



APPENDIX 4-2

**DRAFT BORD NA MÓNA
CUTAWAY BOG
DECOMMISSIONING AND
REHABILITATION PLAN**



Bord na Móna

Lemanaghan Bog (Kilnagoolny)

**Draft Cutaway Bog Decommissioning
and Rehabilitation Plan
2025**

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

“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 Lemanaghan 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 Lemanaghan Bog.

Bord na Móna have defined the key rehabilitation outcome at Lemanaghan Bog as environmental stabilisation.

*This rehabilitation plan for the **main section of Lemanaghan Bog** (Kilnagoolny) has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. A rehabilitation plan **for part of Lemanaghan Bog** (Derrynagun and Curraghalassa) has been fully finalised in 2024 and rehabilitation as part of the Peatland Climate Action Scheme was started in 2024. Bord na Móna expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Lemanaghan Bog, such as renewable energy, 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.

Document Control Sheet							
Document Name:		Lemanaghan Rehab Plan 2025 – sub con application v3					
Document File Path:		Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Boora ref.500\Lemanaghan					
Document Status:		Draft					
This document comprises:		DCS	TOC	Text (Body)	References	Maps	No. of Appendices
		1	1	31	4	0	9
Rev.	0.1	Author(s):		Checked By:		Approved By:	
Name(s):		JOS		MMC		MMC	
Date:		29/06/2022					
Rev.	1	Author(s):		Checked By:		Approved By:	
Name(s):		LC		MMC		MMC	
Date:		26/06/2024		17/07/2024			
Rev.	1.1	Author(s):		Checked By:		Approved By:	
Name(s):				MMC		MMC	
Date:				5/09/2025		5/09/2025	

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Non-technical summary

- Bord na Móna is updating the draft rehabilitation for the main part of Lemanaghan Bog, located in Co. Offaly.
- Lemanaghan Bog is part of the Boora Bog Group with Bellair North and Bellair South Bogs located to the north and Turraun, Derries and Pollagh Bogs located to the south-east of the site.
- Lemanaghan Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat.
- Industrial peat harvesting has now finished at Lemanaghan Bog.
- Lemanaghan Bog is a large bog that is well spread out over four main sections, one large main bog with three isolated, smaller bogs, 'cut' off by roads. The current rehabilitation plan refers to the main section of bog and the lobe to the north. Much of the main section of the bog has been in production since 1959 and comprises 'red' acidic peat associated with sod and milled peat production with smaller areas of pioneer cutaway vegetation. Blacker fen peat exists in the south associated with former sod-peat production.
- This draft rehabilitation plan **excludes** the southern two lobes of Lemanaghan Bog at Derrynagun (south east) and Curraghglassa (south west). Both these areas have been proposed for rehabilitation separately, under the Peatland Climate Action Scheme (see [2024 Bogs - BNM Peatlands Climate Action Scheme \(bnmpcas.ie\)](https://bnmpcas.ie)) and this rehabilitation is ongoing. These lobes are separated from the main bog by the R436 Ferbane-Clara road.
- This draft rehabilitation plan has been prepared as Bord na Móna as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- In general, soggy ground conditions are preferred. Rewetting the remaining peat will result in plants that prefer wetter conditions, like Bog Cotton, will thrive.
- 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.
- Peatland rehabilitation of this bog 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.
- Drain blocking at Lemanaghan will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.
- Many Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds and Birch woodland on shallower peat. In time a naturalised peatland can be developed.

- It will take some time for vegetation and habitats to fully develop at Lemanaghan, and a peatland ecosystem to be restored. However, it is expected that most of the remaining bare peat will be developing pioneer habitats after 5-10 years.
- The development of a range of habitats at Lemanaghan Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. 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.
- 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. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog 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.

1. INTRODUCTION

BnM (formerly known as Bord na Móna) operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. P0500-01). 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. Lemanaghan Bog is part of the Boora bog group (see Appendix I for details of the bog areas within the Boora bog group). Lemanaghan Bog is located in Co. Offaly, approximately three kilometres north-east of Ferbane in Co Offaly.

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 V).
- 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.

Bord na Móna have announced the complete cessation of industrial peat production across its estate (January, 2021).

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Lemanaghan Bog, and how the site will be rehabilitated. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

It has been 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. The Peatlands Climate Action Scheme is expected to operate between 2021-2025. Over 21,000 ha of cutaway peatlands have already been rehabilitated as part of this scheme to date, across multiple Bord na Móna peatlands.

Enhanced rehabilitation measures have started as part of the PCAS project at the two separate southern lobes of Lemanaghan Bog, Derrynagun (south east) and Curraghglassa south west) separated from the main bog by the R436 Ferbane-Clara road. Both areas are excluded from this rehabilitation plan. PCAS measures are **NOT** proposed as part of this draft Lemanaghan rehabilitation plan (*Kilnagoolny*), which applies specifically to the main area of the Lemanaghan Bog at this stage. The potential implementation of enhanced rehabilitation measures across the rest of Lemanaghan will be dependent on the selection of the remaining site to be included in PCAS.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

“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 document covers the area of **Lemanaghan Bog**.

Industrial peat extraction at Lemanaghan Bog permanently ceased in 2019 (having commenced bog development in 1959). However, the bog was in sod-peat production for some time and it is only relatively recently that extensive areas had gone into milled peat production (within the past 15 years). As a result, deep peat reserves remain on much of the former industrial production area of Lemanaghan Bog, with ‘red’ acidic peat remaining. The former industrial production area is beginning to develop pioneer vegetation since the cessation of peat production.

There are known rights of way around the margins of Lemanaghan Bog. 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.

Rehabilitation in other areas of the bog may also be constrained due to other property issues.

Parts of Lemanaghan Bog (within and outside the areas owned and under the control of Bord na Móna) are currently being used by domestic turf cutters for intensive private sod peat production. 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 Lemanaghan Bog that are outside of the control of Bord na Móna. 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.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or archaeological features. There are known archaeological features present at Lemanaghan Bog, which will constrain rehabilitation activities. An area in the north-eastern section of the site is subject to a grazing license.

2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. 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 surveys, additional confirmatory site visits (covering the period 2012 to 2022 inclusive) and monitoring and desktop analysis, forms the basis for the development of this 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-practice 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 peat depth data;
- Hydrological modelling;

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 practice 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.
- 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.
- Quinty & 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:

- Boora bog group Integrated Pollution Control Licence;
- Boora bog group Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (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);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);

- River Basin Management Plan for Ireland 2022-2027;
- Bord na Móna Annual Reports;
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17/2019>.

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, Lemanaghan Bog was surveyed in January of 2011. Additional ecological walk-over surveys and visits have taken place at Lemanaghan Bog between 2017 - 2024. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice 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 (2010), while mosses and liverwort nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Lemanaghan Bog is contained in Appendix II. Note this includes reference to areas outside of the currently proposed rehabilitation plan, i.e. Derrynagun (south east) and Curraghlassa (south west) which are being rehabilitated under the Peatland Climate Action Scheme.

3. SITE DESCRIPTION

Lemanaghan Bog is located in Co. Offaly, approximately 3 km north-east of Ferbane (Grid reference: N 15896 27986). Lemanaghan Bog is part of the Boora Bog Group with Bellair North and Bellair South Bogs located to the north and Turraun, Derries and Pollagh Bogs located to the south-east of the site.

