

# **Bord na Móna**

**Lisclogher West Bog**

**Cutaway Bog Decommissioning and  
Rehabilitation Plan**

**2023**

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

*“The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.”*

*This licence condition requires Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Lisclogher West Bog upon cessation of peat production and compliments the licence requirement to decommission the site.*

**Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.

*Industrial peat production has now fully ceased at Lisclogher West Bog.*

*In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0501-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

*While this document outlines the enhanced rehabilitation measures planned for Lisclogher West bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the ‘standard’ requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the ‘standard’ rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.*

*Bord na Móna have defined the key rehabilitation outcome at Lisclogher West Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards raised bog restoration.*

*Any consideration of any other future after-uses for Lisclogher West Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.*

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## Table of Contents

1.	Introduction.....	1
1.1	Constraints and Limitations.....	2
2.	Methodology .....	4
2.1	Desk Study .....	4
2.2	Consultation .....	6
2.3	Field Surveys.....	6
3.	Site Description.....	7
3.1	Status and Situation.....	7
3.1.1	Site history.....	7
3.1.2	<i>Current land-use</i> .....	7
3.1.3	Socio-Economic conditions.....	8
3.2	Geology and Peat Depths .....	8
3.3	Key Biodiversity Features of Interest.....	9
3.3.1	<i>Current habitats</i> .....	9
3.4	Statutory Nature Conservation Designations.....	11
3.5	Hydrology and Hydrogeology .....	12
3.6	Emissions to surface-water and watercourses.....	12
3.7	Fugitive Emissions to air .....	14
3.8	Carbon emissions.....	14
3.9	Current ecological rating .....	15
4.	Consultation .....	16
4.1	Consultation to date.....	16
4.2	Issues raised by Consultees .....	16
4.3	Bord na Móna response to issues raised during consultation .....	16
5.	Rehabilitation Goals and Outcomes .....	17
6.	Scope of Rehabilitation.....	19
6.1	Key constraints .....	19
6.2	Key Assumptions .....	20
6.3	Key Exclusions.....	20
7.	Criteria for successful rehabilitation .....	21
7.1.	Criteria for successful rehabilitation to meet EPA IPC licence conditions:.....	21
7.2.	Critical success factors needed to achieve successful rehabilitation as outlined in the plan.....	25
8.	Rehabilitation Actions and Time Frame .....	27

8.1	Short-term planning actions (0-1 years).....	28
8.2	Short-term practical actions (0-2 years).....	29
8.3	Long-term (>3 years) .....	29
8.5	Budget and costing .....	30
9.	Aftercare and Maintenance.....	31
9.1	Programme for monitoring, aftercare and maintenance.....	31
9.2	Rehabilitation plan validation and licence surrender – report as required under condition 10.4 .....	32
10.	References .....	33
	Appendix I: A standard peatland rehabilitation plan to meet conditions of the IPC Licence .....	38
	APPENDIX II: Bog Group Context.....	41
	APPENDIX III: Ecological Survey Report.....	46
	APPENDIX IV. Environmental Control Measures to be applied to bog rehabilitation.....	49
	APPENDIX V. Biosecurity.....	50
	Appendix VI. Policy and Regulatory Framework .....	51
	APPENDIX VII. Decommissioning.....	59
	APPENDIX VIII. Glossary.....	62
	APPENDIX IX. Extractive Waste Management Plan.....	64
	APPENDIX X. Mitigation Measures for the Application of Fertiliser.....	68
	APPENDIX XI. Archaeology .....	69
	APPENDIX XII. Water Quality Monitoring Results For Lisclogher West Bog.....	72
	APPENDIX XIII. Forest to Bog Restoration. ....	75

## Non-technical summary

- Bord na Móna is planning to rehabilitate Lislogher West Bog, located in north-east Co Westmeath, approximately 4.3 km south-east of Delvin.
- It was drained in the 1980s but was never brought into industrial peat production.
- This rehabilitation plan has been prepared as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation typical of a raised bog community at Lislogher West. Drain blocking at Lislogher West will minimise pollution of downstream waterbodies. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the deep peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the development of naturally functioning raised bog habitat.
- The key objective is to re-wet and restore Lislogher West raised bog and to encourage Annex I active raised bog development (peat-forming habitat).
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and *Sphagnum* moss will thrive.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Lislogher West Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- Measures proposed for Lislogher West Bog include internal drain blocking and other measures required to raise water levels to the surface of the peat.
- Bord na Móna plan to carry out this work in 2023.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- It will take some time for active raised bog communities to fully develop at Lislogher West, and an active raised bog peatland ecosystem to be restored. However, it is expected that Lislogher West will be developing some active raised bog after 10 years given the occurrence of *Sphagnum* mosses at the site and the measures proposed.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Bord na Móna are currently developing a renewable energy project called Ballivor Wind Farm. This proposed project is in the planning stage, the planning application was submitted in April 2023. Lislogher West Bog had been initially included within the boundary of this project, although no renewable energy development or infrastructure has been proposed for the Bog.

- Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Peatland rehabilitation of these bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

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## 1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor-Derrygreenagh bog group (Ref. P0501-01). Lislogher West bog is part of this bog group (see Appendix II for details). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

*“The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.”*

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix VI).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

*Note: This plan should be read in conjunction with the accompanying Map book.*

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’ (PCAS). The additional costs of the Scheme will be supported by Government through the Climate Action Fund, and Ireland’s National Recovery and Resilience Plan administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have previously identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. The Scheme commenced in 2021.

Only the costs associated with the additional, enhanced and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the Scheme (PCAS) will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards



carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

It is envisaged that the Rehabilitation Scheme will support activities, interventions, or measures across the Bord na Móna cutaway peatlands which accelerate the original timelines. Selected rehabilitation measures will take account of site environmental conditions, which can vary significantly. These measures potentially include:

- more intensive management of water levels through pump management, drain-blocking and cell bunding;
- re-profiling that will deliver suitable conditions for development of wetlands, fens and bog habitats;
- targeted fertiliser applications;
- seeding of targeted vegetation; and
- proactive inoculation of suitable peatland areas with *Sphagnum*.

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels at peat surface  $\pm 10$  cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. In some areas of dry cutaway this trajectory will be significantly longer, and it is not feasible in the short-term to re-wet some areas. These areas will develop other habitats. The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised.

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g. Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

Lislogher West Bog is proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken.

## 1.1 Constraints and Limitations

This document covers the area of **Lislogher West Bog**.

There are a number of small, isolated areas of high bog along the margins, to the south of the bog that are subject to active turbary (within the area owned and under the control of Bord na Móna). These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Lislogher West Bog. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

The Royal County Aeromodellers Club has a lease area within the south of the site on a small area of old cutover bog. This area will be excluded from rehabilitation works.

Coillte have planted some cutover bog and high bog with Lodgepole Pine along the northern side of this bog. Coniferous forestry also occurs fringing the two parcels of bog south of the local road. It is not proposed to change or affect any conifer or commercial forestry via this scheme outside the BNM landholding. Some of the Pine planted on high bog is proposed for 'Forest to Bog' restoration subject to agreement with Coillte.

The proposed Ballivor Wind Farm is located adjacent to this site. This project is currently in pre-planning. This proposed wind farm project does not affect the scope of the rehabilitation. Lisclogher West Bog is outside of the development boundary of this project.

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## 2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the Scheme (PCAS). The development of this rehabilitation plan considered recently published guidance issued by the EPA in 2020 – ‘*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*’.

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2012 to 2021 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al.*, 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;
- Hydrological modelling; and
- The development of a Methodology Paper outlining the Scheme (PCAS)<sup>1</sup>. This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Derryshannoge Bog optimising climate action benefits.

### 2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best-practise guidance (full citations are in the References Section):

- Anderson *et al.* (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.

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<sup>1</sup> <https://www.bnmpcas.ie/supporting-material/>

- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford & Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Gann *et al.* (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al.* (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al.* (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al.* (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quilty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan, *et al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al.* (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al.* (2015). A Practitioners Guide to *Sphagnum* Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Ballivor Integrated Pollution Control Licence;
- Ballivor Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database ([www.epa.ie](http://www.epa.ie));
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;

- BirdWatch Ireland online data (including I-WeBS and CBS datasets; [www.birdwatchireland.ie](http://www.birdwatchireland.ie));
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database ([www.gsi.ie](http://www.gsi.ie));
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- Water Framework Directive catchments.ie/maps/ Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- OPW Indicative Flood Maps ([www.floodmaps.ie](http://www.floodmaps.ie));
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps ([www.cfram.ie](http://www.cfram.ie));
- River Basin Management Plan for Ireland 2022-2027
- Bord na Móna Annual Report 2021 & 2022.
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

## 2.2 Consultation

A number of stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

## 2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Lislogher West Bog was surveyed in July of 2012. A site visit was used to categorise any changes in habitat extent at Lislogher West in September 2021. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline surveys as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al.* (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follow identification keys published by the British Bryological Society (2010).

An ecotope survey was carried out at Lislogher West Bog in August 2022. The main objective of the field survey was to identify and map the ecotopes of the intact high bog and to identify any areas of active raised bog. High bog vegetation was described and mapped based on raised bog ecotope vegetation community complexes developed by Kelly *et al.* (1995) and outlined in Fernandez *et al.* (2014) with some adaptations. Ecotope mapping methodology followed Fernandez *et al.* (2014). Data was recorded using ArcGIS Field Maps on GPS enabled tablets. Ecotope community complexes were identified and mapped along with ecotope boundaries. During the ecotope survey cutover habitats were classified in accordance with the classification outlined in Smith and Crowley (2020), or where appropriate, the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). The results of the ecotope survey are set out in the accompanying ecotope survey report.

A detailed ecological survey report for Lislogher West Bog is contained in Appendix II.

### 3. SITE DESCRIPTION

Lislogher West is located in north-east Co Westmeath, 4.3 km south-east of Delvin. This bog is part of the Derrygreenagh (Ballivor) group of bogs. A minor road runs along the southern side of the site, forming the boundary in parts and also cutting off two smaller areas of high bog and associated habitats from the main bog. A second minor road delineates the eastern boundary and separates Lislogher West from Lislogher.

Lislogher West Bog was drained in the 1980s but was never brought into industrial peat production, therefore the bog has retained many of its natural raised bog features, although there has also been significant degradation and the high bog is dry with relatively deep field drains. Two thirds of the bog were burned in 2008, and more recent burning has occurred in the western section of the bog, south of the local road. As a result of burning the bog is quite dry and firm, with regenerating Heather the most prominent species across the bog. The western end is somewhat wetter and in better condition. There is active turf cutting around the margins at several locations.

The main bog is relatively narrow and elongated. An esker runs along the northern side of the bog and limits the extent of the basin for this bog. The majority of the margins have been abandoned or unmanaged for some time and extensive Birch woodland and mixed conifer woodland has developed on cutover bog.

