



## **Pollagh Bog**

### **Cutaway Bog Decommissioning and Rehabilitation Plan 2020**

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 Pollagh 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 permanently ceased at Pollagh Bog.*

*In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0500-01, due regard was also given to the proposed ‘Peatlands Climate Action Scheme’ (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund, Bord na Móna in developing a package of measures, ‘the proposed Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e. measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

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

*Bord na Móna have defined the key rehabilitation outcome at Pollagh Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland habitats.*

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## Table of Contents

Summary.....	6
1. Introduction.....	10
1.1 Constraints and Limitations.....	11
2. Methodology .....	13
2.1 Desk Study .....	13
2.2 Consultation .....	15
2.3 Field Surveys.....	15
3. Site Description.....	16
3.1 Status and Situation.....	16
3.1.1 Site history.....	16
3.1.2 Current land-use.....	16
3.1.3. Socio-Economic conditions.....	16
3.2 Geology and Peat Depths .....	18
3.2.1 Sub-soil geology.....	18
3.2.2 Peat type and depths.....	18
3.3 Key Biodiversity Features of Interest.....	18
3.3.1 Current habitats.....	18
3.3.2 Species of conservation interest .....	23
3.3.3 Invasive species .....	23
3.4 Statutory Nature Conservation Designations.....	23
3.4.1 Other Nature Conservation Designations .....	24
3.5 Hydrology and Hydrogeology .....	24
3.6 Emissions to surface-water and water-courses.....	25
3.7 Fugitive Emissions to air .....	26
3.8 Carbon emissions.....	26
3.9 Current ecological rating .....	27
4. Consultation .....	28
4.1 Consultation to date.....	28
4.2 Issues raised by Consultees .....	28
4.3 Bord na Móna response to issues raised during consultation .....	28
5. Rehabilitation Goals and Outcomes.....	29
6. Scope of Rehabilitation.....	30

6.1	Key constraints .....	30
6.2	Key Assumptions .....	31
6.3	Key Exclusions.....	31
7.	Criteria for successful rehabilitation .....	32
7.1.	Criteria for successful rehabilitation to meet EPA IPC licence conditions: .....	32
7.2.	Critical success factors needed to achieve successful rehabilitation as outlined in the plan.....	35
8.	Rehabilitation Actions and Time Frame .....	37
8.1	Short-term planning actions (0-1 years).....	38
8.2	Short-term practical actions (0-2 years).....	39
8.3	Long-term (>3 years) .....	39
8.5	Budget and costing .....	45
9.	Aftercare and Maintenance.....	46
9.1	Programme for monitoring, aftercare and maintenance.....	46
9.2	Rehabilitation plan validation and licence surrender – report as required under condition 10/4 .....	47
10.	References.....	48
	Appendix I: A standard peatland rehabilitation Plan to meet conditions of the IPC Licence .....	52
	APPENDIX II: Bog Group Context.....	57
	APPENDIX III: Ecological Survey Report.....	60
	APPENDIX IV: Environmental Control Measures to be applied to bog rehabilitation.....	63
	APPENDIX V: Biosecurity.....	64
	Appendix VI: Policy and Regulatory Framework .....	65
	APPENDIX VII: Decommissioning.....	72
	APPENDIX VIII: Glossary.....	75
	APPENDIX IX. Archaeology .....	77

## SUMMARY

**Name of bog: Pollagh Area: 304ha**

### Site description:

- Pollagh Bog was drained and developed for industrial peat production in the 1950s and has been in active peat production since the 2004. Industrial peat production ceased in 2019.
- The majority of the former peat production footprint is bare peat (~75%) and contains active drainage channels.
- Peat Depths generally vary across the site from 0-2 m, with the deepest peat in the mid southern section (where depths of 2-4m exist). Pollagh is considered a cutover bog with variable depths of peat and some sections having deep peat.
- The site is located adjacent to the Grand Canal and several designated conservation sites.

### Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence. The primary goals and outcomes of this plan are to (1) meet condition 10 requirements and (2) optimise climate action benefits from enhanced rehabilitation measures.

Being cognisant of the proposed Scheme for supporting enhanced decommissioning, rehabilitation and restoration measures (PCAS), the primary rehabilitation goal and outcome for Pollagh Bog is **environmental stabilisation** of the site. This will be achieved via intensive **re-wetting**. This is defined as:

- Carrying out intensive rehabilitation with the application of measures to re-wet peat and slow water movement across the site.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on deeper peat, fen and Reedswamp on shallow cutaway peat, and eventually naturally functioning peatland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current condition peat storage capacity of the bog (locking the carbon into the ground). In time, it is expected that the bog will develop its carbon sink function, in part, as *Sphagnum*-rich communities develop across the bog. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

### Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Pollagh Bog.
- No rehabilitation measures are proposed for Cornalaur Bog as BnM never drained, or developed or carried out any industrial peat extraction on this bog.
- 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. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.
- **The proposed Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Pollagh Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog.
- The key goals and outcomes of rehabilitation at this bog outlined above.

- Minimising potential impacts on neighbouring land. Some boundary drains around Pollagh Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Bord na Móna have identified the main land-use at this site as biodiversity and ecosystem services.

### Criteria for successful rehabilitation:

The Criteria for successful rehabilitation to meet Condition 10 of the IPC Licence have been defined as:

- Rewetting of residual peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation).
- Stabilising or reducing key emissions to water (e.g. silt-run-off) (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (WFD) (IPC Licence validation).
- Optimising the extent of suitable hydrological conditions to optimise climate action (Climate action verification).
- Reduction in carbon emissions (Climate action verification).
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including fen, Reed swamp, heath, scrub, Birch woodland and embryonic *Sphagnum*-rich peatland communities, where conditions are suitable, and eventually towards a carbon sink (Climate action verification). These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at this bog.
- Improvement in biodiversity and ecosystem services. (Climate action verification).

Meeting climate action verification criteria and monitoring of these criteria is dependent on support from the Climate Action Fund or other sources of funding.

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

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

- Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).
- Bord na Móna to have sufficient resources (staff and machinery) to deliver the planned rehabilitation.
- Weather conditions to be within normal limits over the rehabilitation plan timeframe
- Rehabilitation measures to be effective.
- Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.
- Monitoring to be robust and effective.

### Summary of measures:

The below section is a summary of measures proposed for rehabilitation.

- Planning actions, including developing a detailed site plan and carrying out a site drainage management plan.
- Carry out an ecological assessment of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling and cell-bunding.
- Phase 2 measures will include fertiliser application, seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning schedule.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.

**Timeframe:**

- 2020-2021. Short-term planning actions.
- 2021. Short-term practical actions.
- 2021-2024. Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024. Decommission silt-ponds, if necessary.

**Budget and Costing**

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- For the avoidance of doubt, should the proposed Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation required under Condition 10, see appendix 1, and for which financial provisions have been made, to comply with that element of the Licence.

**Monitoring, after-care and maintenance**

The monitoring, after-care and maintenance programme for Pollagh Bog, as required to meet Condition 10 of the IPC Licence, 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, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, if required.
- The monitoring and validation of re-vegetation via natural colonisation will be carried out using an aerial survey, after enhanced rehabilitation measures are implemented.
- **Water quality monitoring** will be established. Monitoring of key water quality parameters will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment and planning procedures.
- Decommissioning of silt-ponds will be assessed and carried out, where needed.

**Additional Monitoring:**



- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial survey, after rehabilitation measures are implemented. It is proposed that sites can be monitored against this baseline in the future.
- Biodiversity Ecosystem services will be monitored using specific indicators.
- Carbon emissions monitoring only be carried out on a small proportion of BnM sites to develop better understanding of carbon emissions and GHG emission factors from different types of BnM sites and will be developed on association with other established research programmes. Reduction in carbon emissions will be modelled by a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Monitoring as part of Climate Action Verification is dependent on support from the Climate Action Fund or other external funding.

