes*)		EU HD, Annex II	Observed in watercourses in cutaway peatlands and watercourses adjacent to intact peatlands.
Fish			
Brook lamprey (*Lampetra planeri*)	RDB (LC)	EU HD, Annex II	Found in watercourses adjacent to bogs in some midland sites.
European Eel (*Anguilla Anguilla*)	RDB (CR)	OSPAR[7]	Found in some streams and lakes.

Species	National	International	Details
Plants			
Basil thyme (*Acinos arvensis*)	FPO RDB (VU)		Plant of eskers in midlands. Found at the Long Derries cSAC, Co. Offaly.
Blue Fleabane (*Erigeron acer*)	RDB (VU)		Plant of eskers in midlands. Recently recorded on disturbed glacial till and along railway embankments at cutaway bog sites in Co. Offaly.
Marsh Saxifrage (*Saxifraga hirculus*)	FPO RDB (EN)		Plant of wet bogs in west of Ireland. Recorded at Bellacorick Iron Flush (site owned by An Taisce).
Serrated Wintergreen (*Orthilia secunda*)	RDB (E)		Only known population remaining in the Republic of Ireland at Ballydangan Bog, Co Roscommon.
Alder Buckthorn (*Frangula alnus*)	RDB (R)		Plant of the edges of remnant raised bog, also found on some cutaway sites.
Bryophytes			*To be updated as ecology survey proceeds.*

Table 3.
List of Bird species that have been found on Bord na Móna property to date.

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Mute Swan	*Cygnus olor*	Y	Y		Amber	Regular breeder on larger wetlands
Bewick's Swan	*Cygnus columbianus*		Y	Y	Red	Recorded; now very rare
Whooper Swan	*Cygnus cygnus*		Y	Y	Amber	Internationally and nationally important numbers occasionally counted on Blackwater bogs (Galway/Offaly) and in Boora Parklands and associated bogs such as Lullymore and Ballycon (Offaly)
Bean Goose	*Anser fabilis*		Y			Rare winter visitor
Pink-footed Goose	*Anser brachyrhynchus*		Y			Occasional winter visitor
Greenland White-fronted Goose	*Anser albifrons flavirostris*		Y	Y	Amber	Occasional winter visitor
Greylag Goose	*Anser anser*	Y	Y		Amber	Feral breeding population around Boora; genuine wild birds regularly with wintering Whooper Swans
Canada Goose	*Branta canadensis*		Y			Occasional winter visitor
Barnacle Goose	*Branta leucopsis*		Y	Y	Amber	Occasional winter visitor
Shelduck	*Tadorna tadorna*		Y		Amber	Rare winter visitor
Wigeon	*Anas penelope*		Y		Red	Regular winter visitor
Gadwall	*Anas strepera*		Y		Amber	Occasional winter visitor
Teal	*Anas crecca*	Y	Y		Amber	Nationally important wintering numbers have been counted at Blackwater, Co. Offaly; scarce and localised breeder
Green-winged Teal	*Anas crecca carolinensis*					Vagrant – one Blackwater record
Mallard	*Anas platyrhynchos*	Y	Y			Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly [3]. Common regular breeder.
Pintail	*Anas acuta*		Y		Red	Nationally important wintering numbers have been counted at Blackwater, Co. Offaly [3]
Garganey	*Anas querquedula*				Amber	Rare passage migrant
Shoveler	*Anas clypeata*	S	Y		Red	Regular winter visitor; possible breeder
Pochard	*Aythya ferina*		Y		Red	Regular winter visitor
Tufted Duck	*Aythya fuligula*	Y	Y		Red	Regular, localised breeder; regular winter visitor
Scaup	*Aythya marila*		Y		Amber	Scarce winter visitor