One of the main topographical features of the main bog is the presence of some more recent conifer plantation, with Lodgepole Pine that extends in strips from the northern margin about midway along the bog. This conifer plantation is managed by Coillte. Several blocks have failed, and the trees are quite sparse with colonisation by Birch. However, the largest blocks are in relatively good condition. This plantation was planted in the 1980's and is at the un-thinned post-thicket stage.

See Drawing number BNM-DR-24-19-01: Bog Site Location, included in the accompanying Mapbook, which illustrates the location of Lislogher West Bog in context to the surrounding area.

#### 3.1 Status and Situation

##### 3.1.1 Site history

Lislogher West bog was ditched in the 1980s but was never brought into production.

Some of the marginal Birch woodland is particularly well-developed and Scot's Pine is a prominent feature of much of the woodland around the site. The 2nd edition OSI 6 inch map (prepared around 1910-20) maps most of the margins as conifer woodland, indicating that this woodland may not have developed naturally but was probably planted at some stage. This map also indicates that woodland or wooded sections on the high bog were more extensive in the past and some areas have been cleared or reverted back to high bog, indicating that there has been a relatively long history of forestry around this site.

##### 3.1.2 Current land-use

Some marginal areas to the northeast and south of the bog are used for private turbary, some within the Bord na Móna site boundary. Peat extraction is still carried out in the central section of the bog, south of the local road, with evidence of relatively recent turbary (within the past two years). During the survey part of the cutaway habitat in this area was in use as spread lands. Turbary areas are mapped as constraints in the accompanying Mapbook.

Bord na Móna are currently developing a renewable energy project called Ballivor Wind Farm. [Bord na Móna Wind Farm | Ballivor Wind Farm](#). This proposed project is in the planning stage, the planning application was submitted in April 2023. Lislogher West Bog is located outside of the Wind Farm development site boundary. The proposed renewable energy project will not impact on Lislogher West Bog.

### 3.1.3 Socio-Economic conditions

Bord na Móna has historically been a vital employer for the rural community of the Midlands of Ireland. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of Bord na Móna's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Lislogher West Bog, jobs included in the above study would have included those to facilitate the original ditching of this site.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through several initiatives, including Education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas.

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year). There are approximately 1400 people working in Bord na Móna at present. There are approximately 255 roles directly involved in PCAS.

## 3.2 Geology and Peat Depths

### 3.2.1 Sub-soil geology

The underlying geology of Lislogher Bog comprises Waulsortian limestone<sup>2</sup> to the west and Lucan Formation to the east; divided by a narrow band of Tober Colleen Formation in the centre. The site is underlain with both gravel and marl.

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<sup>2</sup> <https://dcnr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0>

### 3.2.2 Peat type and depths

Lislogher West still contains significant peat depths. Peat depths are largely 3-4 m.

## 3.3 Key Biodiversity Features of Interest

The majority of Lislogher West Bog within the Bord na Móna boundary consists of drained raised bog, as this bog was drained but never put into production and thus retains its vegetation however, there has been significant degradation, due to drainage and burning. Two thirds of the bog were burned in 2008, and more recent burning has occurred in the western section of the bog, south of the local road.

### 3.3.1 Current habitats

The most common vegetation communities present include (Categories in brackets refer to the Fossitt Code):

- Raised bog (PB1)
- Cutover Bog (PB4);
- Conifer plantation (on high bog and cutover bog, Coillte managed) (WD4);
- Birch woodland (WN7) (non-Annex) (on cutover bog dominated by Birch and/or Scot's Pine);
- Mixed broad-leaved/conifer woodland (WD2) (old plantations);
- Scrub (WS1) (on old cutover bog);
- Poor fen and flush (PF2) (part of high bog);
- Wet grassland (GS4);
- Hedgerows (WL1) (linear development of scrub along boundaries such as roads);
- Depositing stream/river (FW2);
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes);

An ecotope survey of Lislogher West was carried out in August 2022. The primary objective was to assess the baseline condition of the raised bog by mapping high bog ecotopes and identifying any areas of EU Habitats Directive Annex I Active Raised Bog (ARB) (7110) or Degraded Raised Bogs Still Capable of Natural Regeneration (DRB) (7120).

The majority of the bog does not have a well-developed micro-topography, lacking pools and hummocks. It is generally uniform, dominated by low heather, lacking *Sphagnum* mosses and is firm and dry underfoot. The western section of the bog, south of the road had a more natural raised bog topography including hummocks, and pools, although it had been recently burned.

Historical peat-cutting has taken place around the margins of the high bog and old cutover banks are evident along the northern and western margins of the bog. Some marginal areas to the northeast and south of the bog are used for private turbary, some within the Bord na Móna site boundary. Peat extraction is still carried out in the central section of the bog, south of the local road, with evidence of relatively recent turbary (within the past two years). During the survey part of the cutaway habitat in this area was in use as spread lands.

Drainage, burning, turbary and conifer plantations has had a significant negative impact on the quality of the high bog. The majority of the bog is considered raised bog of lower quality, with very dry conditions, a low water table



and with low *Sphagnum* cover. There are some small pockets of marginally better-quality areas present, in the western section of the site, with higher *Sphagnum* cover.

The site is characterised by several different ecotope communities, depending on topography, hydrology, and species composition. The Annex I habitat Active Raised Bog (7110) within the site is limited to a small area of sub-central ecotope and active flush, covering approximately <2 ha.

The remaining ecotopes recorded at Lislogher West Bog include sub marginal, marginal, facebank and inactive flush, which are all important supporting high bog habitat.

Approximately 13 ha of high bog conforms to the Annex I habitat *Degraded Raised Bog Capable of Natural Regeneration (7120)*, where if the hydrology can be repaired following rehabilitation, there is a reasonable expectation of re-establishing vegetation with peat-forming capability within 30 years. This area was determined by hydrological modelling undertaken using LiDAR imagery. This DRB overlaps with marginal ecotope.

A flush occurs in the western section of the bog, situated within the drained basin of Martinstown Lough. The outer margins of the flush are classified as inactive, due to low *Sphagnum* cover. The former basin of the lake is still evident, and the lowest section is quite wet and quaking, with higher *Sphagnum* cover. This area conforms to active flush and sub-central ecotope and is considered Annex I "Active Raised Bog".

The high bog is also surrounded by semi-natural habitats (mainly Birch woodland and scrub) that have developed on cutover bog. These add to the overall biodiversity value of the site and some of the woodland (WN7, non-Annex) is of particular ecological value as it is dominated by mature Scot's Pine and is particularly well-developed.

The invasive species *Rhododendron ponticum* was recorded in the western section of Lislogher West, with occasional small localised stands/individual plants recorded in the flush area.

See Drawing number BNM-DR-24-19-17: Current Habitat Map, included in the accompanying Mapbook, which illustrates the habitats at Lislogher West Bog.

#### *Faunal biodiversity*

The site is used occasionally by Hen Harrier and small flocks of Golden Plover in the winter (Biosphere Environmental Services 2014). The site is also used by breeding Snipe and Skylark.

Several bird species were noted on the site during previous surveys. Mallard, Buzzard, Snipe, Coal Tit, Blue Tit and Long-tailed Tit, Magpie, Blackbird, Pheasant, Grey Crow, Rook, Wren, Robin and Meadow Pipit have all been recorded.

Mammal species including Deer (most likely Fallow Deer), Badger, Irish hare, fox and mink have all been recorded in the bog or bog margins.



*Plate 3.1 Example of drainage ditches occurring within Lisclogher West, supporting Sphagnum mosses (May 2020).*



*Plate 3.2 Example of Birch dominated woodland and some Scot's pine at Lisclogher West (May 2020)*



*Plate 3.3 Example of degraded/dry heather Lisclogher West bog (August 2022).*



*Plate 3.4 Sub-central ecotope located in the active flush in the western section of the bog, formed in the basin of a former lake. (August 2022).*

### 3.4 Statutory Nature Conservation Designations

Lisclogher West has no overlapping designated sites. The nearest EU Designated sites to Lisclogher West Bog are as follows:

- River Boyne And River Blackwater SAC (site code: 002299) located 1.7km to the west,
- River Boyne And River Blackwater SPA (site code: 004232) located 2.5km to the south-west
- Mount Hevey Bog SAC (Site Code 002342) (also a pNHA) located approximately 10km south

In addition, there are a number of nationally designated sites (NHAs and pNHAs) in proximity to the bog:

- Lough Shesk pNHA (site code: 000556) located 6 km to the north
- Royal Canal pNHA (site code: 002103) lies 9.7 km south

- Mount Hevey Bog pNHA (site code: 002342) located approximately 10 km south

There are no Ramsar Sites in the local vicinity of Lisclogher West Bog (i.e. within 3km).

See Figures BNM-DR-24-19-23: Lisclogher West Bog Proximity to Designated Sites in the accompanying map book.

### 3.5 Hydrology and Hydrogeology

Lisclogher West bog forms part of the Boyne Catchment (Catchment ID: HA 07) as defined by the EPA under the Water Framework Directive (WFD) and is situated within the Boyne\_SC\_050 Sub-Catchment. Lisclogher West bog is drained by both the Cartenstown Stream, (historically diverted and now flowing along the southern boundary of Lisclogher), and the Bolandstown stream, located along southern boundary of the bog, and their associated tributaries. These primarily drain in an easterly direction towards the River Boyne. Lisclogher West Bog has a gravity-based drainage system.

GSI data indicates that the underlying geology of Lisclogher Bog comprises Waulsortian limestone<sup>3</sup> to the west and Lucan Formation to the east; divided by a narrow band of Tober Colleen Formation in the centre. The majority of the bog is classified as a Locally Important Aquifer (Bedrock which is Moderately Productive only in Local Zones). There are also no mapped karst features within the surrounding area.

Quaternary Sediment maps show Lisclogher West underlain by peat. A narrow Esker ridge, comprised of gravels of basic reaction, occurs along the southern boundary of the site. In a wider context, the bog is surrounded by Till derived from limestones and a small area to the south west of the bog underlain by Gravels derived from Limestones. GSI Groundwater mapping indicates that the majority of the site is of low vulnerability, with a small proportion of the southern part of the site assessed as moderate vulnerability. While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

### 3.6 Emissions to surface-water and watercourses

Lisclogher West Bog has 4 treated surface water outlets from a previously drained peatlands that were never brought into active peat extraction, which discharge to the Stonyford River (IE\_EA\_07S020400 STONYFORD\_040).

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the attached water quality map.

While the IE\_EA\_07S020100 STONYFORD\_030 is identified as under pressure in the third cycle of the River Basin Management Plan for Ireland 2023 to 2027, the applicable IE\_EA\_07S020400 STONYFORD\_040 is not.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

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<sup>3</sup> <https://dcnr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7ee1b6ab8d5&scale=0>

Initial monthly results are included in appendix XII. These results are from the period November 2020 to January 2023 and are from the surface water outlet from the main sections of bog to be rehabilitated in 2023. Peat extraction never commenced in this bog with results above remaining on a relatively static trajectory, post rehabilitation planned for the coming year.