Lemanaghan Bog is a large bog that is well spread out over four main sections, one large main bog with three isolated, smaller bogs, 'cut' off by roads. This draft rehabilitation plan refers to the main section of bog and the lobe to the north. Much of the main section of the bog has been in industrial peat production since 1959 and comprises 'red' acidic peat associated with sod and milled peat production with smaller areas of pioneer cutaway vegetation. Blacker fen peat exists in the south associated with former sod-peat production. A mineral island containing farmland and associated habitats is located close to the centre of the main section of the bog and is partially owned by Bord na Móna. A roadway extends through the bog to this mineral island. A relatively large area of the main site has been given over to private sod-peat production.

Lemanaghan Bog is located within the Lower Shannon Catchment (Catchment ID: 25A) as defined by the EPA under the Water Framework Directive (WFD) and is situated mainly within the Brosna_SC_060 sub-catchment and partly within the Shannon [Lower]_SC_10 and Shannon [Lower]_SC_30 sub-catchment. The bog drains via a number of drainage channels into streams in the surrounding area, all of which flow into the River Brosna south of the bog, which eventually flows into the River Shannon, north of Banagher.

Lemanaghan Bog has a partially pumped drainage regime.

Two southern lobes of Lemanaghan Bog (Derrynagun (south east) and Curraghglassa (south west)), separated from the main bog via the R436 Ferbane-Clara road, are being rehabilitated under PCAS and subject to a separate rehabilitation plan [2024 Bogs - BNM Peatlands Climate Action Scheme \(bnmpcas.ie\)](https://www.bnmpeatlands.ie/). See Drawing number BNM-ECO-23-27-01: Bog Site Location, included in the accompanying Mapbook¹, which illustrates the location of Lemanaghan Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Lemanaghan Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat.

Industrial peat extraction at Lemanaghan Bog permanently ceased in 2019 (having commenced bog development in 1959). However, the bog was in sod-peat production for some time and it is only relatively recently that extensive areas had gone into milled peat production (within the past 15 years). As a result, deep residual peat remains on part of the former production area of Lemanaghan Bog, with 'red' acidic peat remaining. The former production area is beginning to develop pioneer vegetation since the cessation of industrial peat production.

¹ Cutaway Bog Decommissioning and Rehabilitation Plan – Lemanaghan Bog Map Book

3.1.2 *Current land-use*

Industrial peat production has now permanently ceased at Lemanaghan Bog since 2019. Much of the production area comprises bare peat, with developing pioneer vegetation. Areas that have been out of production for longer have more established pioneer cutaway vegetation with scrub and Birch woodland present.

There are some areas of active turbary around the margins of the site. These are mapped in the accompanying Mapbook.

There was ongoing hydrological management via pumping to support the former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

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 Lemanaghan Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of horticultural peat, sod peat and fuel peat. Employment numbers have now declined with the cessation of peat extraction at this bog.

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.

In respect of Lemanaghan Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of horticultural peat, sod peat and fuel peat. Employment numbers have now declined with the cessation of peat extraction at this bog.

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.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology² of the northern section of Lemanaghan Bog comprises Waulsortian limestone (Massive unbedded lime-mudstone). A narrow band of Ballysteen Formation (Dark muddy limestone, shale) occurs to the south of this. The majority of the southern section comprises Navan Beds (Dark limestone, mudstone, sandstone) and Old Red Sandstone (undifferentiated) (Red conglomerate, sandstone & mudstone).

The bog has a variable topography and several small mounds have been exposed with exposed glacial gravel.

3.2.2 Peat type and depths

Lemanaghan Bog has a variable peat depth. Much of the bog particularly, the eastern side of the bog, has been in production since 1959. However, the bog was in sod-peat production for some time and it is only recently that extensive areas had gone into milled peat production (within the past 15 years). As a result, much of the former industrial production area still has 'red' acidic deep peat. The bog still also contains reserves of deep peat across the north-eastern and north-western arms. The central section has a range of peat depths, with the majority less than 1 m in depth, with pockets of deep peat (+2.6 m) also remaining.

3.3 Key Biodiversity Features of Interest

The majority of the former production area of Lemanaghan Bog is now dominated by bare peat, with pioneer cutaway habitats at various stages of development. A detailed ecological report is provided in Appendix II. Note this includes reference to areas outside of the currently proposed rehabilitation plan, i.e. Derrynagun (south east) and Curraghlassa (south west) which are being rehabilitated under the Peatland Climate Action Scheme.

3.3.1 Current habitats

The most common habitats³ present at this site include:

- Bare peat Cutover Bog (PB4)
- Remnant Raised bog (PB1)
- Pioneer poor fen (PF1)
- Pioneer Heather-dominated vegetation (in mosaic with scrub and poor fen) (PB4)
- Birch-dominated scrub and Birch woodland (WS1, WN7)
- Pioneer dry Purple Moorgrass-dominated grassland (GS3/4)
- Conifer Plantation (WD4)
- Drains (FW4)
- Dry meadows and grassy verges (GS2)
- Dense bracken (HD1)

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

³ Codes refer to Heritage Council habitat classification, Fossitt 2000

- Wet grassland (GS4),
- Pioneer dry calcareous grassland (GS1)
- Riparian zones and silt ponds (including drainage ditches (FW4) and depositing lowland river (FW2))

Main central section

The majority of the central section of the site is dominated by bare peat. The south western part of this section has developed pioneering vegetation including dry Heather dominated vegetation, Birch scrub, *Molinia* dominated grassland and poor fen. Marginal habitats found around the edges of the site included Birch woodland, dry calcareous grassland and remnant raised bog.

A mineral island containing farmland and associated habitats is located close to the centre of the main section of the bog and is partially owned by Bord na Móna. The most northerly mineral island is owned by BnM and consists of agricultural grassland, hedgerows and scrub. The grasslands are cut for silage once a year (leased from BnM) with no domestic animals kept on the grassland.

Main section – southern part (south of works area)

The bare peat in the southern half of the former industrial production area is mainly blacker fen peat. These cutaway sections are legacies of the former sod-peat production. On either side of the remaining high bog there are several fields that are at various stages of pioneer cutaway habitat development. The central parts are higher and are influenced by a series of underlying large ridges/mounds that run through the bog in a N-S direction.

There is a small area of ditched bog that never used for peat extraction along the Ferbane-Clara road in the southwestern section. This high bog is very dry and dominated by Heather. There has been significant subsidence along the drains creating troughs and ridges through-out the bog. This area is being assessed as a potential sod turf cutting relocation site.

See Drawing number BNM-ECO-23-27-17 titled **Lemanaghan Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Lemanaghan Bog.

3.3.2 Species of conservation interest

A number of species of conservation interest have been recorded at Lemanaghan Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

Multiple mammal species have been recorded on or within 1 km of the bog including Irish Hare (*Lepus timidus subsp. hibernicus*), Eurasian Badger (*Meles meles*) and Eurasian Red Squirrel (*Sciurus vulgaris*).

Regarding lepidopteran species, records exist for the following species recorded on Lemanaghan Bog: Common Blue (*Polyommatus icarus*), Meadow Brown (*Maniola jurtina*), Ringlet (*Aphantopus hyperantus*), Small Tortoiseshell (*Aglais urticae*), Speckled Wood (*Pararge aegeria*), Wood White (*Leptidea sp.*) and the species of conservation concern Large Heath (*Coenonympha tullia*) and Small Heath (*Coenonympha pamphilus*). Other species of conservation concern recorded within 1 km of Lemanaghan bog include Marsh Fritillary (*Euphydryas aurinia*), Dingy Skipper (*Erynnis tages*) and Dark Green Fritillary (*Argynnis aglaja*).