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Long-tailed Duck	*Clangula hyemalis*				Red	Rare visitor
Goldeneye	*Bucephala clangula*		Y		Red	Scarce winter visitor
Smew	*Mergus albellus*			Y		Vagrant – one Leabeg record
Red-breasted Merganser	*Mergus serrator*					Scarce visitor
Red Grouse	*Lagopus lagopus hibernicus*	Y	Y		Red	Resident breeder on intact bog remnants
Grey Partridge	*Perdix perdix*	Y	Y		Red	Resident breeder at Boora
Quail	*Coturnix coturnix*	S			Red	Scarce summer visitor; not annual, but possible breeder
Pheasant	*Phasianus colchicus*	Y	Y			Common resident
Great Northern Diver	*Gavia immer*				Amber	Scarce winter visitor
Red-throated Diver	*Gavia stellata*				Amber	Scarce winter visitor
Leach's Storm Petrel	*Oceanodroma leucorhoa*				Red	Rare Vagrant (one record from Boora)
Cormorant	*Phalacrocorax carbo*	Y	Y		Amber	Regular visitor; non-breeding
Little Egret	*Egretta garzetta*		Y			Regular visitor; non-breeding
Grey Heron	*Ardea cinerea*	Y	Y			Resident breeder
Little Grebe	*Tachybaptus ruficollis*	Y	Y		Amber	Nationally important numbers occasionally recorded at Boora Parklands, Co. Offaly. Regular breeder confirmed
Great Crested Grebe	*Podiceps cristatus*	Y	Y		Amber	Localised but regular breeder
White-tailed Eagle	*Haliaaeetus albicilla*		Y		Red	Rare winter visitor
Red Kite	*Milvus milvus*				Amber	Scarce visitor
Black Kite	*Milvus migrans*					Rare Vagrant (one record from Tumduff)
Marsh Harrier	*Circus aeruginosus*			Y	Amber	Scarce passage migrant. Several birds have over-wintered at Boora Parklands in the past 10 years [6]
Hen Harrier	*Circus cyaneus*	Y	Y	Y	Amber	Regularly recorded throughout the year, included regular winter roosts. Breeding confirmed in C. Mayo.
Montagu's Harrier	*Cicus pygargus*					Rare Vagrant (one record from Tumduff)
Sparrowhawk	*Accipiter nisus*	Y	Y		Amber	Widespread resident breeder
Goshawk	*Accipiter gentilis*				Amber	Rare Visitor
Buzzard	*Buteo buteo*	Y	Y			Widespread resident breeder
Osprey	*Pandion haliaetus*			Y		Rare passage migrant
Kestrel	*Falco tinnunculus*	Y	Y		Amber	Widespread resident breeder
Hobby	*Falco subbuteo*					Rare visitor
Red-footed Falcon	*Falco vespertinus*					Rare Vagrant (one record at Timahoe)
Merlin	*Falco columbarius*	S	Y	Y	Amber	Scarce but regular winter visitor; breeding in some sites suspected
Peregrine Falcon	*Falco peregrines*	S	Y	Y		Regular visitor; breeding suspected
Water Rail	*Rallus aquaticus*	Y	Y			Localised but regular breeder
Moorhen	*Gallinula chloropus*	Y	Y			Widespread resident breeder
Coot	*Fulica atra*	Y	Y		Amber	Scarce, but possible breeder
Common Crane	*Grus grus*			Y		Vagrant – recorded at Leabeg and Ballycon
Black-winged Stilt	*Himantopus himantopus*					Rare Vagrant (one record from Finnamores)
Oystercatcher	*Haematopus ostralegus*		Y		Amber	Scarce winter visitor
Ringed Plover	*Charadrius hiaticula*	Y	Y		Amber	Localised but regular breeder
Golden Plover	*Pluvialis apricaria*	S	Y	Y (breeding)	Red	Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly; breeding suspected in Co. Mayo
American Golden Plover	*Pluvialis dominica*					Vagrant – one Blackwater record
Grey Plover	*Pluvialis squatarola*		Y		Amber	Rare winter visitor
Lapwing	*Vanellus vanellus*	Y	Y		Red	Nationally important wintering numbers occasionally recorded at Boora Parklands, Co. Offaly [3]. Also recorded at Lullymore (breeding). Localised but regular breeder