From an analysis of water quality results over since November 2020, these indicate that results were under the Emission Limit Value for Suspended Solids and Ammonia and broadly under the trigger level for COD.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 2.78 mg/l and COD 100mg/l.

Monthly ammonia concentrations from November 2020 to January 2023 had a range of 0.005 to 1.17 mg/l with an average of 0.182 mg/l. Results for suspended solids for the same period indicate a range of 2 to 8mg/l with an average of 2.57 mg/l.

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al.*, 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Lislogher West has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key water body receptor, the Stonyford River, and is expected to support the future status of the waterbody as being of Good Status.

#### **Decommissioning and Rehabilitation Programme Water Quality Monitoring.**

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3 year cycle will not be sufficient to be able to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation programme, so this sampling regime will occur on a monthly basis.

In order to assist in monitoring surface water quality from this bog, it was agreed to increase the existing licence monitoring requirements of the IPC Licence, to sampling for the same parameters every month.

This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their monitoring programme and these are included in the Water Quality Map.



This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at [www.epa.ie](http://www.epa.ie).

The parameters to be included as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.

### 3.7 Fugitive Emissions to air

The bog was never brought into industrial peat production. Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

### 3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink into a carbon source (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). A natural peatland can take in 0.1 to 1.1 t of carbon as CO<sub>2</sub>-C /ha/yr while drainage and extraction can create large source of carbon dioxide releasing 1.3 to 2.2 t of carbon as CO<sub>2</sub>-C /ha/yr (based on Tier 1 Emission factors, Evans *et al.* 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO<sub>2</sub>-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al.* 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO<sub>2</sub> emissions from drained peatlands or increased methane (CH<sub>4</sub>) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO<sub>2</sub> emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO<sub>2</sub> emissions reductions. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

The EPA-funded CarbonRestore Project (Renou-Wilson *et al.* 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG

flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO<sub>2</sub> and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson *et al.* 2018). Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting at this site to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Lisclogher West Bog will become a reduced Carbon source/part carbon sink following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this site is expected to develop as restored raised bog with some *Sphagnum*-rich habitat. Other marginal habitats include poor fen, heath and Birch woodland.

### 3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

This site can be rated as having a **County-National ecological value (C-B)** due to its raised bog restoration potential, its location as an outlier in relation to raised bog distribution in Ireland, and as it is dominated by a significant area of semi-natural habitats in relatively good condition, with potential for restoration.

## 4. CONSULTATION

### 4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Ballivor-Derrygreenagh bog group, including Lislogher West Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018,
- Ongoing consultation with Coillte regarding forestry management (forestry leased to Coillte),
- Occasional consultation with NPWS regarding the status of Lislogher West Bog.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans),
- The proposed development of the nearby Ballivor wind farm,
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

There has been ongoing consultation about the planning and construction of Ballivor Wind Farm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#)) as part of that planning for that particular proposed development. This website describes the project and has up to date project newsletters.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Lislogher West Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Lislogher West Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Lislogher West Bog Rehabilitation Plan will contain a review of the consultation.

### 4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

### 4.3 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not commenced.

## 5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in including drain-blocking to encourage raised bog restoration and the development of active raised bog habitat, where possible.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland originally drained for industrial peat production, but not brought into production, in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.
- Supporting current land-uses (amenity).
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- Integrating rehabilitation measures with existing conifer forestry. It is not proposed at this stage to change or affect any conifer or commercial forestry via this scheme. The future forestry management of these areas will be defined by Coillte.

The rehabilitation goals and outcomes take account of the following issues.

- It will take some time for stable naturally functioning habitats to fully develop at Lislogher West Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source/part Carbon sink. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is expected that the site has the potential to develop some active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Restoration of the bog will also support other ecosystem services such as such the development of habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributory sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities at Lislogher West will contribute to stabilising or improving water quality status of receiving water bodies



in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).

- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

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## 6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Lislogher West Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Lislogher West bog is part of the Ballivor-Derrygreenagh bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Lislogher West Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Lislogher West Bog mean that **raised bog restoration** is the most suitable rehabilitation approach for this site. Lislogher West Bog is comprised of a significant area of drained raised bog containing deep peat reserves.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Lislogher West Bog as **environmental stabilisation, raised bog restoration, and the development of active raised bog, where possible**.
- Rehabilitation of Lislogher West Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- **Coillte**. Coillte have planted some high bog with Lodgepole Pine along the northern side of this bog. Bord na Móna will engage with Coillte regarding the potential to remove this forestry from the high bog to benefit raised bog restoration.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones, however some rehabilitation measures will be implemented in some pockets of cutover in the north-east and south east of the bog margins. Generally, marginal bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

### 6.1 Key constraints

- **Bog conditions**. Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites, like Lislogher West, where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- **Surrounding landscape and neighbours**. Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care will be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

- **Turbary.** Some marginal areas to the northeast and south of the bog are used for private turbary, some within the Bord na Móna site boundary. Peat extraction is still carried out in the central section of the bog, south of the local road, with evidence of relatively recent turbary (within the past two years). During the recent bog survey part of the cutaway habitat in this area was in use as spread lands.
- **Adjacent future potential land-use.** Planned renewable energy development. The proposed Ballivor Wind Farm is located adjacent to this site. This project is currently in planning, the planning application was submitted in April 2023. This proposed wind farm project does not affect the scope of the rehabilitation. Lisclogher West Bog is not located in the wind farm development boundary.
- **Coillte.** Coillte have planted some cutover bog with Lodgepole Pine along the northern side of this bog, within the PCAS footprint and in the wider area of Lisclogher outside of the PCAS rehabilitation footprint. Rehabilitation measures will ensure there are no impacts on Coillte forestry outside of the rehabilitation footprint.
- **Archaeology.** An Archaeological Impact Assessment will be carried out to mitigate against any impact on found archaeology at Lisclogher West Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland, see Appendix XI.
- **Current Land-use.** The Royal County Aeromodellers Club has a lease area within the south of the site on a small area of old cutover bog. This area will be excluded from rehabilitation.
- **Public Rights of Way.** Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

## 6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

## 6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Lisclogher West Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Lisclogher West Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

## 7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by Bord na Móna as

- Stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- Mitigation of potential key emissions (e.g. suspended solids).

### 7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the area originally drained for industrial peat production (but never harvested) to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 3 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

Following commencement, and as the monthly monitoring program at Lislogher West continues in 2023 during the rehabilitation works planned for 2023, with data from the 2022 monitoring program, further trending will be produced to verify any ongoing trends.

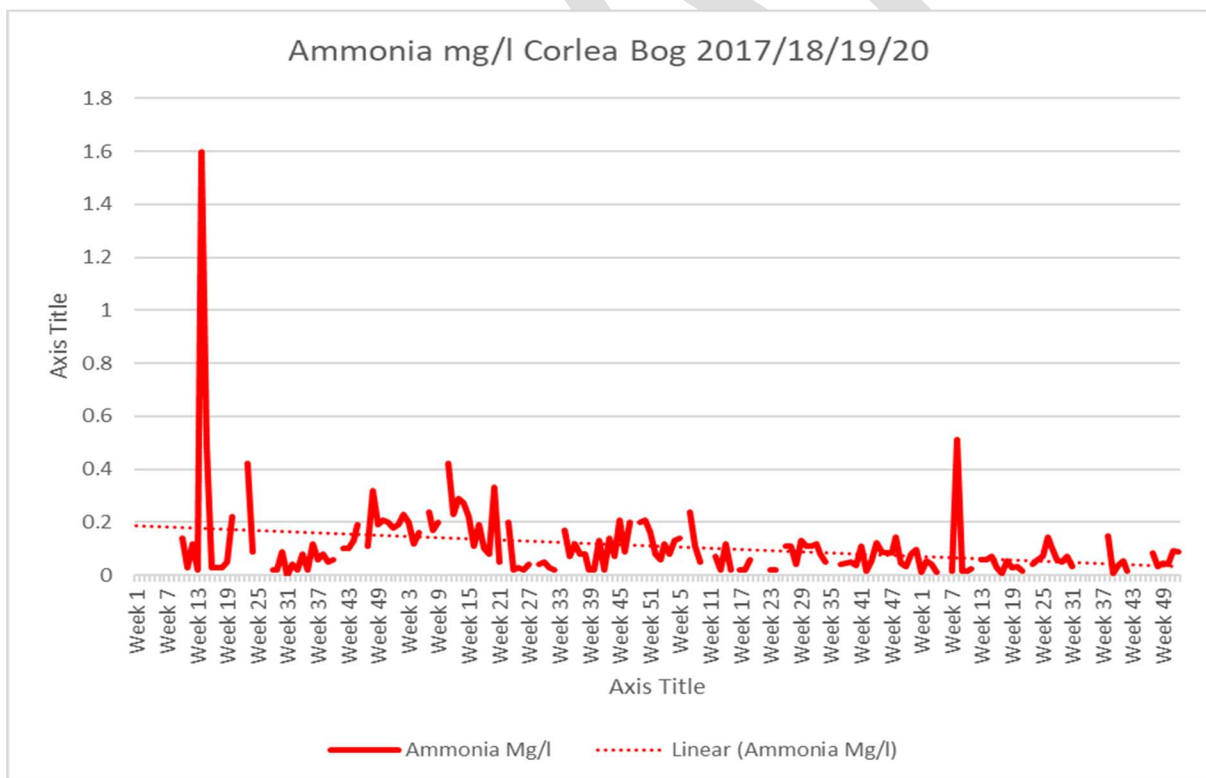
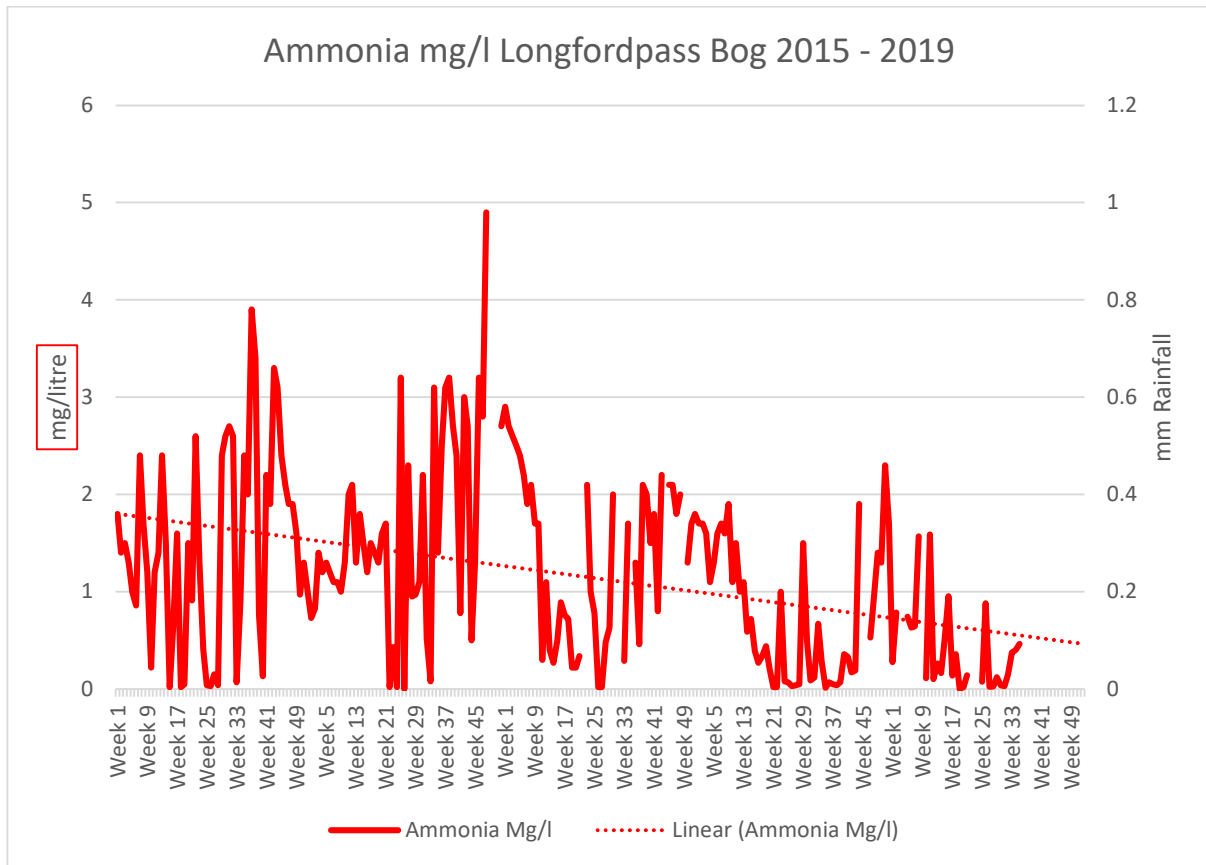