### **Validation and IPC Licence surrender**

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

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

## 1. INTRODUCTION

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. The bog is part of the Boora bog group (see Appendix II for details of the bog areas within the Boora Bog Group). Pollagh Bog is located in Co. Offaly.

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.”*

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management. For the avoidance of doubt this document only covers the area of Pollagh Bog.

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

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

It is proposed by Government that Bord na Móna carry out a Peatlands Climate Action Scheme (PCAS) to carry out decommissioning, rehabilitation and restoration on peatlands previously used for energy production. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, it is important for all stakeholders to understand that only the costs associated with the additional, enhanced and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the proposed Scheme.

It is expected that the proposed Scheme will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

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

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

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a carbon sink again. (In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas. These will develop other habitats). The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised. These measures are designed to encourage the development of embryonic bog habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem.

Pollagh Bog is proposed to be part of this proposed Scheme (PCAS) and this rehabilitation plan outlines the approach taken. In the event that additional external funding is not secured, Bord na Móna will revert to a standard rehabilitation plan (outlined in Appendix I). This rehabilitation plan will also meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions.

### **1.1 Constraints and Limitations**

This document covers the area of **Pollagh Bog**.

The future use of Pollagh Bog has not been defined by Bord na Móna. Biodiversity and ecosystem services have been currently identified as the primary land-use at Pollagh. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Pollagh Bog, will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Peat production activities have the potential to impact the habitats and environment of a bog. The ecological processes involved in the creation and maintenance of functioning, active bog systems are complex, happen over very long time periods (>1,000 years) and not all are fully understood. Nevertheless, the basis for the proposed approaches and implementation outlined in the document is the experience gained in 40 years of research and implementation of the after-use development, rehabilitation and restoration of the Bord na Móna cutaway bogs as well as best practise internationally (see reference documents).

Industrial peat extraction at Pollagh Bog ceased in 2019. Currently the most recent peat production area is bare peat, and there is some pioneering vegetation in the north of the bog. The combination of active enhanced rehabilitation measures and natural colonisation will quickly establish further pioneer vegetation and will be planned to accelerate environmental stabilisation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Pollagh Bog (outside the areas owned and under the control of Bord na Móna) are currently used by domestic turf cutters to harvest peat. 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 the margins of Pollagh 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 enhanced rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

There is also an area of extant (undeveloped) high bog to the east of which BnM have partial ownership (referred to as Cornalaur). Due to the absence of Bord na Móna development the extant high bog at Cornalaur is excluded from decommissioning and rehabilitation.

Pollagh Bog is also referred to as 'Pollagh/Cornalaur' and the use of this designation, such as in mapping, should be seen as interchangeable with 'Pollagh'.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

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## 2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the proposed Scheme (PCAS). The development of this rehabilitation plan considered recently published guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional site visits and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

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

### 2.1 Desk Study

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

- Anderson *et al.* (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- 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.
- 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.
- Quilty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- 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 Integrated Pollution Control Licence;
- Boora Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database ([www.epa.ie](http://www.epa.ie));
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; [www.birdwatchireland.ie](http://www.birdwatchireland.ie));
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database ([www.gsi.ie](http://www.gsi.ie));
- National Parks & Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- Water Framework Directive catchments.ie/maps/ Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- OPW Indicative Flood Maps ([www.floodmaps.ie](http://www.floodmaps.ie)),
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps ([www.cfram.ie](http://www.cfram.ie)),
- River Basin Management Plan for Ireland 2018 – 2021,
- Bord na Móna Annual Report 2020,
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

## 2.2 Consultation

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

## 2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this baseline survey, Pollagh Bog was surveyed in January 2011. Additional surveys and visits have taken place at Pollagh Bog between 2012-2020 to inform rehabilitation planning. A further confirmatory site visit to examine Pollagh Bog took place by BNM Ecologists in Sept 2020. This rehabilitation plan is informed by the original baseline survey as well as subsequent site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al.* (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was 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). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

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

### 3. SITE DESCRIPTION

Pollagh Bog is located in Co. Offaly, adjacent to the village of Pollagh and adjacent to the south side of the Grand Canal. (see Figure 3.1 & 3.2). The surrounding landscape is a mosaic primarily consist of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting. Pollagh Bog lies approximately 0.5Km to the South of the River Brosna, adjacent to the southern side of the Grand Canal and is linked by rail, to Derrinlough Brickette Factory and to West Offaly Power (WOP), which provides the main access to the site.

#### 3.1 Status and Situation

##### 3.1.1 Site history

Pollagh Bog was originally developed for peat production in the 1950's. It has been in peat production since this period. Industrial peat production ceased at Pollagh Bog in 2019. The peat was harvested for fuel peat to be used in West Offaly Power Station in Shannonbridge and Derrinlough Brickette Factory, Offaly.

##### 3.1.2 Current land-use

Industrial peat production ceased at Pollagh Bog in 2019. Site infrastructure and structures are mapped in Figure 3.7. A marginal area in the northernmost part of the Bord na Móna boundary close to the Grand Canal is actively being cut for private turbary (see Figure 3.2).

The entire bog is not within the ownership of Bord na Móna and domestic turf cutting (private turbary) is having a significant impact on the bog, both within and outside the BnM boundary.

Biodiversity and ecosystem services have been identified as the primary future land use for Pollagh Bog by Bord na Móna.

There are no known right of ways on this bog.