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Red listed species Lapwing (*Vanellus vanellus*), Kestrel (*Falco tinnunculus*), Woodcock (*Scolopax rusticola*), Snipe (*Gallinago gallinago*), and Meadow Pipit (*Anthus pratensis*), as well as other common bird species

including included Bullfinch (*Pyrrhula pyrrhula*), Jay (*Garrulus glandarius*), Long-tailed tit (*Aegithalus caudatus*), Wood Pigeon (*Columba palumbus*), Blue Tit (*Cyanistes caeruleus*), Blackbird (*Turdus merula*), Pheasant (*Phasianus colchicus*), Rook (*Corvus frugilegus*), Hooded Crow (*Corvus cornix*) and Wren (*Troglodytes troglodytes*) have all been recorded during BNM ecology surveys. The site is used occasionally during the winter by small flocks of Whooper Swan and Hen Harrier (Biosphere Environmental Services, 2014).

NBDC records for red-listed⁴ bird species of conservation concern recorded in the 10km square (N12) which Lemanaghan intersects include the species: Meadow Pipit (*Anthus pratensis*), Swift (*Apus apus*), Goldeneye (*Bucephala clangula*), Dunlin (*Calidris alpina*), Stock Dove (*Columba oenas*), Corncrake (*Crex crex*), Yellowhammer (*Emberiza citrinella*), Kestrel (*Falco tinnunculus*), Snipe (*Gallinago gallinago*), Grey Wagtail (*Motacilla cinerea*), Curlew (*Numenius arquata*), Red Grouse (*Lagopus lagopus*), Grey Partridge (*Perdix perdix*), Golden Plover (*Pluvialis apricaria*), Woodcock (*Scolopax rusticola*), Redshank (*Tringa tetanus*), Redwing (*Turdus iliacus*), Barn Owl (*Tyto alba*) and Lapwing (*Vanellus vanellus*).

3.3.3 Invasive species

There are no NBDC or BNM records for high impact invasive species from Lemanaghan Bog. A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are a number of European Sites (SAC's or SPA's) in close proximity (i.e. within a 10 km radius at minimum) to Lemanaghan Bog. Lemanaghan Bog has no overlapping designated sites. The nearest EU Designated sites to Lemanaghan Bog are as follows:

- Ferbane Bog SAC (site code: 000575) located approximately 1.3 km south-west
- Clara bog SAC (site code: 000572) located approximately 3.4 km east
- Moyclare bog SAC (site code: 000581) located approximately 5 km south-west

There are also a number of nationally designated sites in proximity to Lemanaghan Bog. The aforementioned SACs are also designated as Proposed Natural Heritage Areas (pNHAs). Additionally, pNHAs include the Grand Canal pNHA (site code: 002104), located approximately 963m south, and Doon Esker Wood pNHA (site code: 001830), located approximately 4.2km north of the Lemanaghan. Clonydonnin Bog NHA (site code: 000565) is located 2.7 km north-west of the bog.

See drawing *BNM-ECO-23-27-23: Lemanaghan Bog Proximity to Designated Sites* in the accompanying map book.

⁴ Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

The closest Ramsar Sites to Lemanaghan Bog are Clara bog (Ramsar site no. 415) located approximately 3.4 km east and Mongan bog (Ramsar site no. 416) located approximately 5 km south-west.

Clara bog is designated as it is one of the largest remaining examples in Ireland of a “midland” raised bog with well-developed microtopography of hummocks, hollows, pools and sphagnum lawns. The Site also supports bog woodland species, rare butterflies, a rare click beetle and a rare moss. It is a breeding site for the merlin (*Falco columbarius*) and a habitat for the European otter (*Lutra lutra*), both species protected under the EU Habitats Directive.

Mongan Bog is an excellent example of a midland raised bog with several special features. The central part is unusually wet and has a particularly pronounced pattern of hummocks, pools and lawns, suggesting that this area is still growing. The bog supports various rare plants or plants with a limited distribution in Ireland. The site is internationally important for wintering Greenland White Fronted Goose (*Anser albifrons flavirostris*).

3.5 Hydrology and Hydrogeology

Lemanaghan bog lies within three different catchments as defined by the EPA under the Water Framework Directive (WFD). The majority of Lemanaghan bog forms part of the Lower Shannon Catchment (Catchment ID: 25A), with a small area at the tip of the north-eastern arm falling into the Upper Shannon Catchment (Catchment ID: 26G), and a small portion of the western arm lying in the Lower Shannon Catchment (Catchment ID: 25B). The bog also lies within three different sub-catchments, with the majority of the bog falling into the Brosna Sub-catchment (Sub-catchment ID: 25A_8), a small part of the of the north-eastern arm falling into the Shannon[Lower]_SC_010 (sub catchment ID: 26G_3), and a small portion of the western arm lying in the Shannon[Lower]_SC_030 (sub catchment ID: 25B_2).

There are several rivers and stream within the site and around the margins that drain the site. The Lemanaghan Stream (EPA code: 25L04), a first order watercourse, arises just outside the northern boundary of the north-western arm of the site and flows in an easterly direction partially along the site boundary, eventually veering south and flowing through the central section of the bog, before flowing into the River Brosna, approximately 2 km south of Lemanaghan Bog.

The first order EPA watercourse Fortified House Castlearmstrong (EPA code: 25L72), flows partially along the eastern bog boundary in a south-easterly direction. These watercourses are all tributaries of the River Brosna (EPA code: 25B09).

Lemanaghan Bog has a partially pumped drainage system, with two pumps in the central section of the site.

GSI data indicates that the majority of Lemanaghan Bog lies within a locally important aquifer - bedrock which is moderately productive only in local zones. A large area of the central section of the site lies within a Locally Important Aquifer - Bedrock which is Generally Moderately Productive. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller

public water supplies, group schemes), or good yields (100-400 m³/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m³/d), dependable springs may be associated with these aquifers.

All of the former peat production area of Lemanaghan Bog is located in an area mapped by GSI as of low groundwater vulnerability. Some small areas along the bog margins and the mineral island area in the north-east of the site lie within areas of moderate groundwater vulnerability (GSI Map viewer). Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Lemanaghan is generally underlain by peat. In a wider context, the bog is surrounded by till derived from limestones, Gravels derived from Limestones, lacustrine sediments and alluvium.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Lemanaghan Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BNM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a regular basis by Bord na Móna to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in Drawing numbers BNM-ECO-23-27-02 titled **Lemanaghan Bog: Structures and Sampling**, along with Drawing number BNM-ECO-23-27-WQ01 titled **Lemanaghan Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Lemanaghan Bog.

3.7 Fugitive Emissions to air

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

The bog is likely to be a carbon source as it is a drained (degraded) peatland with some active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural peatland which acts as a modest carbon sink into a cutaway ecosystem which is a large source of carbon dioxide (2–5 t C/ha/year) (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). Furthermore, they are also a significant source of methane (Huttunen *et al.*, 2003; Laine *et al.*, 2007a) as a consequence of the conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. 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 CO₂ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson *et al.* 2018).

It is expected that Lemanaghan 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 *Sphagnum*-rich habitats, poor fen, Heather and Birch woodland along with some wetland habitats with open water, Reed Swamp and fen habitats. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of Lemanaghan Bog can be rated as **Local Importance; lower value to Local Importance; higher value**. Bare peat in the former production area of Lemanaghan Bog, and other intensively managed areas are assessed as **local importance (lower value)**.