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

**Additional criteria for successful rehabilitation to optimise climate action and other ecosystem service benefits:**

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/part carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including re-wetted raised bog and marginal Birch woodland, where conditions are suitable. Some of these habitats have already in part established. It will take some time for stable naturally functioning habitats to fully develop at Lisclogher West Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services. This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

**Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.**

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures  Restoration of hydrological regime.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)  Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2023-2025
IPC validation	Key water quality parameters  Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2022-2024
IPC validation	Reducing pressure from drainage on the local water body catchment (WFD)	Where this section of the water body (that this bog drains to) has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

Criteria type	Criteria	Target	Measured by	Expected Timeframe
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions.  Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2023-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2023-2025

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the *Climate Action Fund* and Ireland's *National Recovery and Resilience Plan* or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.

## 7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate



planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.

- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 10-20 years for the establishment of active raised bog communities to establish on the bog following restoration. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson *et al.* 2018).
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation and restoration has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

## 8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced restoration and rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths and LiDAR Surface Maps; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-24-19-21 titled **Lislogher West Bog: Aerial Imagery2020**

BNM-DR-24-19-04 titled **Lislogher West Bog: Peat Depths**

BNM-DR-24-19-03 titled **Lislogher West Bog: LiDAR Map**

The restoration and rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-24-19-05: Lislogher West Bog Rehabilitation Measures** in the accompanying Mapbook (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These measures for Lislogher West bog will include (see Table 8.1):

- Raised bog restoration measures including intensive drain-blocking (7/100 m);
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels;
- Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;
- Removal of conifer forestry from the high bog (Forest to Bog restoration). A small part of the high bog was planted with conifer forestry. It is proposed to remove this forestry to support raised bog restoration. Trees will be felled and removed, conifer stumps will be “flipped”, the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. This requires engagement and agreement with Coillte and with the Forest Service. This enhanced bog restoration measure is proposed to be carried out as a trial at Lislogher West to learn new techniques and to inform the feasibility and potential to use these new techniques at other sites to remove conifers (See Appendix XIII).
- Removal of feral self-sown conifer trees from the high bog (TCT1). Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration.
- Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and

maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Table 8-1 Types of and areas for enhanced rehabilitation measures at Lislogher West Bog.

Type*	Enhanced Rehabilitation Measure		Extent (Ha)
Deep Peat	DPT2	Intensive drain blocking (max 7/100 metres), modifying outfalls	119.24
Deep Peat	DPT4	Berms and field re-profiling (45m x 60m cell), modifying outfalls and managing overflows, drainage channels for excess water, <i>Sphagnum</i> inoculation	5.47
Conifer removal	TCT1	Removal of self-seeded feral conifers from high bog. Fell to waste. This overlaps with the deep peat (DPT2) footprint.	119.24**
Forest to bog	FTB1	Forest to Bog. Agreement with Coillte and Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking.	6.98
Additional works	AW2	Targeted Drain Blocking, where possible	29.06
Marginal land	MLT1	No work required	47.54
Silt ponds	Silt pond	Silt ponds	0.19
Constraint	Constraint	Other Constraints	29.92
<b>Total</b>			<b>238.40</b>

\*Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

\*\* Note that this is not an additional area. This area overlaps the deep peat footprint (DPT2) footprint. Targeted conifer removal will take place in this area.

### 8.1 Short-term planning actions (0-1 years)

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme does not materialise, from the EPA.
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (PCAS measures) will be applied to Lislogher West Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.

- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan.
- Engage with Coillte and the Forest Service regarding the feasibility of removing conifer plantations from the high bog at Lislogher West.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

## 8.2 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Carry out actions to remove conifer forestry from the high bog, including tree-felling, removal of biomass (where possible), stump-flipping, surface smoothing and drain-blocking.
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme.

## 8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

## 8.4 Timeframe

- **2022-2023:** Short-term planning actions.
- **2023-2024:** Short-term practical actions.

- **2024-2025:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2025:** Decommission silt-ponds, if necessary.

## 8.5 Budget and costing

Bord na Móna (BnM) appreciates the Minister's intention to support Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as the 'Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2021). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different drainage and turf cutting types across the site (See Appendix I).

## 9. AFTERCARE AND MAINTENANCE

### 9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photography when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at [www.epa.ie](http://www.epa.ie).
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of

rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by enhanced rehabilitation. These proposed monitoring measures will be funded by the proposed *Climate Action Fund* and Ireland's *National Recovery and Resilience Plan* or additional other funding. Monitoring of climate action and other ecosystem service benefits will be designed to take account of the requirements of monitoring benefits of the overall Scheme and will be stratified; that is not all monitoring will be carried out in each site. These are defined as:

- Vegetation and habitat monitoring after rehabilitation is completed using a bog condition assessment (ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

## 9.2 Rehabilitation plan validation and licence surrender – report as required under condition

### 10.4

**IPC License Condition 10.4.** *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.



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## APPENDIX I. A STANDARD PEATLAND REHABILITATION PLAN TO MEET CONDITIONS OF THE IPC LICENCE

In the event that the Scheme (PCAS) is not supported by additional funding, Bord na Móna is still obligated to carry out peatland rehabilitation to meet the conditions of the IPC Licence. Under its EPA licences and following cessation of peat extraction, BnM is mandated to 'decommission' its operations by removing materials 'that may result in environmental pollution' and establish that 'rehabilitation' measures have environmentally stabilised the drained peatland.

This proposed standard peatland rehabilitation plan is outlined here to **estimate potential costs**. Bord na Móna will still be expected to cover the costs that would have accrued from standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration and the benefits that flow from these measures and interventions/improvements will be eligible for funding by government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

The same process as outlined in Section 2 will be followed.

### Scope of rehabilitation

The principal scope of this rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Lislogher West Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Lislogher West bog is part of the Ballivor-Derrygreenagh bog group.
- The current condition of Lislogher West Bog.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Lislogher West Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use: Bord na Móna have submitted a planning application to build a wind farm on cutaway bog in the Ballivor area. This project is known as Ballivor Wind Farm. Lislogher West Bog will not be part of this project.

### Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Lislogher West Bog is environmental stabilisation of the site via the hydrological restoration of the bog. This is defined as:

- Carrying out intensive drain blocking to re-wet peat and slow runoff.
- Stabilising potential emissions from the site (e.g. suspended solids).
- Environmental stabilisation.

The outcome is setting the site on a trajectory towards establishment of natural habitats.

**Criteria for successful rehabilitation:**

- Rewetting of the degraded (dry) raised bog following industrial peat drainage, that was never brought into peat production/extraction. Drain blocking and other associated rehabilitation measures will reduce or eliminate any potential run off of suspended solids and will encourage the development of peat forming vegetation (*Sphagnum* moss) cover via natural colonisation. This will in time reduce the area of bare exposed peat.
- This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a restored raised bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction i.e. the STONYFORD\_040 watercourse (EPA mapped watercourses<sup>4</sup>). The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

**Rehabilitation targets**

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat blockages and re-wetting). This will be demonstrated by a post rehab aerial survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be demonstrated by water quality monitoring results.

**Rehabilitation measures:**

- Intensive blocking of field drains, associated with former industrial drainage of the site, along each field drain to re-wet and restore the bog.
- Re-alignment of any piped drainage; and management of water levels to re-wet peat.
- No measures are planned for the other surrounding marginal peatland habitat where a hydraulic break is missing between the bog and adjacent lands.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

**Timeframe:**

- 2023. 1<sup>st</sup> phase of rehabilitation. Field drain blocking.
- 2024-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

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<sup>4</sup> EPA, 2021, EPA online map viewer: Online, Available at: <https://gis.epa.ie/EPAMaps/>, Accessed 10.12.2021

- 2024-2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + modifying outfalls with overflow pipes	124.7
Marginal land	MLT1	No work required	83.58
Silt ponds	Silt pond	Silt ponds	0.19
Constraint	Constraint	Other Constraints	29.92
<b>Total</b>			<b>238.59</b>

See Drawing number BNM-DR-24-19-20: Lisclogher West Bog: Standard Rehabilitation Measures included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

#### Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at [www.epa.ie](http://www.epa.ie).
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

#### Validation and IPC Licence surrender

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites (EPA, 2012) when:

- The planned rehabilitation has been completed;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.



## APPENDIX II. BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Counties Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Bog Group ceased in 2020.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The Bord na Móna Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carranstown, Bracklin and Lislogher East. Milled peat was supplied from Ballivor, Carranstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lislogher East was never developed for milled peat production but there was still some sod peat production on this site. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area is now considered cutaway. Lislogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat is extracted from the sites and the industrial peat production area is shrinking. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and Bord na Móna (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. Bord na Móna originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of conifer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.