##### 3.1.3 Socio-Economic conditions

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

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



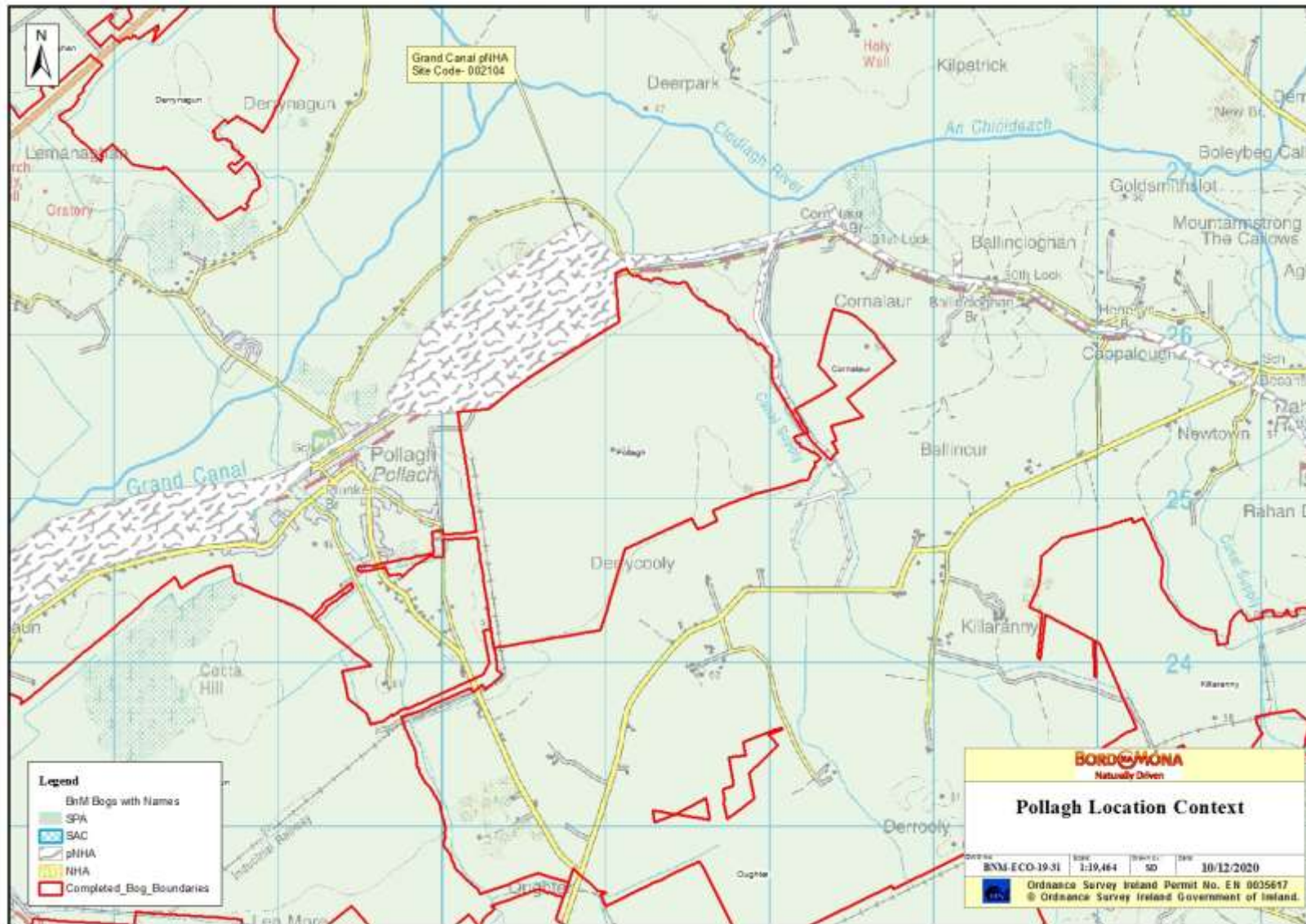


Figure 3.1 Location of Pollagh Bog in context to other Bord na Móna bogs, designated sites and the surrounding area

In respect of Pollagh Bog, jobs included in the above study would have included those to facilitate extraction of peat at this site, and associated processing and transfer to the relevant power station.

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the proposed scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

## **3.2 Geology and Peat Depths**

### *3.2.1 Sub-soil geology*

The underlying geology at Pollagh Bog is Waulsortian Limestones, which are described as Massive unbedded lime-mudstone<sup>1</sup>. The underlying soils and sub-soils are classed as ‘Raised Bog Cutover Peat’.

### *3.2.2 Peat type and depths*

Pollagh Bog has a long history of industrial peat production. Fen peat and exposed underlying sub-soil is now exposed across the site. Peat depths (2015) generally vary across the site from 0-2 m, with the deepest peat in the mid southern section (where depths of 2-4m exist) (Figure 8.2). Peat depths around the eastern, western and southern margins are much shallower (0-1 m).

## **3.3 Key Biodiversity Features of Interest**

The majority of Pollagh Bog within the Bord na Móna boundary is bare peat as this site was in production until 2018. A small portion of the site is developing as cutaway. This area acts as a local refuge for wildlife in the area.

### *3.3.1 Current habitats*

Pollagh bog is a relatively deep basin that is dominated by bare peat and former industrial production bog. This bog has a pumped drainage system. Pollagh is also spring-fed (possibly related to the former soak system).

There is a small area of cutaway towards the north-west corner of the site that extends along the northern boundary of the site. The majority of this area is over some higher ground and glacial gravel is exposed in a few places. The oldest section of vegetation on the highest ground is mainly vegetated by typical cutaway habitats such as open Birch and Willow scrub and poor fen vegetation dominated by Soft Rush and Bog Cotton. Some of the drier poor fen also has frequent grass cover with Creeping Bent and Cocksfoot. Bulrush and Common Reed are spread throughout this area in the drains with several clumps of Common Reed present. Towards the western side there is some lower ground that is partially re-wetted with Bog Cotton-dominated poor fen and some shallow pools. This band of pioneering vegetation has extended north eastwards towards the location of the existing pump and silt pond. The newest vegetation cover corresponds to Birch Scrub, with poor fen and pioneering dry grassland.

The margins of the former production area contain a range of habitats, including Birch woodland, scrub, small dried remnants of raised bog (some being actively cut) and cutover bog.

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<sup>1</sup> <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>



*Figure 3.3. View of the typical milled peat surface with existing drainage across Pollagh Bog (2011)*



*Figure 3.4. View of milled peat surface with emerging vegetation at Pollagh Bog (2020)*



*Figure 3.5. Mosaic of pioneering Birch Scrub & Poor Fen at Pollagh Bog (2020)*

A habitat map of Pollagh Bog is shown in Figure 3.6, overleaf.

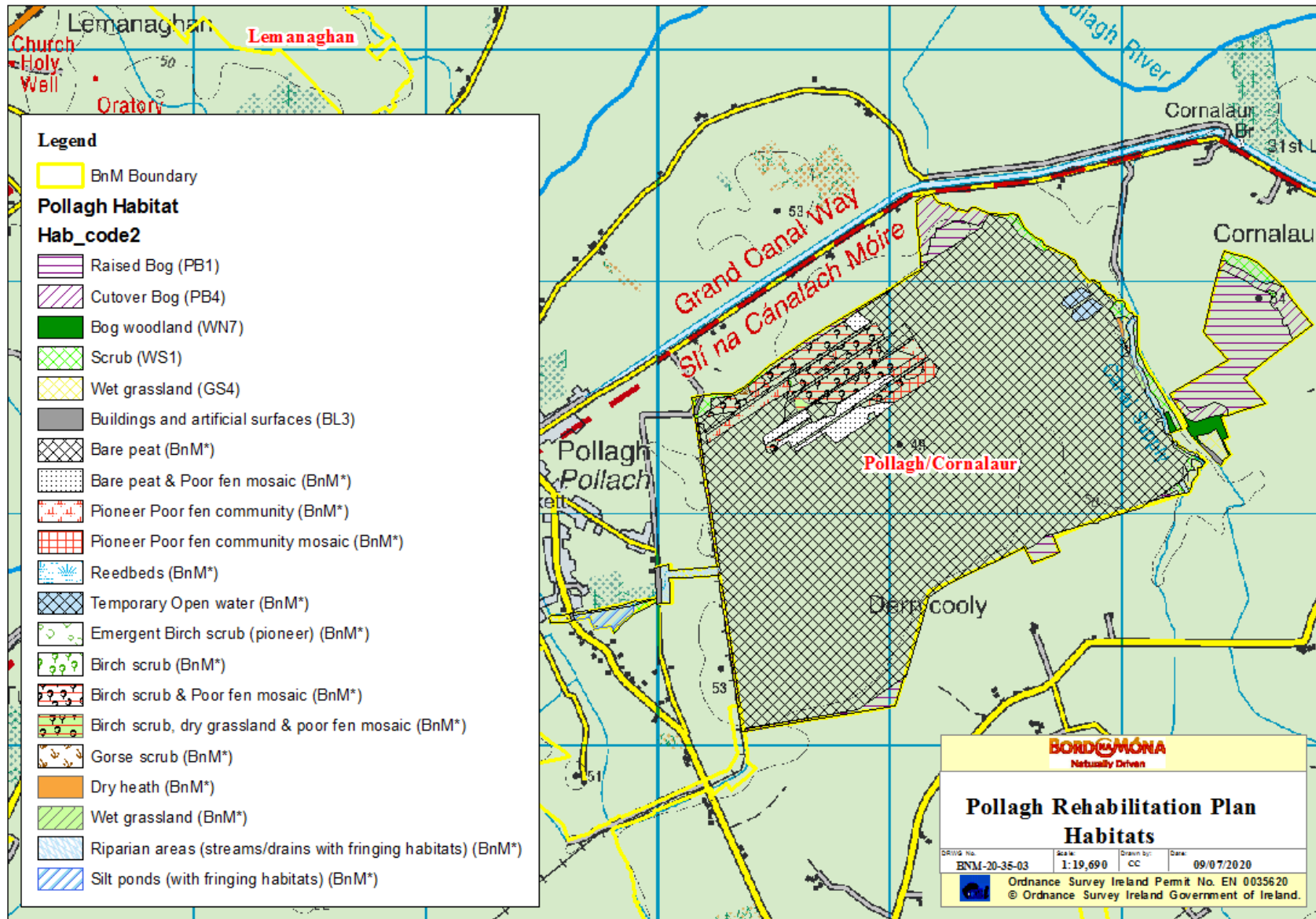


Figure 3.6. Habitat map of Pollagh Bog showing Bord na M6na habitat categorisation