Marginal habitats and including woodland, scrub, pioneer cutaway habitats and remnant raised bog may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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 Boora bog group, including Lemanaghan Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc.).
- Consultation for the preparation of the Lemanaghan PCAS rehabilitation plan relating to Derrynagun and Curraghlassa associated with Lemanaghan Bog 2024 (PCAS) [2024 Bogs - BNM Peatlands Climate Action Scheme \(bnmpcas.ie\)](https://www.bnmpeatlands.ie/2024-Bogs-BNM-Peatlands-Climate-Action-Scheme).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Lemanaghan 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 Lemanaghan Bog.

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

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced for rehabilitation for this section of Lemanaghan Bog.

4.3 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not commenced for this section of Lemanaghan Bog.

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.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- 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.
- 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.

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

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at Lemanaghan Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Lemanaghan 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. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new 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 Lemanaghan Bog 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).

- Bord na Móna are also planning rehabilitation measures in some nearby bogs e.g. Lemanaghan PCAS extent (Derrynagun (south east) and Curraghglassa (south west) and Ballaghurt in 2024, and rehabilitation has taken place in several surrounding bogs in 2022/23, including Ballaghurt, Glebe, Bunahinly, Kilgarvan, Bloomhill and Blackwater bogs. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The main area of Lemanaghan Bog **excluding** (Derrynagun (south east) and Curraghglassa (south west).
- EPA IPC Licence - Ref. P0500-01. 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. Lemanaghan bog is part of the Boora bog group.
- The local environmental conditions of Lemanaghan Bog mean that intensive drain blocking is the most suitable rehabilitation approach for this site.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Lemanaghan Bog as **environmental stabilisation** and **optimising residual peat re-wetting**, to enhance the development of compatible habitats.
- The cutaway is predominantly bare peat and has begun to develop pioneer cutaway habitats. Rehabilitation is proposed to enhance residual peat re-wetting while taking account of potential future infrastructure and land-uses (e.g. amenity).
- Rehabilitation of Lemanaghan 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.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these 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 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).
- The majority of this bog has been cutaway. Lemanaghan bog has a partially pumped drainage regime, which will need to be considered as part of the wider rehabilitation. A mosaic of wetland habitats is the most compatible habitat that can be developed in response to re-wetting, if pumping ceases or is reduced.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to 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.** There are a number of small, isolated areas (constraint), near the south-eastern and north-west margins that are subject to active turbary.

- **Archaeology.** There are archaeological features present at Lemanaghan Bog, which may similarly constrain rehabilitation activities. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. The rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future. Any newly discovered archaeology may require rehabilitation measures to be reviewed and adapted. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **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. Several Rights of Way exist at or around the margins of Lemanaghan Bog, most of which lead to known turbary areas.

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:

- Areas with active turbary.
- The longer-term development of stable naturally functioning habitats at Lemanaghan 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 Lemanaghan Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- **The PCAS extent of Lemanaghan Bog** (Derrynagun (south east) and Curraghglassa (south west)) are part of a separate rehabilitation plan that was finalised as part of the Peatland Climate Action Scheme in 2024 and rehabilitation measures have started in this area.

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 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 a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

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 to offset potential run from 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) as per the IPC License requirements.
- 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, the results of monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 4 years, 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 4 years post cessation of peat extraction with ongoing rehabilitation indicate downward trends.

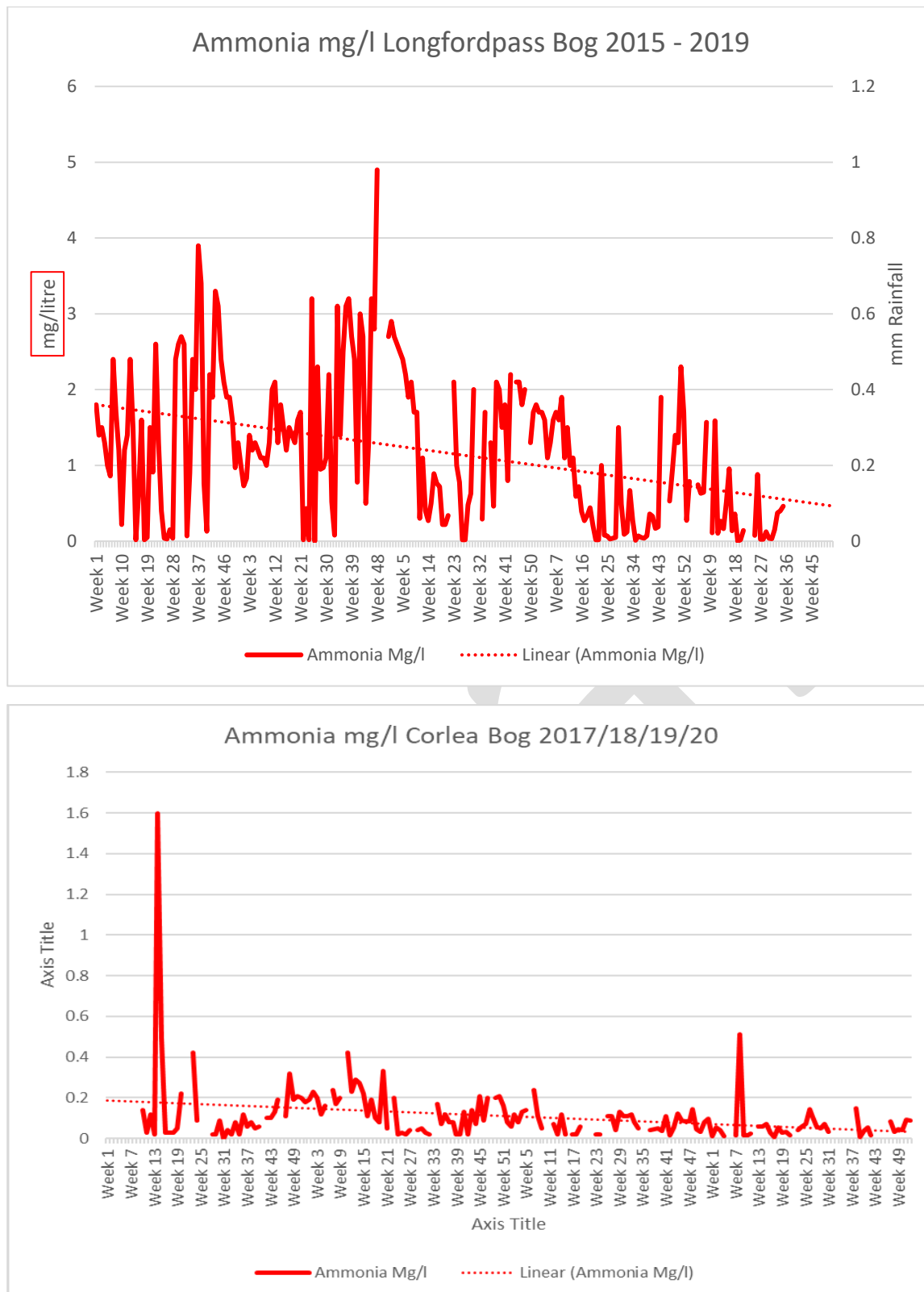


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

Table 7.1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Time-frame
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)	3 years
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

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).** 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.
- **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 practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective 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 cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch Woodland make take 20-30 years to develop. However, it may take 50 years for Active Raised Bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- 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. 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 based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is 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-ECO-23-27-21 titled ***Lemanaghan Bog: Aerial Imagery 2000***

BNM-ECO-23-27-21 titled ***Lemanaghan Bog: Aerial Imagery 2020***

BNM-ECO-23-27-22 titled ***Lemanaghan Bog: Peat Depths***

BNM-ECO-23-27-03 titled ***Lemanaghan Bog: LiDAR Map***

The restoration and rehabilitation measures are provisionally outlined in drawing titled BNM-ECO-23-27-20 ***Lemanaghan Bog: Standard Rehabilitation Measures*** in the accompanying Mapbook.