A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road motocross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

During the 1980's/1990's about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the Bord na Móna Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of *Sphagnum*-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to the Meath-Westmeath Bog Group and is likely to be part of a lease to this group in the future.

Some rehabilitation was carried out in a small area of cutaway in Ballivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the Peatland Climate Action Scheme started at Carranstown in 2022.

Intensive decommissioning and rehabilitation for the Derrygreenagh Bog Group started in 2021 at a number of individual bogs.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and PCAS rehabilitation started in 2021. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BnM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat as fuel.

Bord na Móna is currently developing a wind energy project called Ballivor Wind Farm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#).) This proposed project is in the planning stage, the planning application was submitted in April 2023. The proposed wind farm extends across parts of Bracklin, Lislogher East, Carranstown and Ballivor Bogs. There is no wind farm infrastructure located in Lislogher West Bog..

Bord na Móna is currently developing a renewable energy project called Derrygreenagh Energy Park. [Derrygreenagh - Bord Na Mona \(bnmenergypark.ie\)](#). This project is proposed to host a range of different renewable energy and energy storage technologies. The proposed location extends across Derryhinch, Drumman, Derryarkin and Ballybeg Bogs. This proposed project is currently in pre-planning. Bord na Móna will continue to implement its general strategy of integrated land-use and will look to integrate this renewable energy infrastructure with the current cutaway landscape and also with other land-uses. Bord na Móna are also continuing to review its landbank for future potential renewable energy projects.

A breakdown of the component bog areas for the Derrygreenagh Bog Group (Ballivor) IPC License Ref. P0-501-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway.. Some areas of cutaway are developing pioneer cutaway vegetation communities. Is part of the proposed Ballivor Wind Farm, which is currently in planning.	2020	Draft 2021
Bracklin (excluding Bracklin West)	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats Bare peat is prevalent in the western section, which was in milled peat extraction. Is part of the proposed Ballivor Wind Farm, which is currently in planning. Part of Bracklin is being assessed for PCAS in 2023.	2020	To be part finalised in 2023
Carranstown	306	Industrial peat production commenced at Carranstown in the 1980s. The majority of the site has relatively deep peat.	Carrenstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Part of Carranstown is included in the Ballivor Wind Farm footprint, which is currently in planning.	2020	Finalised 2022 Rehab started in 2022
Lislogher East	486	Industrial peat production commenced at Lislogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lislogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Wind Farm, which is currently in pre-planning.	2020	Draft 2021
Lislogher West	239	Lislogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lislogher West was drained but never fully developed for industrial peat extraction.	N/A	To be finalised 2023
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power.	2020	Draft 2017

			The majority of the site is bare peat.		
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	Draft 2017
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power.  Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.  Being considered for Derrgreenagh Energy Park, which is currently in pre-planning.	2020	Draft 2017
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.  Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past.  Part used for gravel extraction.  Being considered for Derrgreenagh Energy Park, which is currently in pre-planning.	2015	Draft 2017
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.  Most of the site is bare peat with emerging cutaway habitats.  Part of the site was used to trial herb production. This initiative has now ceased.  Being considered for Derrgreenagh Energy Park, which is currently in pre-planning.	2020	Draft 2017
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.  Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past.  Part used for gravel extraction.  Part of the site was used to trial herb production.  Part of the site is used for log storage (biomass)  Being considered for Derrgreenagh Energy Park, which is currently in pre-planning.	2020	Draft 2017
Toar	445	Industrial peat production commenced at Toar in the 1980s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power.  Most of the site is bare peat.  Part of the site is used for log storage (biomass).  Part of the site is being considered for gravel extraction. This proposal is at the feasibility stage.	2020	To be finalised 2023

See Drawing number *BNM-DR-23-19-24 Bog Group Map*, included in the accompanying Mapbook which illustrates the location of Lisclogher West Bog and the Derrygreenagh Bog Group in context to the surrounding area.

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## APPENDIX III. ECOLOGICAL SURVEY REPORT

<b>Ecological Survey Report</b>			
<p><i>Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.</i></p>			
<b>Bog Name:</b>	<u>Lislogher West</u>	<b>Area (ha):</b>	239ha
<b>Works Name:</b>	Ballivor	<b>County:</b>	Westmeath
<b>Recorder(s):</b>	MMC	<b>Survey Date(s):</b>	1/04/2010
<p><b>Habitats present (in order of dominance)</b></p> <p>The most common habitats present at this site include:</p> <ul style="list-style-type: none"> <li>• Raised bog (PB1) (Codes refer to Heritage Council habitat classification, (Fossitt 2000), See Appendix II.)</li> <li>• Cutover Bog (PB4)</li> <li>• Conifer plantation (on high bog and cutover bog, Coillte managed) (WD4)</li> <li>• Birch woodland (WN7) (on cutover bog dominated by Birch and/or Scot's Pine)</li> <li>• Mixed broad-leaved/conifer woodland (WD2) (old plantations)</li> <li>• Scrub (WS1) (on old cutover bog)</li> <li>• Poor fen and flush (PF2) (part of high bog)</li> <li>• Wet grassland (GS4)</li> <li>• Hedgerows (WL1) (linear development of scrub along boundaries such as roads)</li> <li>• Depositing stream/river (FW2)</li> <li>• Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)</li> </ul>			
<p><b>Description of site</b></p> <p>Lislogher West is located in north-east Co Westmeath, 4.3 km south-east of Delvin. This bog is part of the Ballivor group of bogs. It was ditched in the 1980s but was never brought into production. Adjacent Bord na Móna properties at Lislogher East and Bracklin have been in production for horticultural peat. A minor road runs along the southern side of the site, forming the boundary in sections and also cutting off two smaller areas of high bog and associated habitats from the main bog. A second minor road delineates the eastern boundary and separates Lislogher West from Lislogher. The absence of production has meant that the site has retained many of its natural raised bog features, although there has also been significant degradation. A recent fire in 2008 burned about two thirds of the main bog and the burnt section is currently in very poor condition.</p> <p>The main bog is relatively narrow and elongated. An esker runs along the northern side of the bog and limits the extent of the basin for this bog. The majority of the margins have been abandoned or unmanaged for some time and extensive Birch woodland and mixed conifer woodland has developed on cutover bog. Some of this Birch woodland is particularly well-developed and Scot's Pine is a prominent feature of much of the woodland around the site. The 2<sup>nd</sup> edition OSI 6 inch map (prepared around 1910-20) maps most of the margins as conifer woodland, indicating that this woodland may not have developed naturally but was probably planted at some stage. This map also indicates that woodland or wooded sections on the high bog were more extensive in the past and some areas have been cleared or reverted back to high bog, indicating that there has been a relatively long history of forestry around this site.</p> <p>One of the main topographical features of the main bog is the presence of some more recent conifer plantation, with Lodgepole Pine that extends in strips from the northern margin about midway along the bog. This conifer plantation is managed by Coillte. Several blocks have failed and the trees are quite sparse with colonisation by Birch. However, the largest blocks are in relatively good condition. This plantation was planted in the 1980's and is at the un-thinned post-thicket stage.</p>			

The majority of the high bog has been badly damaged by the recent fire and has been stripped of vegetation. It is quite dry and firm with regenerating Heather the most prominent species. Bare peat is very prominent in this section and is being colonised by *Campylopus introflexus*, which is abundant. Deergrass is also prominently regenerating. It was likely to have also been significantly dried out by the ditching in the past. Nearly all of the drains are actively functioning and are not infilling. The generally narrow topography of the bog also leads itself to being drier than usual as it was quite narrow and there are relatively steep slopes on both sides leading to the margins. Water was flowing in many of the drains from rain the previous evening. *Sphagnum* sp. cover was quite rare (< 1% cover) in the burnt section. There were also very few hollows or typical wet hollows. *S. capillifolium*, *S. papillosum* and *S. subnitens* were all noted within the burnt section of the high bog and *S. cuspidatum* and *S. magellanicum* was only noted on one occasion in a small blacked drain associated with the conifer forestry. Some of the burnt section also had standing dead trees (Pine and Birch) that had been scattered over the bog.

In contrast, the vegetation of the un-burnt section of high bog to the west is dominated by tall Heather. This section also contains *Cladonia* spp. cover. And some more typical raised bog vegetation dominated by species such as Carnation Sedge, Deergrass, Bog Asphodel and Bog Cotton. This section of high bog is also relatively dry and the surface was spongy but generally firm. The drains within this section are still active. *Sphagnum* cover was also low in this section with occasional small hummocks and the moss cover was dominated by *Hypnum* spp. Some sections do have frequent Pine colonising the high bog, generally close to the more mature margins. These trees are relatively small and poorly developed on the high bog.

There are two main flushes on the high bog at this site. The eastern flush extends across the whole of the high bog and has been burnt. The vegetation is dominated by Purple Moor-grass and some scattered Birch, now standing dead. Several Pine are also present. Bog Myrtle is also present and is regenerating. Other species noted in this flush include Bilberry, Bog Rosemary, Lousewort and hummocks of *Polytrichum* sp. *Campylopus introflexus* is abundant on the bare peat present in the flush.

The western flush is actually situated on the site of a former lake called Martinstown Lough. This lake was drained and has infilled and now has poor flush characteristics. The flush and the surrounding area are populated with Pine and Birch. The former basin of the lake is still evident and the lowest section is quite wet and quaking. This small section could be considered active flush (active raised bog). *Sphagnum* cover was abundant and was dominated by *S. magellanicum* and there was also frequent *Aulacomnium palustre*. Cranberry was also frequent within this wet zone.

There are several patches of Birch woodland (WN7) (dry) on very old cutover, along the margins of the main bog. Several of these patches are dominated by Birch but have occasional or frequent mature Scot's pine in the canopy. There is some encroachment of Birch and Gorse onto the high bog along the margins. Other species present include Grey Willow, Holly, Bracken, Bilberry, Bramble, Purple Moor-grass, Board-buckler Fern and Ivy. Leaf litter is prominent in the ground cover and there is frequent moss cover with *Hypnum* spp., *Pseudoscleropodium purum* and *Thuidium tamariscinum* all common. Some of the Birch and Holly have dbh of 30-40 cm.

Some of the Birch woodland along the margins of the road (southern boundary) is particularly well-developed. This woodland, although being dominated by Birch and Scot's Pine, contains Yew, Oak, Alder, Beech, Ash and Hazel.