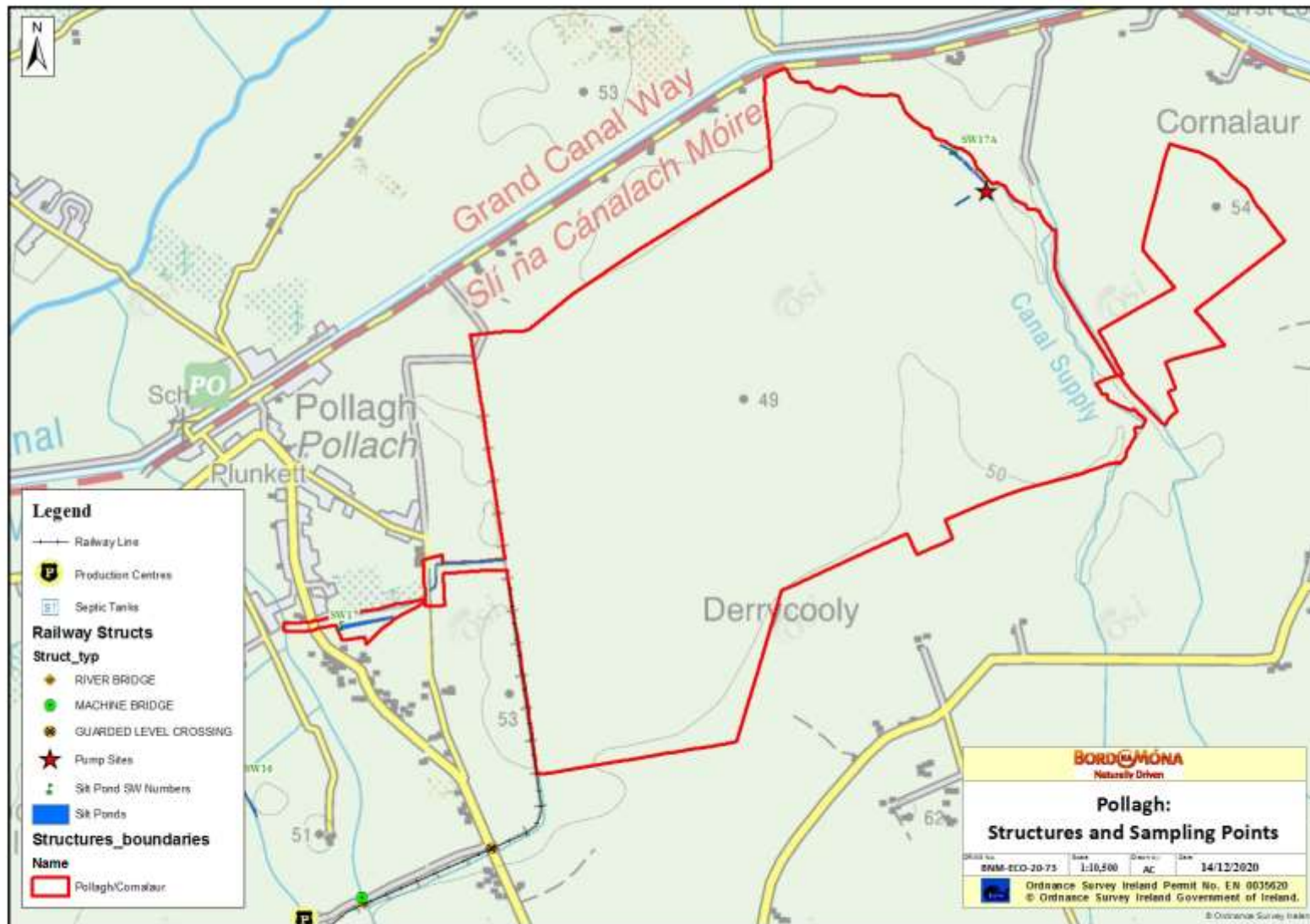


Figure 3.7. Map of Pollagh Bog showing structures, site infrastructure and designated emission points.

### 3.3.2 Species of conservation interest

During field surveys in January 2011 Kingfisher *Alcedo atthis* and 6 no. Whooper Swan *Cygnus cygnus* (Amber listed in Ireland and also on Annex I of the EU Birds Directive) were recorded on site. Kingfisher may utilise the feeder channel into the Grand Canal, and or the bordering watercourses to the east (Derrycooley Stream) or West (DERRYCOOLEY/Pollagh). In July of 2020, ‘chipping’ (considered equivalent of breeding season song) Snipe *Gallinago gallinago* were recorded at 2 no. locations; other species utilising the bog were Grey Heron *Ardea cinerea*, Mallard *Anas platyrhynchos*, Skylark *Alauda arvensis* (recorded in song on pioneering cutaway therefore considered a likely breeder); and Common Kestrel *Falco tinnunculus* (Amber listed) was also noted hunting.

A review of available Biodiversity records from the National Biodiversity Data Centre (hereafter NBDC) on the 2 no. tetrads (N22C/N22D) which include Pollagh Bog found records of 2 no. species of bird in N22C (the tetrad which includes the majority of Pollagh Bog) namely Common Grasshopper Warbler *Locustella naevia* and Eurasian Woodcock *Scolopax rusticola* (Amber listed), whilst the tetrad N22D had no bird species noted.

With regard to terrestrial mammals, Irish Hare *Lepus timidus hibernicus* occurs at Pollagh, in addition European Hedgehog *Erinaceus europaeus* have been recorded in tetrad N22D, along with Eurasian Badger *Meles meles*. With regard to Bats, three species namely Lesser Noctule *Nyctalus leisleri*, Common Pipistrelle (*Pipistrellus pipistrellus sensu lato*) and Soprano pipistrelle (*pipistrellus pygmaeus*) have been recorded in tetrad N22C.

Pollagh Bog has an interesting botanical history. It was studied by the famous Irish botanist J.J. Moore in the 1950’s who recorded several rare plants including Rannoch Rush (*Scheuchzeria palustris*) in a soak system on Pollagh Bog, the only site in Ireland where this plant has been recorded. This plant was subsequently transplanted in 1959 to Clara and Raheenmore Bog when it became known that Bord na Móna was going to drain the bog. J.J. Moore described Pollagh Bog as being very wet and containing some wet woodland. A second plant species Toothed Wintergreen (*Orthillia secunda*), was recorded from the site. This species has a very restricted distribution in ROI, only being known from three sites, although it has recently been recorded at Bord na Móna Ballydangan Bog. Both species are thought to be extinct at Pollagh Bog.

### 3.3.3 Invasive species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here. No such instances exist in respect of Pollagh Bog. American Mink *Mustela vison* has been recorded in tetrad N22C – but is unlikely to be dispersed during PCAS activities. A broad range of common garden escapes are occasionally present around the margins of Bord na Mona bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

## 3.4 Statutory Nature Conservation Designations

No part of Pollagh Bog is designated as SAC or SPA.

The Grand Canal pNHA (NPWS site code 2104) is located to the north of this site and part of the designated area along the canal is adjacent to the northern Pollagh BnM boundary (Figure 3.1). Some undeveloped and partially fringe habitats within the BnM boundary are designated as part of this pNHA. A small drainage channel feeds into the canal and flows along the east side of the production bog, separating Pollagh from Cornalaur. This feeder is also within the pNHA designation. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.

Regarding European Sites the closest to Pollagh Bog is Clara Bog SAC (Site Code 000572) which is ca.3.5km northeast. Additional European Sites in proximity include Charleville Wood SAC (Site Code 000571-ca. 7.5km east), Clonaslee Eskers and Derry Bog SAC (Site Code 000859 -ca.12km south southeast), Ferbane Bog SAC (Site Code 000575- ca.8.5km west), and Moyclare Bog SAC (Site Code 000581- ca.12km west).