These rehabilitation measures for Lemanaghan bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with some permanent deeper water if pumps are decommissioned. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels of surrounding rivers.
- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes.
- Wetland measures including blocking outfalls and managing water levels with overflow pipes.
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. The 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 rehabilitation measures at Lemanaghan Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	441
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	328
Wetland cutaway	WLT1	Modifying outfalls and managing water levels with overflow pipes	122
Marginal land	MLT1	No work required	110
Constrained area	Constraint	Constraint - active turbary	113
Total Area			1114

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

8.1 Completed and Ongoing

- The majority of the site is still bare peat. Bare peat areas within the older cutaway areas are reducing due to natural re-colonisation of the cutaway. A small part of the site has already re-vegetated, with pioneer vegetation developing a mosaic of typical cutaway peatland habitats including scrub and Birch woodland.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Lemanaghan Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed 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.
- A review of remaining milled peat stocks 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. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site.
- 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.

8.3 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.
- 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.

8.4 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.

8.5 Timeframe

- **Year 1:** Short-term planning actions.
- **Year 1-3:** Short-term practical actions.
- **Year 1-3:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **> Year 3:** Decommission silt-ponds, if necessary

8.6 Budget and costing

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, 2023). 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 cutaway types across the site.

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.
- 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 photo, 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.
- Monitoring results will be maintained, trended 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.
- 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 monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- 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.

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.

10. REFERENCES

- Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.
- Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. *Restoration Ecology*, Issue 2 Pages 271-282.
- 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.
- Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) *Global Peatland Restoration demonstrating SUCCESS*. IUCN UK National Committee Peatland Programme, Edinburgh. <http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf>
- Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. <http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf>.
- Bord na Móna (2020). Bord na Móna Annual Report 2020. https://www.bordnamona.ie/wp-content/uploads/2020/07/M12822-BORD-NA-MONA_Annual-Report-2020_WEB2.pdf
- Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) *Peatland restoration and ecosystem Services- science, policy and practice*. Cambridge University Press.
- Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. *Moors for the Future Report No 16*. Moors for the Future Partnership.
- Clark, D. and Rieley, J. 2010. *Strategy for responsible peatland management*. International Peat Society, Finland.
- Clark, D. (2010). *Brown Gold. A history of Bord na Móna and the Irish peat industry*. Gill Books.
- Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. *Biology and Environment: Proceeding of the Royal Irish Academy*, Vol. 106B, No. 2, 65-116 (2006).
- Department of Communications, Climate Action and Environment 2019. *National Climate Action Plan 2019*. <https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx>
- Department of Housing, Planning, Community and Local Government 2017. *Public consultation on the River Basin Management Plan for Ireland*. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf
- Department of Arts, Heritage and the Gaeltacht 2015. *National Peatland Strategy*. Department of Arts, Heritage and the Gaeltacht. <http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf>
- Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). *The Wetland Restoration Manual*. The Wildlife Trusts, Newark.

- Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf
- European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.
- EPA (2019). <http://gis.epa.ie/Envision>. EPA Envision Map Viewer. (Last Viewed: 16/202/2022).
- EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan.
<http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html>.
- Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. *Wetlands Ecology and Management*, 11, 21-35.
- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, 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. & O'Connell, C.A. (1984). Further observations of *Sarracenia purpurea* L. in County Kildare (H19). *Irish Nat. Journ.* 21:264-266
- Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.
- Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decler, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. *Restoration Ecology* 27(S1): S1–S46.
- Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands *Journal of Environmental Management* 161.
- Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 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*. Moors For The Future Partnership.
- Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), *A Compendium of Peat Restoration and Management Projects*.
- Joosten, H. and Clarke, D. 2002. *Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making*. I.M.C.G. – I.P.S., Jyväskylä, Finland.
- Lindsay, R., 2010. *Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change* (Report to RSPB Scotland, Edinburgh).
- Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

- McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.
- Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, <http://www.mires-and-peat.net>
- McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.
- NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.
- NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. [https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan\(WEB_English\)_05_02_18%20\(1\).pdf](https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf)
- NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>
- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.
- NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority. <https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>.
- Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 17.08.2021
- Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.
- Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.
- Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

- Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.
- Schouten, M.G.C. 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; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.
- Smith, G., O'Donoghue, P., O'Hara, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.
- Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.
- Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf>
- Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.
- Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.
- Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.
- Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

APPENDIX I: BOGA GROUP CONTEXT

The Boora group of bogs are sited between Killeigh (Offaly) in the East to Banagher (Offaly) in the West and between Kinnitty (Offaly) in the south and Clara (Offaly) in the North. The River Shannon is the major river catchment for the area with a smaller area lying within the Barrow catchment.

The Boora Group is one of the oldest bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of the Boora Bogs in 1946 with milled peat production commencing in 1955. Milled peat was produced in the Boora Bogs for the supply of fuel peat to the power station in Ferbane which commenced power generation in 1957 and closed in 2001. The Boora bogs were also developed for the supply of milled peat to the Derrinlough Briquette factory, which commenced production in 1957. The bogs in The Boora Bog Group have also been used in the past to supply milled peat for the horticultural market.

Much of the Boora Bog complex became cutaway as it was in industrial peat production at an early stage. A number of rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Boora Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management (specifically Grey Partridge) and wetland creation. Some of this was carried out in the 1980s. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs at Boora, it was found that these require financial investment that at this time exceeds any potential commercial output value. The Lough Boora Discovery Park encompasses all areas relating to amenity and biodiversity (www.loughboora.com).

Since 2021 a significant portion of the bogs in Boora have been re-wetted within PCAS.

A breakdown of the component bog areas for the Boora Bog Group IPC License Ref. PO500-01, and current, indicative Peat Production Status, is outlined in Table Ap-2. See Drawing number BNM-ECO-23-27-24- titled **Boora Bog Group**, included in the accompanying Mapbook which illustrates the location of Lemanaghan Bog and the Boora Bog Group in context to the surrounding area.

Table Ap-2: *Boora Bog Group names, area and indicative status*

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killaun	359.5	Cutover Bog Industrial peat production commenced at Killaun Bog in 1996 and ceased in 2020. Only the upper most layers of peat have been harvested. Deep peat reserves remain on site. Killaun is considered a deep peat cutover bog.	Killaun Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Most of the former production area is bare peat.	2020	Draft 2017
Boora	1,842.4	Cutaway Harvested since the 1950's resulting in the exhaustion of the commercially viable peat resource at the bog. The majority of Boora Bog is considered a shallow peat cutaway bog. Some areas of deep peat persist at this site.	The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s). This site now forms the core of Lough Boora Discovery Park.	2020	Finalised 2021 Rehab complete