A second area of high bog located to the south of the minor road and to the west of the site was also surveyed (in Bracklin Townland). The high bog was unditched and was generally dry and un-burnt. Scot's Pine is spreading onto the bog around the margins. There was a small wet section in the central part of the bog, possibly associated with a main drainage feature. This area has the appearance of being a flush and was very wet and quaking in places. It has the appearance of being an old soak or perhaps a subsided area that has re-wetted. It may have been a former lough but there was no indication of a lake from the old maps. This area is in a small hollow and is vegetated with Pine and Birch, which are mainly stunted and depauperate. The ground cover is dominated by Heather and Hair's-tail Bog Cotton. Cross-leaved Heath and Cranberry also appear on the hummocks. *Sphagnum* spp. cover is abundant (100% in places) and there are large hummocks of *S. capillifolium*, *S. palustre*, *S. fallax* and probably other species. *Sphagnum cuspidatum* is frequently found in hollows. Purple Moor-grass and Bilberry are found around the edges where it is somewhat drier and firmer underfoot.

Adjacent to this wet area (in Bracklin Townland) is a small copse of very mature Scot's Pine that have developed (or planted) on the adjacent cutover. These Scot's Pine are some of the best developed of this species seen yet on the survey (> 20 m high) and are a typical example of the type of woodland that is found around the margins of this bog. The understorey and shrub layers were quite open with Holly and Birch present. The ground cover was dominated by Purple Moorgrass, Bilberry and Bracken. There were some wet areas but the ground cover was mainly dry.

#### Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

**Adjacent habitats and land-use**

Habitats around the margins of the site include:

- Improved grassland (GA1) and wet grassland (GS4) that are both grazed by cattle.
- Other typical marginal peatland habitats are present including remnant high bog (PB1), cutover bog (PB4), scrub (WS1) and Birch woodland (WN7).
- Conifer plantations (WD4) have been developed adjacent to the site at several locations.
- There is some active peat cutting by private individuals on the high bog both inside and outside the BnM boundary.

**Watercourses (major water features on/off site)**

- The southern boundary of part of the site is marked by a stream/river that flows east and is part of the Boyne catchment.
- Martinstown Lough is a former lough located towards the west side of the site that was drained and is now a flush.

**Fauna biodiversity**

Several bird species were noted on the site during the survey.

- Two pairs of Mallard were noted on the high bog using the drains.
- A Buzzard over-flew the bog.
- Two Snipe were noted on high bog.
- Coal Tit, Blue Tit and Long-tailed Tit were all recorded within the Birch woodland around the margins of the bog.
- Other more common birds were noted on the site. These included Magpie, Blackbird (on cutover bog), Pheasant (calling around margins in woodland), Grey Crow (over-flying site, occasionally roosting on trees on bog), Rook (over-flying site, occasionally roosting on trees on bog), Wren, Robin and Meadow Pipit (on high bog).

**Mammals**

- Signs of Deer (most likely Fallow Deer) were noted at several locations around the site with some tracks across the bog and within some of the Birch woodland.
- Hare was noted on the high bog.
- Fox scats were deposited on the high bog at several locations.
- There were signs of Mink along the stream located along the southern boundary of the site. This stream/river also has potential for occasional usage by Otter.

## APPENDIX IV. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances,, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.



## APPENDIX V. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under Bord na Móna ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague<sup>5</sup> will be adhered with throughout all rehabilitation measures and activities.

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<sup>5</sup> <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

## **APPENDIX VI. POLICY AND REGULATORY FRAMEWORK**

Bord na Móna Plc is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security. In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, Bord na Móna is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire Bord na Móna business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

Bord na Móna is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by Bord na Móna. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

### **1 EPA IPC Licence**

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor-Derrygreenagh Bog Group (Ref. PO-501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Ballivor group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

### **2 The Peatlands Climate Action Scheme (PCAS)**

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional

and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

### **3 National and EU Climate and Biodiversity Policy**

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

Peatlands rehabilitation and restoration is referenced in Section 17.3.3 of the Land Use, Land Use Change, Forestry and Marine Chapter of the National Climate Action Plan 2021 as follows:

“The rehabilitation of degraded peatlands to a condition in which they regain their ability to deliver specific ecosystem services has considerable potential for initial mitigation gains, and future carbon sequestration. Additional benefits of peatland restoration include positive socio-economic outcomes for the Midlands, increased natural capital, enriched biodiversity, improved water quality, and flood attenuation.”

The scheme is included as Action 33 in the Climate Action Plan 2021 Annex of Actions - Deliver the Enhanced Decommissioning, Rehabilitation and Restoration (EDRR) Scheme for Bord na Mona Peatlands.

EDRRS is also referenced in the Climate Action Plan 2021 as a measure to deliver a Just Transition in the Midlands.

International research and scientific understanding of peatlands is now reflected in key Irish national policy and strategy documents such as the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017 - 2022 (Department of Arts, Heritage and the Gaeltacht 2017), The National Peatland Strategy (Department of Arts, Heritage and the Gaeltacht 2015), The National Biodiversity Action Plan (National Parks and Wildlife Service 2017), The River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018), and the Biodiversity – Climate Change Sectoral Action Plan (Department of Arts, Heritage and the Gaeltacht 2019). Each of the national plans, which are also complemented with the recently published EU Green Deal communication on Biodiversity Strategy for 2030 (COM 2020) have overlapping objectives and actions that focus on the restoration of peatlands damaged by turf-cutting, drainage and other impacts, as well as the re-wetting of Bord na Móna industrial peat extraction bogs.

While not specifically identified as a restoration implementor, EDRRS objectives are in line with those of the United Nations Decade on Ecosystem Restoration 2021-2030 of Preventing, Halting and Reversing the Degradation of Ecosystems worldwide.

EDRRS is also in line with the EU Commission proposal for a Nature Restoration Law which will apply legally binding targets for nature restoration in different eco-systems to every Member State. The aim is to cover at least 20% of the EU's land and sea areas by 2030 with nature restoration measures and eventually extend these to all ecosystems in need of restoration by 2050.

#### **4 National Peatlands Strategy**

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as Bord na Móna.

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

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the proposed future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

## **5 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)**

The National River Basin Management Plan (Department of Housing, Planning, Community and Local Government 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Scheme (**PCAS**).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2018-2021 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NWBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and

fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The draft NWBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage are impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by Bord na Móna in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NWBMP 2022-2027.

## **6 National Biodiversity Action Plan 2016-2021**

The National Biodiversity Action Plan 2016-2022 has a 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. Ireland's 2<sup>nd</sup> National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

The delivery of rehabilitation via PCAS is expected to significantly contribute in the future to actions and targets of the National Biodiversity Action Plan 2016-2021, particularly in relation to peatland restoration and creation of new habitats such as wetlands and woodlands.

A new National Biodiversity Action Plan is currently being developed.

## **7 National conservation designations**

Bord na Móna operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, cNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

## **8 National Raised Bog Special Area of Conservation Management Plan 2017-2022.**

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the

important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. PCAS is expected to restore several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

## **9 All-Ireland Pollinator Plan 2021-2025**

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

## **10 Land-use planning policies**

As Bord na Móna operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. Bord na Móna seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

## **11 National Archaeology Code of Practise**

Bord na Móna operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (<https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf>)

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

## 12 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on Bord na Móna lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and Bord na Móna's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *“Restore at least 15% of degraded areas through conservation and restoration activities.”*

The EU's headline target for progress by 2020 is to:

- *“halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss.”*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity policies.

## 13 Bord na Móna commitments

Bord na Móna made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, the Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.



In line with Bord na Móna's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

#### **14 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)**

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

## APPENDIX VII. DECOMMISSIONING

### 1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

*10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:*

*10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Lislogher West Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Not relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Not relevant
4	Decommissioning or Removal of Buildings and Compounds	Not relevant
5	Decommissioning Fuel Tanks and associated facilities	Not relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

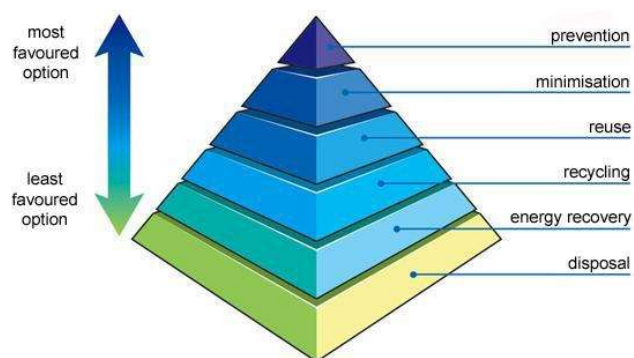
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

## 2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future afteruse of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Lislogher West Decommissioning Plan
1	Removal of Railway Lines	Not Applicable
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Not Applicable
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog
5	Removal of High Voltage Power Lines	Not Applicable

\* It is noted that the Bord na Móna industrial railway is currently designated as a protected structure in the current Westmeath County Council County Development Plan. This is currently being assessed by archaeological consultants for Bord na Móna.

## APPENDIX VIII. GLOSSARY

**Cutaway Bog:** A Bord na Móna site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

**Deep peat cutover bog.** Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

**Dry cutaway bog:** Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (ie. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

**Enhanced decommissioning:** This is defined as decommissioning carried out under Scheme, which is proposed to externally funded.

**Enhanced rehabilitation:** This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that Bord na Móna be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

**Environmental stabilisation:** The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

**Marginal land.** Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

**Rehabilitation:** Rehabilitation is defined in general by Bord na Móna as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

**Restoration:** Ecological restoration is defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, Bord na Móna cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelem – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

**Standard rehabilitation:** This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. Other after-use development may also serve to act as rehabilitation.

**Standard decommissioning:** This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

**Wetland cutaway bog.** Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping is reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

## APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

### (Minimisation, treatment, recovery and disposal)

#### Objective:

The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

#### Scope:

This plan covers IPPC Licence's Ref P0501-01, Derrygreenagh-Ballivor Group of Bogs in Counties Meath and Mestmeath.

#### 1.0 Extractive Waste:

Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

##### 1.1 Silt Pond excavations and maintenance.

All peat extraction activities are serviced by a silt lagoons/ponds. During the excavation of these silt ponds, pre IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher than 2-3 metres.

##### 1.2 Power Station screenings:

Lough Ree Power Ltd screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bog timbers. Schedule 3 (ii) of the IPPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPPC Licence, and as per the attached locations.

##### 1.3 Bog Timbers:

During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

### 2.0 P0501-01 IPPC Licence Extractive Waste Conditions

#### 2.1 Condition 7.5 Extractive Waste Management

The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009. The Plan shall be submitted for agreement by the Agency by the 31<sup>st</sup> December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.

All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

#### 2.2 Condition 7.6 Waste Facility

- (i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
- (ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
- (iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
- (iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
- (v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
- (vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

#### 2.3 Condition 7.7 Excavation Voids

7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.