#### 3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15<sup>th</sup> March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar Sites in the local vicinity of Oughter Bog (i.e. within 3km) The closest Ramsar Sites to Oughter Bog include Mongan Bog, Clara Bog, and Raheenmore Bog.

<https://www.arcgis.com/apps/MapTour/index.html?appid=cd6e1a247bdc4179b9dfc0461e950f1e#>

### 3.5 Hydrology and Hydrogeology

Pollagh Bog has a pumped drainage regime. Hydrological modelling (Figure 8.3 & 8.4) indicates that the majority of the bog is a natural basin with significant potential for re-wetting. It is likely that a portion of these basins will re-wet with deeper water, creating a mosaic of wetland habitats, when pumping ceases or is reduced. Anecdotally, Pollagh Bog has always had a significant spring influence and was difficult to drain in places. There is likely to be alkaline influence on the water chemistry of the ground water of a portion of this bog due to exposed underlying marls that are highly alkaline or sub-soils that are limestone-based.

Pollagh Bog is located in the Upper River Shannon Catchment. It is separated into two main catchments that drain to the east and to the west. The western catchment discharges via silt ponds to the Pollagh Stream. The eastern catchment discharges via a pump and silt ponds to the Derrycooly Stream. Both channels discharge north to the River Brosna, north of the canal. The Grand Canal feeder also flows between Pollagh and Cornalaur. However, this feeder is perched at a higher level than the above stream and there is no inflow from the production bog.

Silt ponds are present at both sides of the site to manage discharges to neighbouring water-courses. The bog has field drains running in a north-northeast to south-southwest orientation.

Pollagh bog is located in an area with a locally important bedrock aquifer. 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 m<sup>3</sup>/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.

The bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). 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 groundwater contamination occurring at this site.



The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt. The bog water table across the site is expected to be high when bog drains are blocked, and perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater flows is limited by the permeability of the underlying glacial deposits. As such the potential for bog rehabilitation to interact or impact on underlying groundwater is very low.

### **3.6 Emissions to surface-water and water-courses**

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 discharges into a terminal silt pond that allows for settlement of suspended solids before discharging into the local stream systems. The eastern catchment has pumped drainage while the western catchment has gravity drainage. 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 Pollagh 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 Moña to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during 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. Silt ponds are present at both sides (east and west) of the site to manage discharges. The bog has field drains running in a north-east to south-west orientation.

There are 6 silt ponds at Pollagh Bog. Two are located on the western side (Reference PH34, PH34A) and there are 4 in close proximity to each other in the NW of the bog, which together comprise Reference PH35, close to the onsite pump. The western silt ponds discharge to the Pollagh Stream. The eastern silt ponds discharge to the Derrycooly Stream. Both streams discharge to the River Brosna catchment.

Pollagh bog has one surface water outlets to the Grand Canal Supply Stream water body which is the water feed supply to the Grand Canal, and one other discharge points to the Brosna river IE\_SH\_25B090761 via IE\_SH\_25P050300. Peat extraction was identified as pressure in the second cycle of the river basin management plan but is not indicated as remaining so in the third cycle, currently under preparation, in relation to the Brosna River.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7 mg/l and COD 100mg/l.

From an analysis of any monitoring over the past 4 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and trigger level for ammonia and COD. (Table 3.1).

Table 3.1.

Bog	SW	Monitoring	Sampled	pH	SS	TS	Ammonia	TP	COD	Colour
Pollagh	S-17A	Q3 20	17/08/2020	8.2	5	423	0.124	<0.05	23	73.9
Pollagh	SW-17	Q3 20	17/08/2020	7.7	20	475	0.241	<0.05	11	72.1
Pollagh	SW-17	Q3 19	02/09/2019	7.6	4	484	0.646	<0.05	26	95.8
Pollagh	SW-17A	Q3 19	02/09/2019	8.2	10	476	0.117	<0.05	15	84
Pollagh	SW-17	Q4 17	13/12/2017	7	5	212	1.9	0.05	63	231
Pollagh	SW-17A	Q4 17	13/12/2017	7.4	5	374	0.34	0.05	67	169

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

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

Water will still discharge from designated emission points when rehabilitation at Pollagh Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key downstream water body receptors, and is expected to support the retention of the current and future status of Pollagh Stream as being of Good Status.

### 3.7 Fugitive Emissions to air

Industrial peat production has ceased at this bog. Rehabilitation of the cutaway peatland will seek to re-wet peat where possible, and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, 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.

The EPA-funded CarbonRestore Project (Renou-Wilson et. al. 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO<sub>2</sub> and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018). It is expected that Pollagh Bog will become a reduced Carbon source following rehabilitation. The site does have potential to become a carbon sink in the longer-term. This depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich habitats, the balance of carbon fluxes from different cutaway habitats (some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors) and future climatic conditions. 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).

It is expected that Pollagh Bog can become a reduced carbon source with sections having potential to develop as a carbon sink (albeit in the longer term) following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of any *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. This bog is expected to develop a mosaic of fen, Reed swamp, wet woodland, scrub and embryonic *Sphagnum*-rich habitats. There is also known to be a spring influence on the ground-water of the bog. 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 Pollagh can be rated as having a **low-moderate local ecological value (E)**. Bare peat and other intensively managed areas are assessed as having a low local ecological value and there is only a small area of developing cutaway present on the site.

The intact high bog at Cornalaur is assessed as having a **C-B ecological value** as it is a fairly large section of high bog, although of lower quality as it is relatively dry and degraded.

It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural habitats, such as more extensive areas of fen, Reed swamp and embryonic raised bog.

## **4. CONSULTATION**

### **4.1 Consultation to date**

Consultation will seek 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. All national stakeholders will be emailed a copy of this draft plan when it has been finalised internally by Bord na Móna, and invited to make submissions on the objectives and content of this plan in relation to Pollagh Bog.

There has been ongoing consultation about rehabilitation and other general issues over the years about Pollagh Bog with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Mona Biodiversity Action Plan review days 2010-2018.
- 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).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- The development of Lough Boora Discovery Park (Offaly County Council);
- Development of a management plan for Lough Boora with local stakeholders from Pollagh (Birdwatch Ireland 2018)
- Interaction with the Grand Canal with Waterways Ireland.

Local stakeholders will also be identified through ongoing engagement with neighbours whose land adjoins Pollagh Bog. Additionally, local representatives of national bodies (such as Regional National Parks and Wildlife staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will also be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified will be invited to submit their comments or observations in relation to the proposed rehabilitation at Pollagh Bog.

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

### **4.2 Issues raised by Consultees**

N/A. Not issued to consultees yet.

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

N/A

## 5. REHABILITATION GOALS AND OUTCOMES

The key rehabilitation goal and outcomes for Pollagh Bog under the proposed Scheme are **environmental stabilisation** of the site and **optimising climate action benefits**. This is defined as:

- Carrying out an intensive rehabilitation measures (including, drain-blocking, re-profiling, cell-bunding, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum*).
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich peatland vegetation communities on areas of residual deep peat.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Stabilisation or reduction in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Setting the site on an appropriate trajectory to develop naturally functioning peatland habitats over time. 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 proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the proposed Scheme, will improve habitat conditions of the whole bog, making the overall bog wetter. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions. It will take some time for stable naturally functioning habitats to fully develop at Pollagh Bog

Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is a world-wide 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 (Grand-Clement *et al.*, 2015; Anderson *et al.*, 2017; Minayeva *et al.*, 2017). 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. *Sphagnum*-rich peatland communities are considered to be actively peat-forming and are considered to be carbon sinks (Renou-Wilson *et al.*, 2011; NPWS 2017a, Renou-Wilson *et al.*, 2018) and have potential to develop on deeper residual peat. Other sections of the site will improve in condition after re-wetting and also have the capacity to develop as a reduced Carbon source as Reed Swamp, fen, scrub and bog woodland habitats develop.