Pollagh/ Cornalaur	280.8	Cutaway At Pollagh Bog, industrial peat production began in 2004 and ceased in 2020. Peat reserves of variable depth remain on site. Some deep peat areas remain. Pollagh is considered a cutover bog with variable peat depths.	Pioneer emergent peatland vegetation communities are developing throughout the bog. The adjacent Cornalaur Bog was never developed for peat production.	2020	Finalised 2021 Rehab complete
Noggusboy	917.4	Cutaway Bog Industrial peat production commenced at Noggusboy during the 1950's and ceased in 2020. Long-term peat extraction has exhausted commercially viable peat reserves on this bog. Noggusboy is considered a shallow peat cutaway bog.	Part of the site was developed for conifer forestry by Coillte. Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999. There is some emerging naturally colonising cutaway.	2020	Finalised in 2022 Rehab complete (Noggusboy West)
Drinagh	1,339.1	Cutaway Bog Industrial peat production commenced at Drinagh during the 1950's and ceased in 2020. Some small pockets of deep peat reserves remain in parts of Drinagh Bog but most of the commercially viable peat reserves have been exhausted. Drinagh is considered a shallow peat, cutaway bog.	Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats. Some Coillte conifer forestry is also present. There is some emerging naturally colonising cutaway in Drinagh West. Derrinlough Windfarm has received planning permission and is under construction.	2020	Finalised 2023 Rehab ongoing
Killaranny	242.8	Cutover Bog Industrial peat production commenced at Kilaranny during the 1980's. Deep peat reserves remain on much of the bog. Kilaranny is considered a deep peat cutover bog.	Kilaranny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.	2020	Finalised 2022 Rehab complete
Oughter	352.9	Cutaway Development of Oughter Bog commenced in the 1960's. Industrial peat production ceased in 2012. Shallow peat depths remain over much of the former production bog area. Oughter is considered a shallow peat cutaway bog.	The site has naturally been re-wetting and there is already significant natural colonisation. Part of the site has been developed as the Midlands National Shooting Centre of Ireland.	2012	Finalised 2021 Rehab complete
Galros	191.5	Cutover Bog Industrial peat production commenced at Galros during the 1980's and ceased in 2020. Some areas of deep peat remain on the former production area. Galros is considered a cutover bog of variable peat depth.	Galros Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat. Some naturally emerging cutaway habitats are developing in part of the site.	2020	Draft 2025

Clongawny More	987.2	Industrial peat production commenced at Clongawny More during the 1950's and ceased in 2020. Some pockets of deep peat persist, particularly in the south-western portion of the former production area. Clongawny More is considered a cutover bog with variable peat depths throughout the site.	Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999. Some Coillte conifer forestry is also present. The site has naturally been re-wetting and there is already significant natural colonisation. BnM currently have submitted an application for renewable energy development on this bog. Derrinlough Windfarm has received planning permission and is under construction.	2020	Finalised in 2024 Rehab ongoing
Derrinboy	305.7	Cutover Bog Derrinboy was first developed by BnM in the 1980's. Peat production ceased at Derrinboy in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat have been harvested. Derrinboy is considered a deep peat cutover bog.	Derrinboy Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	Finalised in 2022 Rehab complete
Moneitta	707.5	Cutover Bog Moneitta was first developed by BnM in the 1970's. Peat production ceased at Moneitta in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Moneitta is considered a deep peat cutover bog.	Moneitta Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Lemanaghan Rail_Link	6.9	N/A	Not applicable	N/A	N/A
Derries	368.2	Cutaway Bog Development of The Derries Bog commenced in the 1960's. Industrial peat production ceased in 2005. Shallow peat depths remain over much of the former production bog area. The Derries Bog is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of site in 1999. Amenity trackway development in 2015. Part of the Lough Boora Discovery Park. The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2005	Finalised 2021 Rehab complete
Turraun	534.5	Cutaway Bog Development of Turraun Bog commenced in the 1950's. Industrial peat production ceased in 2018. Turraun is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2018	Finalised 2021 Rehab complete
Derryclure	327.6	Cutover Bog Derryclure was first developed by BnM in the 1980's. Peat production ceased at Derryclure in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested.	Derryclure Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2021

		Derryclure is considered a deep peat cutover bog.			
Lemanaghan	1,253.7	Cutover Bog Industrial peat production commenced at Lemanaghan during the 1950's and ceased in 2019. Varied peat depths across the site. Deep peat reserves remain on much of the former production area of Lemanaghan Bog. It is considered a cutover bog.	Lemanaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat. There are some naturally emerging cutaway habitats.	2020	Draft 2025 Rehab ongoing across part of site
Belair North	565.7	Cutover Bog Belair North was first developed by BnM in the 1960's. TPeat production ceased at Belair North in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Belair North is considered a deep peat cutover bog.	Belair North Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2025
Derrybrat	171.6	Cutaway Bog Industrial peat production commenced at Derrybrat during the 1950's and ceased in 2016. Derrybrat has shallow peat depths across the site. It is considered a shallow peat cutaway bog.	The site has been partially rehabilitated and there is already significant natural colonisation. Some conifer forestry has been developed by Coilte on the site.	2016	Finalised 2022 Rehab complete
Belair South	228.8	Cutover Bog Belair South was first developed by BnM in the 1970's. Peat production ceased at Belair South in 2020. This bog was used to supply horticultural peat. As a result, only the upper layers of peat were harvested. Belair South is considered a deep peat cutover bog.	Belair South Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2025

APPENDIX II: ECOLOGICAL SURVEY REPORT

Note: this Ecology Survey Report includes reference to areas outside of the currently proposed rehabilitation plan, i.e. Derrynagun (south east) and Curraghlassa (south west) which are being rehabilitated under the Peatland Climate Action Scheme.

Ecological Survey Report			
<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>			
Bog Name:	<u>Lemanaghan</u>	Area (ha):	1285ha
Works Name:	Boora	County:	Offaly
Recorder(s):	MMC & DF	Survey Date(s):	25 th & 26 th January 2011
Habitats present (in order of dominance) The most common habitats present at this site include: • Bare peat (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II). • Birch Scrub – (cBir, oBir, eBir) and Gorse scrub (eGor) • Pioneer dry heath (dHeath) (frequently in mosaic with bare peat and or Bog Cotton-dominated vegetation) • Pioneer poor fen vegetation dominated by Bog Cotton, Soft Rush and/or Marsh Arrowgrass (pEang, pTrig, pJeff) • Dry grassland habitats – (gMol, gCal) • Temporary open water (TOW) • Access routes (railways, tracks and associated habitats) • Riparian zones (Rip) (drains, channelised streams and associated bank habitats) • Works area • Silt ponds (Silt) The most common habitats found around the margins of this site include: • Conifer plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000) • Raised bog (PB1) • Cutover bog (PB4) • Dry heath (HH1) • Improved grassland (GA1) • Hedgerows (WL1) • Oak-Ash-Hazel woodland (WN2)			
Description of site Lemanaghan Bog is located approximately four kilometres east of Ferbane in Co Offaly. The R436 Ferbane-Clara Road passes along much of the southern end of the site (two small sections of the site are located to the south of this road) while the N62 Ferbane to Athlone Road forms a boundary with some of the western edge of the site. Pollagh village is located approximately 3.5 kilometres to the south of the site. Lemanaghan Bog is a large bog that is well spread out over four main sections, one large main bog with three isolated, smaller bogs, 'cut' off by roads. A mineral island containing farmland and associated habitats is located close to the centre of the main section of the bog and is partially owned by Bord na Móna. A roadway extends through the bog to this mineral island. A relatively large area of the main site has been given over to private sod-peat production.			

Much of the bog particularly, the eastern side of the bog, has been in production since 1959. However, the bog was in sod-peat production for some time and it is only recently that extensive areas have gone into milled peat production (within the past 10 years). As a result, much of the production area still has 'red' acidic peat and small areas where production has been in-active have developed more acidic type pioneer cutaway vegetation with Heather and Gorse prominent. An isolated section of the site in the south-west (south of the road) (Curraghalassa) contains some features of archaeological significance (20 gold coins dating from 1279-1301) and is not used for production as a result of this find. Other archaeological features that have been uncovered on the site include timber trackways and artefacts such as shoes.