7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

### Condition 7.5. Extractive Waste Management Plan. 5 (1)

#### 3.0 Minimisation.

##### 3.1 Silt pond excavation material and cleanings.

IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

### 3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

### 3.3 Bog Timbers.

Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

## 4.0 Treatment

### 4.1 Silt pond excavation material and cleanings.

The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

### 4.2 Power Station Screenings.

The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

### 4.3 Bog Timbers

As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

## 5.0 Recovery

### 5.1 Silt pond excavation material and cleanings.

Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

### 5.2 Power Station Screenings.

Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

### 5.3 Bog Timbers

Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

## 6.0 Disposal

### 6.1 Silt pond excavation material and cleanings.

Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

### 6.2 Power Station Screenings.

Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

### 6.3 Bog Timbers

These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

## 7.0 Extractive Waste Management Plan

### 5 (2a)(i)

The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

### 5 (2a)(ii)

Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with our Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

### 5 (2a)(iii)

Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

### 5 (2a)(iv)



The peat bogs do not contain any topsoil, so this is not required.

#### 5 (2a)(v)

Peat mineral resources do not undergo any treatment.

#### 5 (2b)

These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

#### 5 (2c)(i, ii & iii)

These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

#### 5 (3)

The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold. The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings. Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

#### Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

#### Description of operations.

Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

#### Closure plan. (Bog Rehabilitation Plan).

Condition 10.1 – 10.3 of the IPPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
  - 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
  - 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

#### 10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Ballivor IPPC Licence Coordinators office.

The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.

Screenings and bog timbers are all naturally occurring elements of peatland and their placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.

The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

**Review.**

This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Ballivor IPPC Licence P0501-01.

## APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
  1. The land is waterlogged;
  2. The land is flooded, or it is likely to flood;
  3. The land is frozen, or covered with snow;
  4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
  5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- Buffer zones in respect of waterbodies, as specified on <https://www.epa.ie/about/faq/name,57156,en.html>, will be adhered with at all times with regard to fertiliser application.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

Water body / Feature	Buffer zone
Any water supply source providing 100m <sup>3</sup> or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m <sup>3</sup> or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

## APPENDIX XI. ARCHAEOLOGY

### Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.



Code of Practice

# Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.
6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.
7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.
8. To provide assistance, where required, to the Department during archaeological surveys.
9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.
10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



<h1>Bord na Móna</h1>	<b>Procedure: ENV017</b>	<b>Rev: 1</b>
<b>Title: Archaeological Findings</b>	<b>Approved: EM</b>	<b>Date:</b>

**1) Purpose**

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

**All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.**

**2) Procedure**

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

**NOTE:** Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is .....

**3) Records**

Revision Index			
Revision	Date	Description of change	Approved
1			
2			



**Archaeological Impact Assessment of Proposed Bog  
Decommissioning and Rehabilitation at Lisclogher West Bog,  
Co. Westmeath**

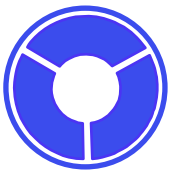
**Report For**

**Bord Na Móna Energy Ltd.**

**Author**

**Dr. Charles Mount**

**Bord Na Móna Project Archaeologist**



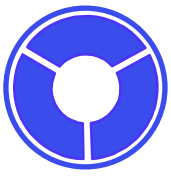
## Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.239 hectares at Lisclogher West Bog, Co. Westmeath on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Lisclogher West Bog will include:

- Raised bog restoration measures including intensive drain-blocking (7/100 m);
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Regular drain blocking (3/100) on dry cutaway along with the blocking of outfalls and management of water levels;
- Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;
- Removal of conifer forestry from the high bog (Forest to Bog restoration). A small part of the high bog was planted with conifer forestry. It is proposed to remove this forestry to support raised bog restoration. Trees will be felled and removed, conifer stumps will be “flipped”, the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. This requires engagement and agreement with Coillte and with the Forest Service. This enhanced bog restoration measure is proposed to be carried out as a trial at Lisclogher West to learn new techniques and to inform the feasibility and potential to use these new techniques at other sites to remove conifers (See Appendix XIII).
- Removal of feral self-sown conifer trees from the high bog. Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration.
- Silt control measures will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Lisclogher West Bog is located c.2.6km south of Delvin and there is a minor road running through it for most of its length. The bog rehabilitation area occupies the townlands of Ballyhealy or Ballinure, Bolandstown, Bracklin and Martinstown on OS 6-inch sheet Westmeath No. 14.





## Methodology

This is a desk-based archaeological assessment that includes a collation of existing written and graphic information to identify the likely archaeological potential of Lislogher West Bog. The extent of the rehabilitation area is indicated in Fig. 1. This area was examined using information from:

- The IAWU Peatland Survey
- The 2005 Peatland Survey
- The Record of Monuments and Places
- The Sites and Monuments Record (SMR) that is maintained by the Dept of Housing, Local Government and Heritage
- The Excavations database
- Previous assessments

An impact assessment has been prepared and recommendations have been made.

## Desktop assessment

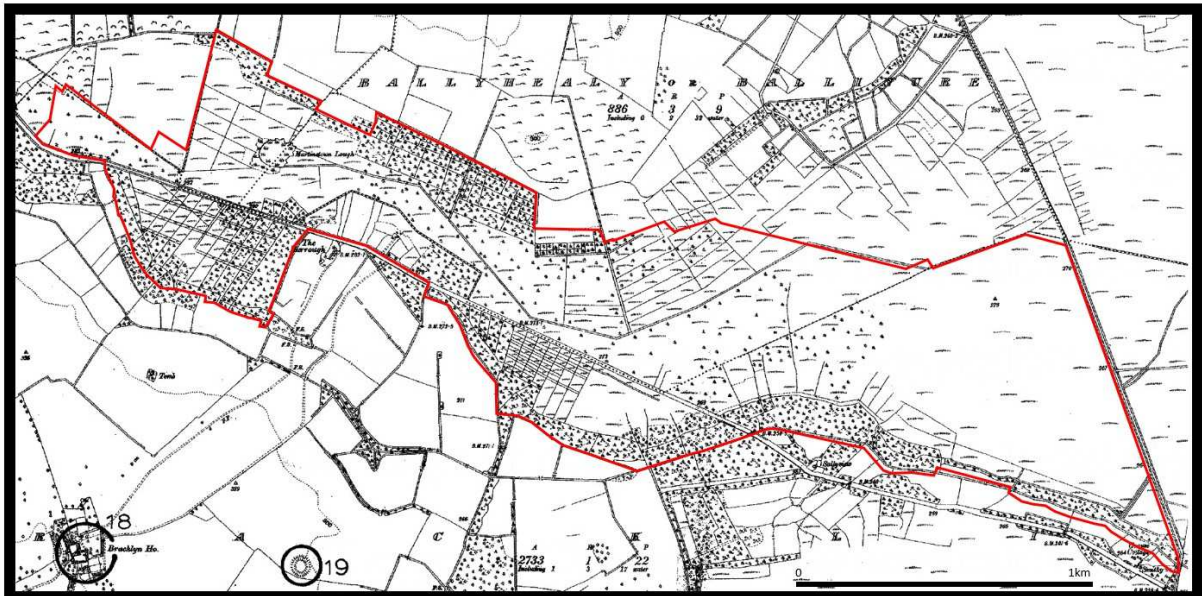


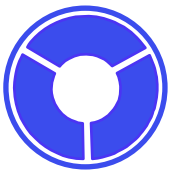
Fig. 1. Lislogher West Bog, Co. Westmeath, detail of the Record of Monuments and Places map sheets Westmeath No. 14. The proposed rehabilitation area is outlined with the red line.

### Peatland survey

Lislogher West Bog was not surveyed by the Irish Archaeological Wetland Unit (IAWU).

### Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Westmeath which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1997). This record was published by the Minister in 1997 and includes sites and monuments that were known in Lislogher West Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).



### 2005 Archaeological Survey of Ireland Peatland Survey

Lisclogher West Bog was surveyed by ADS Ltd in 2005 as part of the Archaeological Survey of Ireland Peatland Survey (Licence No. 05E0792). No sightings of archaeological heritage were recorded during the fieldwalking survey (Whitaker 2006, 11-12).

### Archaeological Excavations

The Excavations Bulletin at excavations.ie was checked for reports of licenced excavations carried out in the rehabilitation area. This indicates that there have been no licenced excavations carried out in the rehabilitation area.

### Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 8th of May 2023. This review established that there are no SMRs located in the proposed rehabilitation area (see Fig. 2).



Fig. 2. Lisclogher West Bog, Co. Westmeath, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

### Previous assessments

Lisclogher West Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-03. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all archaeological objects from the bog reported to the Museum by that date and these are included below in Table 1 (Pers Comm. Jane Whitaker). The assessment noted that there was a potential for archaeological heritage to be uncovered during the course of any future development works in Lisclogher West Bog.

### Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0500-03 contains a complete list of known archaeological objects from Lisclogher West Bog reported to the National Museum of Ireland up to 2018 (see Table 1).



Townland	Museum No./ catalogue No.	Description
Lisclogher	1954:54	Bronze Axehead
Lisclogher	IA/104/1982	14 pieces of wood

Table 1. List of archaeological finds from Lisclogher West Bog reported to the National Museum of Ireland.

## Impact assessment

There are no known sightings of archaeological material in the rehabilitation area. There are some archaeological objects known from the bog that have been removed to the National Museum (see Table 1).

## Recommendations

There are no known sightings of archaeological monuments in the rehabilitation area. There are some archaeological objects known from the bog that have been removed to the National Museum (see Table 1). Should any previously unknown archaeological heritage be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. Lisclogher West Bog was surveyed by ADS Ltd in 2005 as part of the Archaeological Survey of Ireland Peatland Survey and no sightings of archaeological heritage were recorded. There are no known sightings of archaeological monuments in the rehabilitation area. There are some archaeological objects known from the bog that have been removed to the national Museum (see Table 1). Should any previously unknown archaeological heritage be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## References

DAHGI 1997. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Westmeath.

EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.

Whitaker, J. 2006. Peatland Survey 2005 Allen, Kilberry & Coolnamóna Bogs Counties Kildare, Laois, Meath, Offaly, & Westmeath. Unpublished report for Department of the Environment, Heritage and Local Government.