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 Carbon sink function.

The main deliverable of this enhanced plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

## 6. SCOPE OF REHABILITATION

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

- 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. Pollagh Bog is part of the Boora Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This Scheme is designed to enhance the ecosystem services of Pollagh Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The area of Pollagh Bog is defined by Figure 3.1
- No rehabilitation measures are proposed for Cornalaur Bog as Bord na Móna never drained, or developed or carried out any industrial peat extraction on this bog.
- The local environmental conditions of Pollagh Bog identify deep peat re-wetting, dry cutaway and wetland prescriptions as the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Pollagh Bog as **environmental stabilisation and optimising suitable hydrological conditions and setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on deep peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Enhanced Rehabilitation of Pollagh 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 any rehabilitation in the marginal cutover bog zone. The cutover bog mainly consists of active private turbary.

### 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), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- At Pollagh Bog, a significant portion of peat has been removed leaving a largely un-vegetated surface over peat deposits of varying depth. In addition, the site is spring-fed and has some exposed glacial gravel, along with pioneering scrub, poor fen and grassland communities. There are local factors that will influence the future trajectory of this site (hydrological and underlying geological conditions) which need to be considered as part of the wider rehabilitation work. A pump was installed in 2011; and an assessment will be needed when this pump is being decommissioned. There is significant potential for development of wetland habitats in this site due to the current drainage conditions and topography of

the site. The bog is underlain by springs, further affecting the drainage conditions. The bog is also underlain by shell marl, which will have a significant influence on water chemistry and the development of the future wetlands habitats, meaning there is potential for more extensive rich fen development.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care must be taken to ensure that active rehabilitation management will not 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. Some boundary drains around Pollagh Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- The Grand Canal feeder, which occurs in close proximity, is hydrologically distinct from the hydrology of Pollagh Bog, and therefore neither the canal feeder or the canal itself is expected to be affected by decommissioning and rehabilitation.
- **Archaeology.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Pollagh Bog was carried out (Appendix IX). There are no known archaeological features. Rehabilitation will take account of stray archaeological finds (Appendix VI).

## 6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project. For the avoidance of doubt, should the proposed Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation measures required under Condition 10, and for which financial provisions have been made, to comply with that element of the Licence.
- 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 practical ground work.

## 6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term restoration trajectory of the site to raised bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards the development of naturally functioning peatland habitats (wetland, fen, some embryonic *Sphagnum*-rich vegetation). The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Pollagh Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- Cornalour Bog. Bord na Móna never carried out any bog development on this site.

## 7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what key targets will be used to mark the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

A key objective of this enhanced rehabilitation plan is **environmental stabilisation**.

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation, and,
- mitigation of key emissions (e.g. silt run-off).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures. Enhanced rehabilitation will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

In general, the key objective will be to optimise the area of suitable hydrological conditions for climate action benefits (re-wetting peat and keeping water levels close to the peat surface) across this heterogeneous cutaway landscape to accelerate the trajectory of establishment of embryonic *Sphagnum*-rich peat-forming habitats on suitable deep peat areas and optimise water levels in the shallow cutaway areas for the development of Reed swamp and fen habitats.

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

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. 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 drone survey after rehabilitation is completed.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Where the section of the water body that this bog drains to, continues not to be identified as under pressure from peat extraction, that the intervening EPA monitoring programme associate with its Programme of Measures for this water body shows positive improvements in water quality impacts that can be attributable to the rehabilitation works undertaken on this bog. This will be measured by the EPA WFD monitoring programme.



### 7.1.1 Additional criteria for successful rehabilitation for the optimisation of climate action and other ecosystem service benefits:

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising deep peat re-wetting and re-wetting of other sections). This will be measured by an aerial drone survey after rehabilitation has been completed.
- Accelerating the trajectory of the site towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including fen, Reed swamp, scrub, Birch woodland, heath, and embryonic *Sphagnum*-rich peatland communities, where conditions are suitable. These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Pollagh Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.

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

<b>Criteria type</b>	<b>Criteria</b>	<b>Target</b>	<b>Measured by</b>	<b>Expected Time-frame</b>
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures  Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)  Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2021-2025
IPC validation	Key water quality parameters  Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2021-2023
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	Where the section of the water body that this bog drains to, continues not to be identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that can be attributable to the rehabilitation	EPA WFD monitoring programme	WFD schedule

Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions.  Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2021-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map  Baseline monitoring to be carried out during the Scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2021-2025
Climate action verification	Biodiversity and ecosystem services.  Habitat establishment  Presence of key species – Sphagnum  Breeding birds  Pollinators  Carbon emissions	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined)  Presence of key species – Sphagnum – Walkover survey  Breeding birds – Breeding bird survey  Pollinators – Pollinator walk  Water quality – Water quality monitoring	2021-2025

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund.
- **Bord na Móna to have sufficient resources (staff and machinery) to deliver the planned rehabilitation.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be 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 degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on ground that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog and creating carbon sinks (Renou-Wilson et al. 2018).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

## 8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling (Figure 8.3 & 8.4) will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling (Figure 8.4) indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in Figure 8.5. (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Pollagh Bog will include:

- Re-wetting the deep peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water.
- In some areas, a cut-and-fill cell bunding technique is proposed. The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels.
- Re-wetting some deep peat areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- Seeding of vegetation and inoculation of *Sphagnum*.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Pollagh Bog. It may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated.

**Table 8.1:** Types of and areas for enhanced rehabilitation measures at Pollagh Bog. (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

Type		Enhanced Rehabilitation Measure	Extent (Ha)
Deep peat	DPT1	Regular drain blocking (max 3/100 m) + blocking outfalls and managing water levels with overflow pipes	42.0
Deep peat	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	51.5
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	10.0
Dry cutaway	DCT2	Regular drain blocking (max 3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	55.9
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	48.5
Wetland	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	59.1
Marginal land	MLT1	No work required (Marginal land including Silt Ponds)	34.1
Silt ponds		Silt ponds	3.3
Total			304.4

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the proposed Scheme not materialise, from the EPA;
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies will be applied to Pollagh Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See Figure 9.1 for an indicative view of the application of different rehabilitation methodologies).
- Carry out a drainage management appraisal of the proposed enhanced rehabilitation measures.
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. Incorporate the results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, where possible. There are no known archaeological features at this bog (Appendix IX);
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. A known right of way exists along across one of the Bord na Móna margins.
- It is proposed to undertake several different rehabilitation methodologies at Pollagh Bog (See Figure 9.1).

- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, if required, such as the presence of sensitive ground-nesting bird breeding species (e.g. Skylark, Woodcock etc.) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, if required, as mitigation.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas (where required). All rehabilitation will be carried out with regard to environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- While natural colonisation is expected to commence almost immediately, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. The wetland areas are already colonising with pioneer vegetation. Phase 2 actions will include seeding of targeted vegetation and inoculation of *Sphagnum* on deep peat and transplanting of some wetland vegetation, where needed.
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning (if required) to prevent silt run-off from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible activities and interventions to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the proposed Scheme.

## 8.3 Long-term (>3 years)

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

## 8.4 Timeframe

- 2020-2021. Short-term planning actions.
- 2021. Short-term practical actions.
- 2021-2024. Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2024. Decommission silt-ponds, if necessary.



Figure 8.1 Pollagh Bog Aerial Photograph. The majority of the bog is bare peat.