An old pilgrim path (walking trail) follows the eastern boundary of the site. This trail connects Clonmacnoise with Ballycumber and is a way-marked trail.

Main section

A small works area is located towards the central part of the site. This area contains some small buildings and machinery. A long silt pond and pump are located immediately to the east of this area and the stream that flows through the site flows in and out of this silt pond.

For the most part sections of the site in the north-east and to the east of the access roadway (Castletown Bog) to the central mineral island (farm) are in full production and are mapped as bare peat. At the time of the ecological survey drainage works were on going in these sections of the site. Marginal habitats found around the edges of the site included bog woodland, dry calcareous grassland (gCal) and remnant raised bog. A small section of the site that the BnM boundary maps show within the site has been transformed into a go-cart racing track. A section of remnant raised bog in the south-eastern corner of the site was being subjected to turf cutting resulting in this habitat becoming drier.

A section of dry heath (dHeath) exists directly to the east of the mineral island (farm). This area has been ditched and had its top surface of vegetation removed in the past but it was now revegetated with Heather with patches of Birch scrub developing. An area with three silt ponds is located along the eastern boundary of the site. The access road to the mineral island consisted of a rough un-tarred track that was bounded by fragmented hedgerows. Three mature Scots Pine trees are located alongside the track.

There are two sections of mineral island (farm) that are located side by side within the site. Both sections are composed of grassland and hedgerows. The first mineral island is more southerly in aspect than the other. This section of agricultural grassland, scrub and hedgerow are in private ownership (farm) and is not managed by BnM. Some habitats that surround this area consist of bog woodland with an area of scrub and cutaway bog located to the south west, these afore mentioned habitats are located within the BnM property. The area of cutover bog is still used for turf cutting and drying and was also subjected to some dumping of domestic rubbish. To the east of this section of cutaway an area that up until ten years ago was used for industrial peat production, however since production ceased in this area poor fen and scrub habitats were developing.

The most northerly mineral island is owned by BnM and consists of agricultural grassland, hedgerows and scrub. The grasslands are cut for silage once a year (leased from BnM) with no domestic animals kept on the grassland. The hedgerows consisted of Ash, Oak, Birch, Holly, Blackthorn, Hazel, Willow and Gorse. These hedgerows have not been cut back in some time and are tall and leggy. Patches of scrub are also located within this area and these areas of scrub are developing into a mixture of Birch woodland (WN7) (along the edges of the mineral island) and Oak-Ash-Hazel (WN2) woodland. No domestic animals are kept on this mineral island but several Rabbits and Hare were observed, there were also signs of Badger. An old disused access track still remains that connected this mineral island with other farmland along the north western boundary of the site. There may be potential for some semi-natural calcareous grassland to be present around this mineral island, due to the long-term management of the area (grazing-farming).

South of the mineral island (farm) owned by Bord na Móna there is a small area of bog (between the mineral island and the railway to the south) that seems to have come out of production. There has been no production in this area for 10 years. This area has a variable topography and several small mounds have been exposed with exposed glacial gravel. These are being vegetated with dry calcareous grassland. The surrounding bog is a mosaic of bare peat and patches of poor fen dominated by Soft Rush and some marsh Arrowgrass. Towards the southern end there is a fall in the topography and there is some development of Bottle Sedge-dominated vegetation in an area that is wetter.

In the south-east corner, an area to the north of the R436 public road contained mainly bare peat and is in full production. A silt pond was located within this area and a stream (tributary of the Brosna River) flows along the western boundary. Some pioneer habitats, mainly Gorse scrub and Purple Moorgrass-dominated grassland were also becoming established along the western edge of this section. A bog road cuts through the northern end of this section. To the north of the bog road a small remnant section of raised bog is present. This section of raised bog is small, dry and degraded due to encroaching turf cutting. Pioneer habitats surrounding the remnant section of raised bog include dry calcareous grassland (gCal) and Purple Moorgrass-dominated grassland (gMol) with large areas of bare peat remaining.

Main section –southern part (south of works area)

The majority of this area is production bog with bare peat. There are several bands of cutaway vegetation several fields wide that have developed in the southern half. These areas of cutaway vegetation run most of the length of this section and are interspersed with several active production fields with bare peat. The bare peat in the southern half of the production area is mainly blacker fen peat. These cutaway sections are legacies of the former sod-peat production. A band of high bog (about 2 fields wide) mostly vegetated with dry heath (Heather), Purple Moor-grass-dominated vegetation and Birch scrub (oBir, cBir) has been left in the centre of each section where a deep drain flowed along the length of the bog. One of these cutaway strips also has an access zone where an old railway is found on the remaining high bog. On either side of the remaining high bog there are several fields that are also out of production and at various stages of pioneer cutaway habitat development. The central parts are higher and are influenced by a series of underlying large ridges/mounds that run through the bog in a N-S direction. These areas generally have denser Birch scrub (eBir and oBir) and some element of

Purple Moorgrass vegetation or dry grassland (gDa-An) development. The lower (and younger?) sections generally have typical poor fen vegetation with Soft Rush dominating. Further north, the poor fen vegetation generally peters out.

There are several areas along the central riparian zone-stream where there is some wet production bog. This is the lowest part of the site and there are pumps on both sides. However, there has been no pumping this year due to maintenance issues and water has been allowed to build-up on both sides.

The southern boundary of most of this section has a band of extensive cutover bog that has been given over for private sod-peat cutting. There is a deep drain (Rip) running the length of this section that contains Common Reed with an adjacent access track. Silt-ponds are also present towards the south-west corner and this riparian zone has developed mature Birch scrub. This area is a mosaic of more active cutover bog with bare peat and regenerating older cutover bog with typical communities such as pioneer dry heath (Heather (dHeath), Bog Cotton-dominated vegetation Purple Moorgrass-dominated vegetation and Birch scrub (oBir). The more active peat cutting seems to be taking place towards the south-west corner and this section has more bare peat and younger pioneer communities such as bare peat in mosaic with Soft Rush and Bog Cotton. Some of the older more established Bog Cotton and Purple Moorgrass-dominated vegetation (in the wetter areas) also contains hummocks of *S. papillosum*, *S. capillifolium* and *S. subnitens*.

There is a small area of ditched bog that never went into production along the Ferbane-Clara road in the south-western section. This high bog is very dry and dominated by Heather. There has been significant subsidence along the drains creating troughs and ridges through-out the bog. There are very poor prospects for any raised bog restoration within this section.

Derrynagun Bog

This section of bog is located to the south east of the main section of bog. The Ferbane-Clara road separates it from the main section of the site. This bog is still in full peat production and for the most part it is bare peat. Fringe habitats include Gorse scrub (WS1), Silt ponds, remnant sections of raised bog (PB1) and Birch woodland (WN7). The sections of remnant raised bog are small and very dry and are dominated by Heather. Some turf cutting is still carried out along the south eastern boundary of the site. An ancient track way has been uncovered in this section of bog in the past.

Northern section

This section of the bog is separated from the main section of the bog by a small public road, there is a rail connection to the more northerly Bellair Bog from this section of the site.

The majority of this section of the site is in active production and is mapped as bare peat. However approximately five production fields along the eastern boundary of the site have not been harvested within the past five years, resulting in the areas becoming revegetated with Heather. This section of the site does not appear to have ever been harvested to a great extent (approximately three peat harvesting seasons). A section of remnant raised bog is located along the eastern boundary of the site, this area of raised bog was dry and was dominated by Heather. Drains have recently been installed in this area, most likely by local turf cutters that are cutting turf along the north eastern boundary of the site.