Dr. Charles Mount  
9 May 2023

## APPENDIX XII. WATER QUALITY MONITORING RESULTS FOR LISCLOGHER WEST BOG

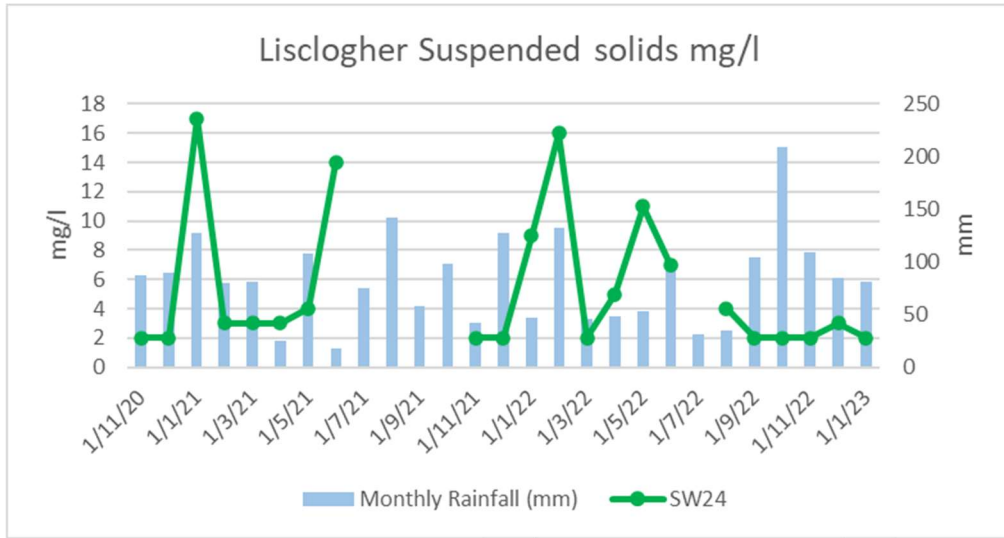


Plate 12-1 Results of suspended solids monitoring at Lisclogher West November 2020 - January 2023

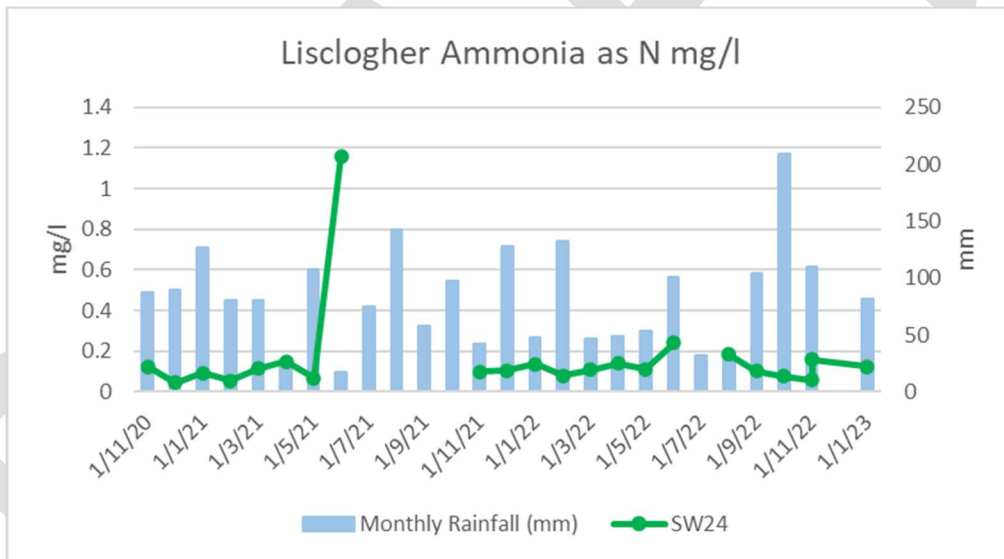


Plate 12-2 Results of Ammonia monitoring at Lisclogher West November 2020 - January 2023

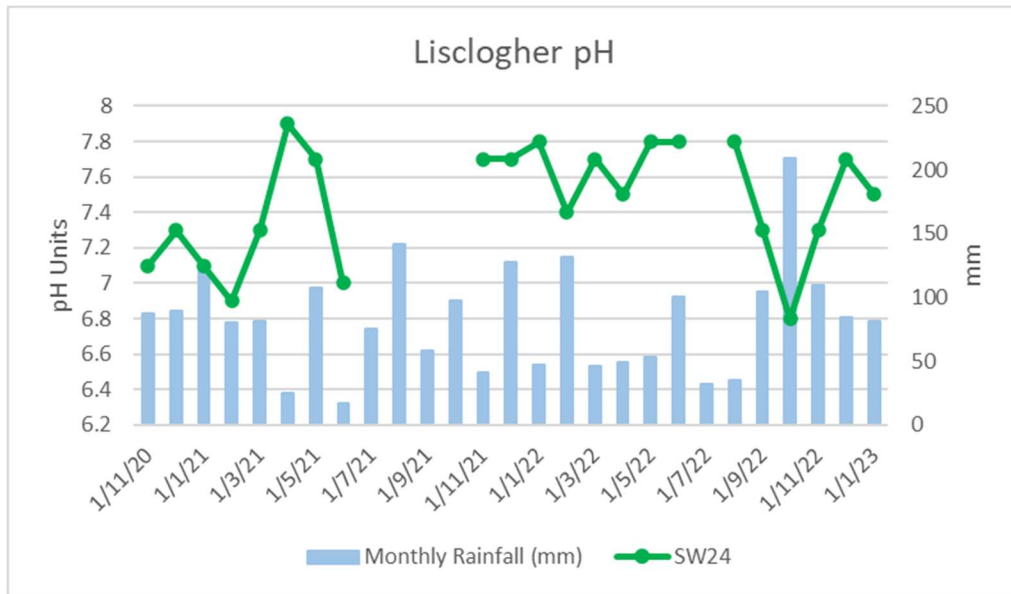


Plate 12-3 Results of pH monitoring at Lislogher West November 2020 - January 2023

DRAFT

Table AP12.1. Water quality data for 12 months from November 2020 to Dec 2021 at Lislogher West bog.

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids			
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	2	2	17	3	3	3	4	14	N/F	N/F	N/F	N/F	2	2	9	16	2	5	11	7	4	2	2	2	3	2	
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5	81.1
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
				mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
Derrygreenagh	P0501-01	Lislogher	SW24	354	224	471	271	204	222	522	388	N/F	N/F	N/F	N/F	342	274	265	456	324	404	276	283	N/F	178	471	569	358	253	341
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	71	41	93	62	52	44	90	88	N/F	N/F	N/F	N/F	56	59	58	87	62	75	58	52	N/F	36	92	113	88	58	68
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
Derrygreenagh	P0501-01	Lislogher	SW24	7.1	7.3	7.1	6.9	7.3	7.9	7.7	7	N/F	N/F	N/F	N/F	7.7	7.7	7.8	7.4	7.7	7.5	7.8	7.8		7.8	7.3	6.8	7.3	7.7	7.5
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5	81.1
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	0.09	0.05	0.09	0.05	0.08	0.05	0.05	0.25	N/F	N/F	N/F	N/F	0.05	0.05	0.06	0.07	0.05	0.06	0.07	0.11	N/F	0.06	0.06	0.06	0.05	0.05	0.05
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	198	154	144	150	186	377	311	425	N/F	N/F	N/F	N/F	427	374	443	362	310	297	384	413	N/F	466	291	255	427	419	410
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	0.124	0.044	0.094	0.055	0.114	0.149	0.066	1.16	N/F	N/F	N/F	N/F	0.1	0.105	0.138	0.079	0.107	0.139	0.111	0.242	0.184	0.102	0.077	0.058	0.158	0.123	
			Monthly Rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5	81.1
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Derrygreenagh	P0501-01	Lislogher	SW24	30	19.6	29.6	21.3	20.4	16.2	32.5	27.2	N/F	N/F	N/F	N/F	26	24	21.3	31.9	24.6	28.9	20.4	19.4	N/F	15	34	44.3	32.1	21.9	25.8



## APPENDIX XIII. FOREST TO BOG RESTORATION.

There have been several case-studies and examples of the removal of planted conifer forestry from raised and blanket bogs to support raised bog restoration in Ireland and Britain. Mackin et al. (2017) provided case studies and guidance for the removal of forestry from raised bogs carried out Coillte in Ireland. Key issues include

- establishing if a forestry crop is commercially viable;
- ground conditions, the use of a forestry harvester and the use of brash;
- limiting impacts to the bog surface;
- the potential for peat-forming bog vegetation;
- blocking forestry drains;
- timing of forestry operations;
- re-planting obligations;
- re-growth of trees.

Forest to bog restoration is gaining more and more interest in Scotland, Wales and England, particularly when considering the value of peatlands as a carbon store, carbon sink potential and other ecosystem services like biodiversity. Forest to bog restoration is seen as one way to lower carbon emissions from areas of peatlands that were planted with forestry (Hermans et al. 2019, Anderson 2021). It may take 15-20 years after restoration before there is a net positive climate action impact. Forest biomass (the timber) is a sink for carbon and forest to bog restoration is only recommended for conifer stands where there is a low conifer yield class. However, the long-term climate action benefit of continued forestry management on these deep peats is not likely to match the benefits of peatland restoration.

Felled-to-waste restoration (felling trees and allowing them to decompose naturally) has largely been replaced by newer management approaches (whole tree harvest, re-profiling, furrow blocking), which have the potential to accelerate recovery of water table and vegetation (Anderson 2017, Hermans et al. 2019, Anderson 2021). One key issue highlighted by the original trials and research was the regrowth of trees that were colonising the somewhat drier low ridges in the peatland that were originally created when the peatland was drained. New methods to counteract this issue include re-profiling of the drained peatland surface to flatten out this micro-topography. This includes stump-flipping, where conifer stumps are pulled out and pushed back into the bog to remove a slightly drier mound. Surface smoothing is a technique that flattens out the ridges created by drainage. These new techniques, in addition to drain-blocking, create a surface where there are optimised water levels close to the bog surface and this will help reduce new tree colonisation as the bog is recovering.

Bord na Móna worked with NPWS and private contractors to apply these techniques to a small area of Carrenagappaul Bog, Co. Galway as part of the recent Living Bog LIFE Project.

The Forestry Commission in England (Forestry Commission 2022) have recently published a draft decision-making support tool to support decisions about forestry and peat, when to restore peatlands, when to re-plant forestry, when to fell and allow development of a different habitat and when to establish new woodland/forestry on peat soils. The application of this tool to the conifer forestry on the Lislogher West site indicates that forest to bog restoration is appropriate as:

- This is a deep peat raised bog site with peat depths of between 3-6 m.
- There is important habitat on site (Annex I degraded raised bog capable of restoration)
- The conifer trees are likely to be having a negative impact of the condition of this habitat.

- This overall site (Lislogher West Bog) has been identified as having high restoration potential and is targeted for restoration.
- The yield class for the planted conifers on the bog is less than YC10.

It is proposed to trial forest to bog restoration at Lislogher West Bog. The target area (approx. 7 ha) is relatively small and suitable to be developed as a trial. Trees will be felled and removed, conifer stumps will be “flipped”, the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. Bord na Móna will engage with practitioners of forest to bog restoration in Britain to be able to apply these new techniques at Lislogher West. This trial will allow Bord na Móna to learn new forest to bog techniques and will inform the feasibility and potential to use these new techniques at other sites to remove conifers. The first step of this proposed restoration is to engage and reach agreement with Coillte and with the Forest Service.

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