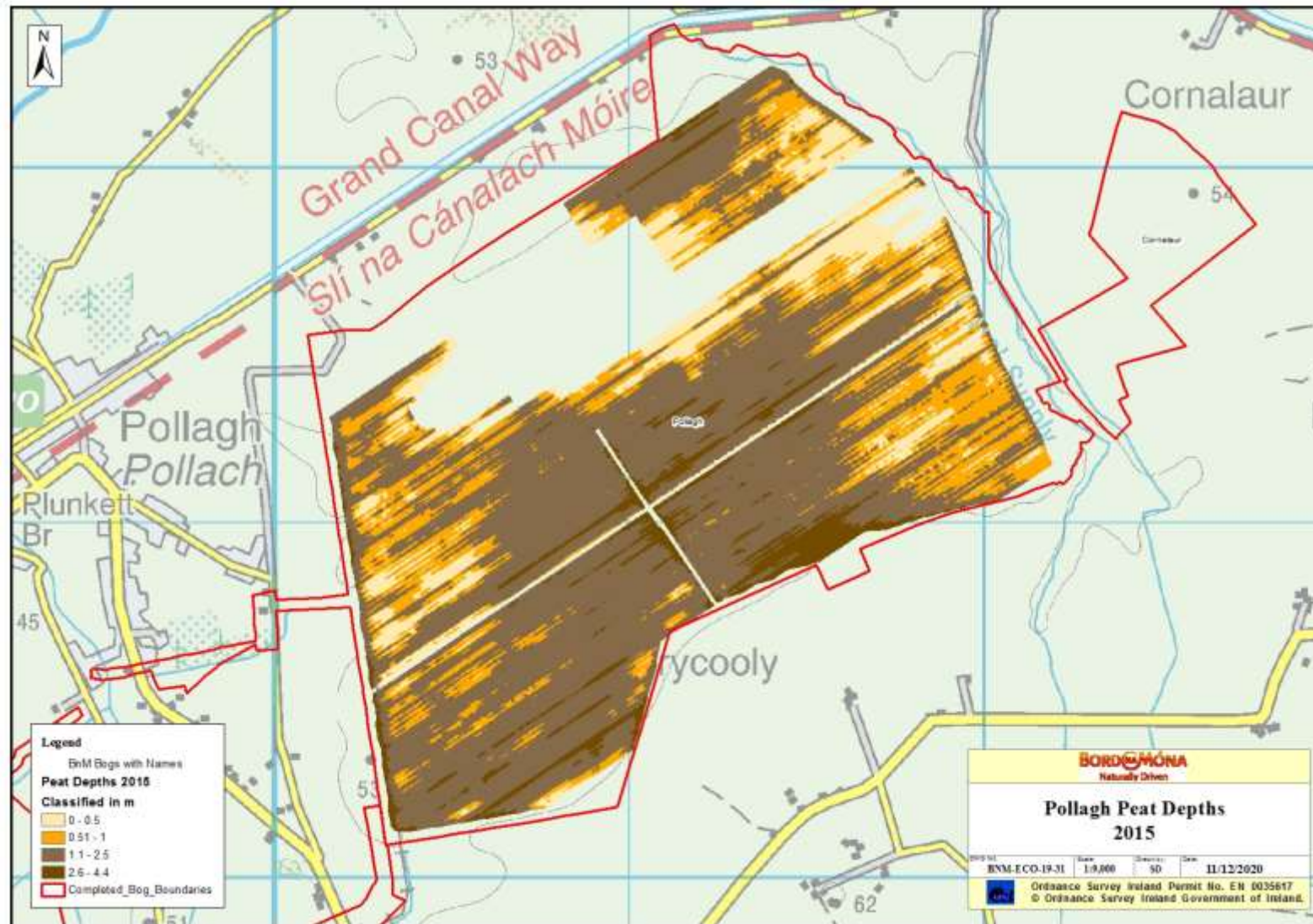


Figure 8.2. Peat Depth Map for Pollagh Bog. Deep peat reserves remain in the central and south-west areas, the peat over the remainder of the site has been cutaway.

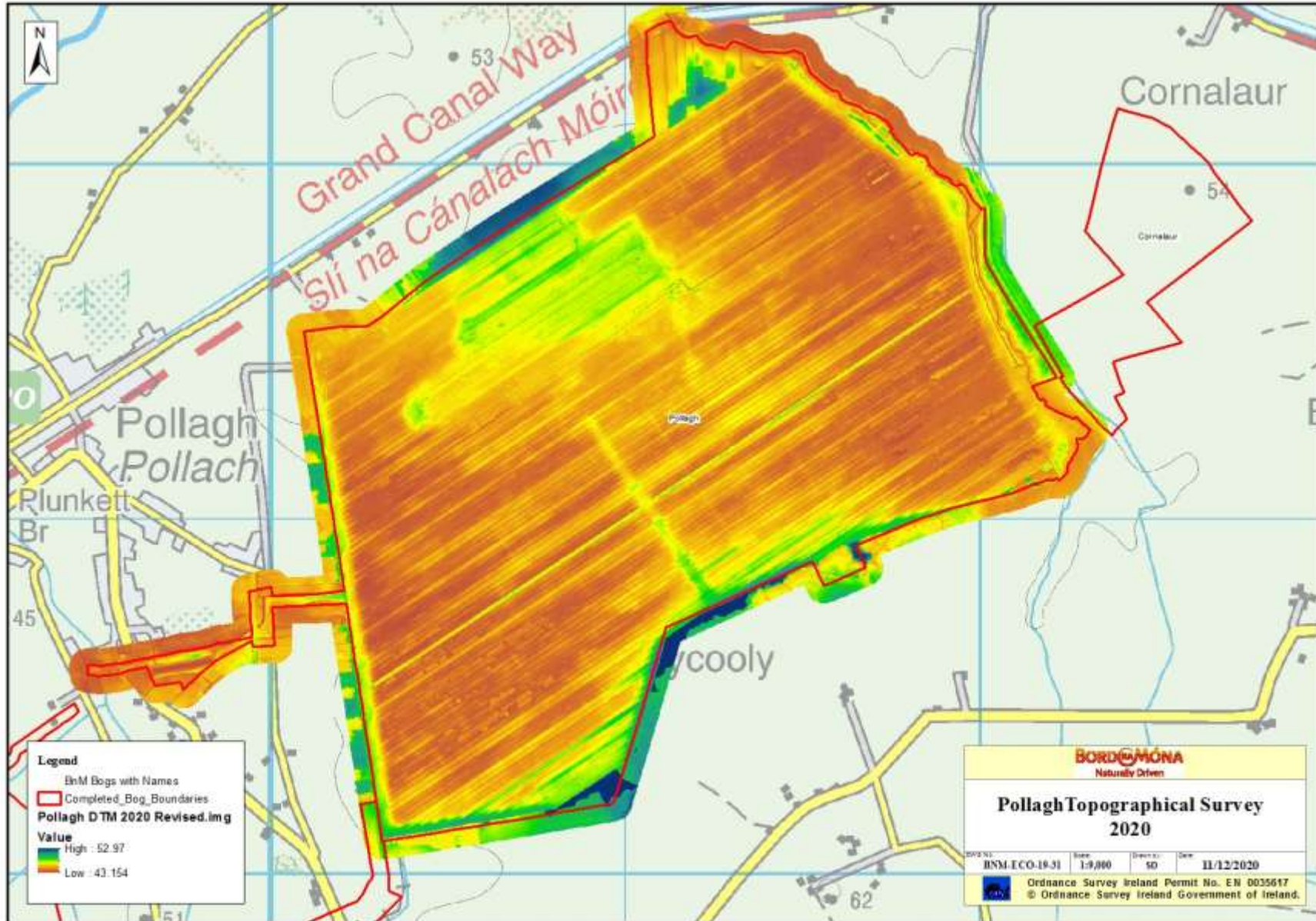


Figure 8.3. LIDAR topography map of Pollagh Bog. Low areas and basins are orange-yellow, more elevated areas are blue-green.