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Knot	*Calidris canutus*				Amber	Scarce passage migrant
Sanderling	*Calidris alba*					Scarce passage migrant
Little Stint	*Calidris minuta*					Scarce passage migrant
Temminck's Stint	*Calidris ferruginea*					Vagrant – one Turraun record
Dunlin	*Calidris alpine*	S	Y	Y (Breeding population)	Red	Regular passage migrant and scarce winter visitor; breeding possible in Co. Mayo
White-rumped Sandpiper	*Calidris fuscicollis*					Rare vagrant (one record from Boora Lake)
Long-billed Dowitcher	*Limnodromus scolopaceus*					Rare vagrant (one record from Boora Lake)
Ruff	*Philomachus pugna*		Y	Y	Amber	Scarce passage migrant and winter visitor
Jack Snipe	*Lymnocryptes minimus*		Y		Amber	Scarce winter visitor
Snipe	*Gallinago gallinago*	Y	Y		Amber	Widespread resident breeder reinforced by migratory winter visitors
Woodcock	*Scolopax rusticola*	Y	Y		Red	Localised but regular breeder; winter visitor
Black-tailed Godwit	*Limosa limosa*		Y	Y	Amber	Scarce passage migrant and winter visitor
Whimbrel	*Numenius phaeopus*					Passage migrant
Curlew	*Numenius arquata*	Y	Y		Red	Scarce and localised breeder; regular winter visitor
Common Sandpiper	*Actitis hypoleucos*	Y	Y		Amber	Localised but regular breeder
Green Sandpiper	*Tringa ochropus*		Y			Passage migrant
Spotted Redshank	*Tringa erythropus*		Y		Amber	Passage migrant
Greenshank	*Tringa nebularia*		Y			Passage migrant
Redshank	*Tringa totanus*	Y	Y		Red	Localised but regular breeder
Lesser Yellowlegs	*Tringa flavipes*					Rare Vagrant (two records at Clongawny)
Red-necked Phalarope	*Phalaropus lobatus*			Y	Red	Very rare but possible breeder
Grey Phalarope	*Phalaropus fulicarius*					Vagrant – one Derries record
Black-headed Gull	*Larus ridibundus*	Y	Y		Red	Regular but localised breeder; occasional winter visitor
Common Gull	*Larus canus*	Y	Y		Amber	Very scarce breeder.
Lesser Black-backed Gull	*Larus fuscus*		Y		Amber	Occasional, non-breeding visitor
Herring Gull	*Larus argentatus*		Y		Red	Occasional, non-breeding visitor
Great Black-backed Gull	*Larus marinus*		Y		Amber	Occasional, non-breeding visitor
Kittiwake	*Rissa tridactyla*				Amber	Rare visitor
Black Tern	*Chlidonias niger*					Rare Vagrant (one record from Drinagh)
Arctic Tern	*Sterna paradisaea*				Amber	Rare visitor
Common Tern	*Sterna hirundo*				Amber	Occasional, non-breeding visitor
Stock Dove	*Columba oenas*	Y	Y		Amber	Scarce and localised resident breeder
Wood Pigeon	*Columba palumbus*	Y				Common and widespread resident
Collared Dove	*Streptopelia decaocto*					Resident
Cuckoo	*Cuculus canorus*	Y				Localised but regular breeder
Barn Owl	*Tyto alba*	Y			Red	Scarce and localised resident; breeding possible
Snowy Owl	*Bubo scandiacus*					Vagrant – one Clonbonny record
Long-eared Owl	*Asio otus*	Y	Y			Localised but regular breeder
Short-eared Owl	*Asio flammeus*		Y	Y	Amber	Scarce winter visitor
Swift	*Apus apus*				Amber	Summer visitor; breeding possible
Kingfisher	*Alcedo atthis*	S	Y	Y	Amber	Occasionally recorded on cutaway sites (Turraun, Ballycon, Lullymore in Co. Offaly, Drumman, Co. Westmeath & Milkernagh, Co. Longford)
Magpie	*Pica pica*	Y	Y			Common and widespread resident
Jay	*Garrulus glandarius*	Y	Y			Recorded
Jackdaw	*Corvus monedula*	Y	Y			Common and widespread resident
Rook	*Corvus frugilegus*	Y	Y			Common and widespread resident
Hooded Crow	*Corvus corone cornix*	Y	Y			Common and widespread resident