North-west section

This section is 'cut-off' from the main section by the railway running around the site. This section extends to the Ferbane-Athlone (N62) road. The majority of this section is in active production and bare peat. It is relatively young and the peat is generally 'red' acidic peat. However, there is a significant area north of a second access zone that has not been in production for some time and is developing a mosaic of dry heath with Heather, Gorse scrub and scattered Birch. The stream that flows through the site flows along the northern boundary of this section. Along the southern margin of this area there is some high bog that is used for private sod-peat production. There has been some regeneration of pioneer dry heath and Bog Cotton within this area.

Curraghalassa Bog

This section of the site is located in the south-west corner and is 'cut off' from the rest of the site by the Ferbane-Clara Road. It mainly consists of ditched high bog where there has been no production due to archaeological constraints. It is surrounded by active cutover bog along the south-eastern boundary and there is encroachment from private cutting around other sections.

The high bog is very dry and dominated by Heather. The drainage has been very effective and there is significant subsidence along the drains creating ridges in the centres of the fields and troughs along the drains. There are only small patches of more typical high bog vegetation with Bog Asphodel more prominent. Occasional drains still have some *S. cuspidatum* where the drainage is slightly impeded. However the *Sphagnum* cover on the high bog is very low. The moss cover is generally represented by *Hypnum jutlandicum* and *Campylopus introflexus*. Birch (2-6 m high), some Pine and some Gorse are scattered over the bog with the central section becoming quite dense with trees between the two mineral mounds. Some of this area could be classified as Birch woodland/scrub (WN7). It also contains more frequent Purple Moorgrass and Bog Myrtle. However the majority of the woodland/scrub has been damaged recently by fire. This burn has also affected the high bog south of the mineral islands and significant areas of Heather have been burnt and the ground cover now has a significant portion of bare peat. The prospects for raised bog restoration at this stage are very poor and this area is more likely to develop Birch woodland in the long-term.

The main topographical features of this bog are two small mineral islands or mounds that both have several mature Oak and Ash. Some of the Oak trees are quite large. This woodland development (WN2) is related to the underlying mineral sub-soil. The woodland development is quite poor as both areas are small and the ground cover is dominated by Ivy and Bramble. Timber may have been removed from both mounds at some stage in the past. Other typical WN2 species include Hazel, Elder, Hawthorn, Blackthorn and Soft-Shield Fern. In both mounds the Oak-Ash-Hazel type woodland grades into more typical Birch woodland where Birch is dominant. Other typical species such as Bramble, Bracken, Broad Buckler Fern and Bilberry are present. One noticeable feature of the north-east mound was that there were several young Oak trees growing on peat within the Birch woodland/scrub around the mound.

Designated areas on site (cSAC, NHA, pNHA, SPA other) None Ferbane Bog cSAC (NPWS site code 000575) is located 2.3 km east of the site while The Grand Canal (NPWS site code 002104) is located to the south of the site. The Boora-Lemanaghan raillink (not surveyed) passes over the canal.
Adjacent habitats and land-use Surrounding habitats include remnant sections of raised bog (PB1), Conifer plantations (WD4), cutover bog (PB4), wet grassland (GS4), improved agricultural grassland (GA1), depositing river (FW2), Birch woodland (WN7) and a newly constructed go cart track (BL3) that is partly located within the BnM boundary.
Watercourses (major water features on/off site) • Tributaries (unnamed) of the Brosna River flow along the eastern boundary of the site and flow south to the River Brosna (2 km from site). • Another tributary flows through the centre of the site and is significantly channelised in a deep channel with poor riparian development. Parts of this stream were heavily silted, although Mallard were roosting in one section. There may be potential for Kingfisher along this stream. No signs of Otter were noted. • A further tributary of the Brosna River flows out of the south western corner of the site. • All water courses on or next to the site are part of the Shannon catchment.
Peat type and sub-soils The majority of the site still has 'red' acidic peat, although the site is now milled for fuel peat. Some of the areas initially in production have been inactive for some time and are now developing pioneer dry heath and scrub. There are some sections where blacker fen peat has been exposed. Glacial sub-soil seems to underlay much of the southern area and this is exposed in some places on the tops of mounds. Blue-silty clay is also exposed in places along the central stream and shell marl was exposed near the pumps. Shell marl was exposed in some of the drains in Derrynagun.
Fauna biodiversity Birds Several bird species were noted on the site during the survey. • Lapwing (4) on Derrynagun Bog. • Kestrel • Bullfinch (3) • Woodcock (1) • Jay (2) • Snipe (1) • Long-tailed Tit (using conifers adjacent to bog and road in SW area) • Other more common species included Meadow Pipit, Wood Pigeon, Pheasant, Blue Tit (4), Grey Crow Wren, Rook and Blackbird. Mammals Signs of several mammal species were recorded on the site. • Badger (scrapes) and signs of foraging in several locations • Fox (scats in several locations) • Rabbit (sighting, frequent signs around the bog)

- Hare (several sighted in different locations)
- Mink (tracks)

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

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APPENDIX III. 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 bowzers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowzers will be bunded to 110% capacity to prevent spills. Tanks for bowzers 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 IV. 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 Practice measures around the prevention and spread of Crayfish plague⁵ will be adhered with throughout all rehabilitation measures and activities.

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

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (now known as BnM) 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 Cúil na Mona bog group (Ref. P0-507-01). 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 Cúil na Mona 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.

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.

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 principal 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 River Basin Management Plan for Ireland 2022-2027 (DHLGH 2024) 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 2022-2027 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 (2022-2027) programme of measures. The NRBMP 2022-2027 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 2022-2027 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 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 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 NRBMP 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 is 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 NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation via PCAS is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. Bord na Móna are working with NPWS to identify bog restoration and other rewetted cutaway sites that can contribute towards Ireland's targets for the Nature Restoration Law.

8 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.

9 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.

10 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.

11 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.

12 National Archaeology Code of Practice

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.

13 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 EUs 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.

14 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.

APPENDIX VI. 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	Lemanaghan Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where 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.

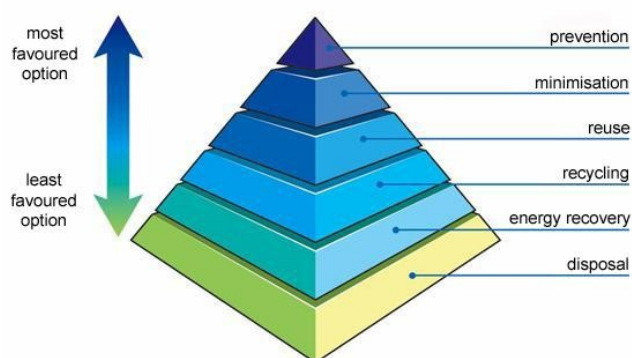
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

APPENDIX VII. 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 cutaway 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 (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there is a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

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).

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 VIII. 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 P0500-01, Boora Group of Bogs in County Offaly.

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 is 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:

Peat from the bogs is screened 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 P0500-01 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 31st 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 Boora 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. 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 Boora IPPC Licence P0500-01.

APPENDIX IX. 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.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, in line with advice on the implementation of the European Union (Good Agricultural Practice for Protected of Waters) (Amendment) Regulations 2022, latest statutory instrument below at link: <https://www.irishstatutebook.ie/eli/2022/si/113/made/en/pdf> will be adhered to at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m ³ 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 ³ 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 X. 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.



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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.



	Procedure: ENV017	Rev: 1
Title: Archaeological Findings	Approved: EM	Date: 13/10/2020

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	13/09/2020	First release	EMcD
2			