Common name	Latin name	Breeding [1]	Wintering	EU BRq Annex I	BoCCI	Notes [2]
Raven	*Corvus corax*	Y	Y			Common and widespread resident
Goldcrest	*Regulus regulus*	Y	Y		Amber	Common and widespread resident
Blue Tit	*Parus caeruleus*	Y	Y			Common and widespread resident
Great Tit	*Parus major*	Y	Y			Common and widespread resident
Coal Tit	*Parus ater*	Y	Y			Common and widespread resident
Skylark	*Alauda arvensis*	Y	Y		Amber	Common and widespread resident
Sand Martin	*Riparia riparia*	S			Amber	Common and widespread summer visitor; large migratory roosts in reedbeds
Swallow	*Hirundo rustica*	Y			Amber	Common and widespread summer visitor
House Martin	*Delichon urbica*	Y			Amber	Common and widespread summer visitor
Long-tailed Tit	*Aegithalos caudatus*	Y	Y			Common and widespread resident
Chiffchaff	*Phylloscopus collybita*	Y	Y			Common and widespread summer visitor; occasional winter visitor
Willow Warbler	*Phylloscopus trochilus*	Y				Common and widespread summer visitor
Blackcap	*Sylvia atricapilla*	Y	Y			Common and widespread summer visitor; occasional winter visitor
Whitethroat	*Sylvia communis*	Y				Common and widespread summer visitor
Grasshopper Warbler	*Locustella naevia*	Y			Amber	Localised but regular breeder
Sedge Warbler	*Acrocephalus schoenobaenus*	Y				Common and widespread summer visitor
Treecreeper	*Certhia familiaris*	Y	Y			Common and widespread resident
Wren	*Troglodytes troglodytes*	Y	Y			Common and widespread resident
Starling	*Sturnus vulgaris*	Y	Y		Amber	Common and widespread resident
Blackbird	*Turdus merula*	Y	Y			Common and widespread resident
Fieldfare	*Turdus pilaris*		Y			Common winter visitor
Song Thrush	*Turdus philomelos*	Y	Y			Common and widespread resident
Redwing	*Turdus iliacus*		Y			Common winter visitor
Mistle Thrush	*Turdus viscivorus*	Y	Y		Amber	Common and widespread resident
Spotted Flycatcher	*Muscicapa striata*	Y			Amber	Common and widespread summer visitor
Robin	*Erithacus rubecula*	Y	Y		Amber	Common and widespread resident
Whinchat	*Saxicola rubetra*	Y			Red	Very rare summer visitor
Stonechat	*Saxicola torquata*	Y	Y		Amber	Common and widespread resident
Wheatear	*Oenanthe oenanthe*	Y			Amber	Regular passage migrant; very rare breeder
Dunnock	*Prunella modularis*	Y	Y			Common and widespread resident
House Sparrow	*Passer domesticus*	Y	Y		Amber	Common and widespread resident
Grey Wagtail	*Motacilla cinerea*	Y	Y		Red	Common and widespread resident
Pied Wagtail	*Motacilla alba*	Y	Y			Common and widespread resident
White Wagtail	*Motacilla alba ssp. alba*					Scarce passage migrant
Meadow Pipit	*Anthus pratensis*	Y	Y		Red	Common and widespread resident
Chaffinch	*Fringilla coelebs*	Y	Y			Common and widespread resident
Brambling	*Fringilla montifringilla*		Y			Scarce winter visitor
Greenfinch	*Carduelis chloris*	Y	Y		Amber	Common and widespread resident
Goldfinch	*Carduelis chloris*	Y	Y			Common and widespread resident
Linnet	*Carduelis cannabina*	Y	Y		Amber	Common and widespread resident
Redpoll	*Carduelis flammea*	Y	Y			Common and widespread resident
Crossbill	*Loxia curvirostra*	Y	Y			Scarce resident and winter visitor
Bullfinch	*Pyrrhula pyrrhula*	Y	Y			Common and widespread resident
Yellowhammer	*Emberiza citrinella*	Y	Y		Red	Scarce resident
Reed Bunting	*Emberiza schoeniclus*	Y	Y			Common and widespread resident

[1] Y indicates breeding confirmed, S indicates breeding probable.

[2] List compiled using records from Crowe (2005), Copland (2010a,b), Heery (2009) and internal Bord na Móna records. List likely to expand in future as more records are accumulated.

[3] Data from Crowe (2005).

[4] Data from Copland (2010a).

[5] Data from Copland (2010b) (Mayo).

[6] Data from Heery (2009).

[7] OSPAR Convention for the protection of the marine environment of the North-east Atlantic [1992]

Notes

Back cover photos:
Main image:
Whooper Swans.
Bottom row:
Lapwing eggs and nest; Devil's- Bit Scabious; Great Sundew and Lesser Bladderwort in bog pool.

Species-rich grassland in the Sculpture Park at Lough Boora.

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