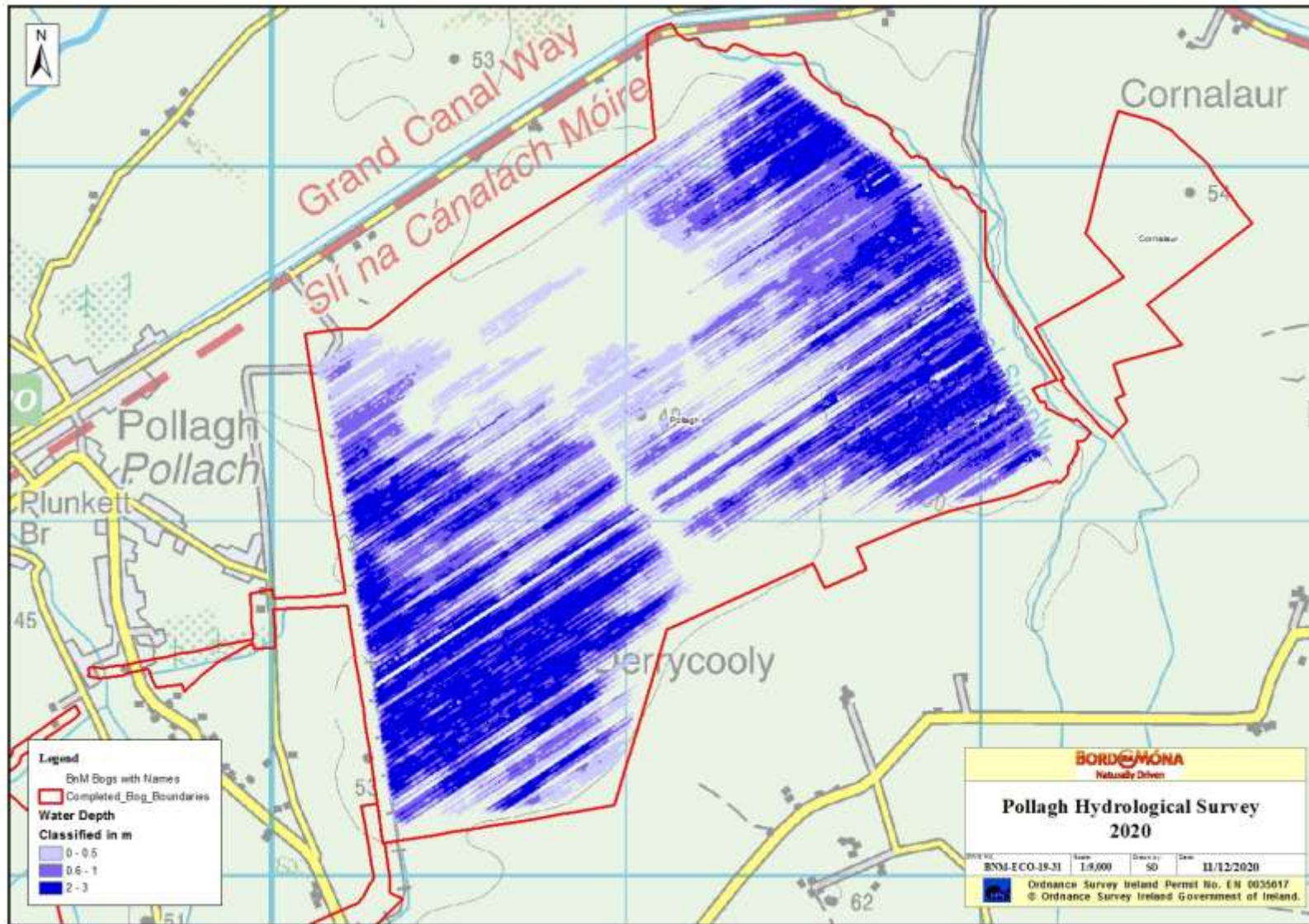


Figure 8.4. Hydrological modelling for Pollagh Bog showing range of expected water depths based on current topography and key flow-paths.

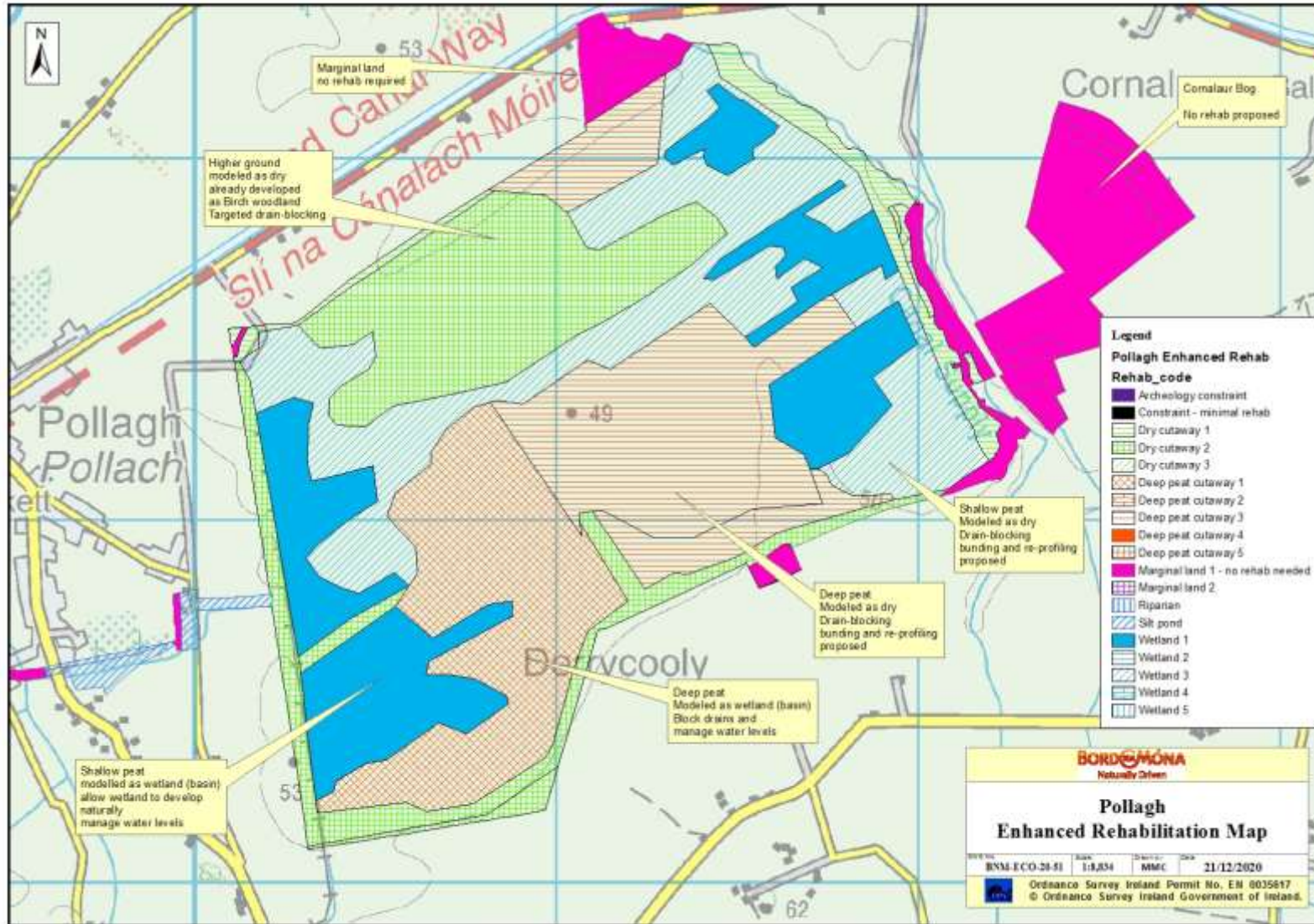


Figure 8.5. Indicative Enhanced Rehabilitation Plan

## 8.5 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2020). 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 deep peat habitats, shallow cutaway areas and regenerating bog communities across high bog (See Appendix I).

## 9. AFTERCARE AND MAINTENANCE

### 9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial drone 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 required.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to three years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments. With regard to this bog,.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at [www.epa.ie](http://www.epa.ie).
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a three-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the drone 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 appropriate assessment process and planning procedures.

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

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

## 9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10/4

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

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

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

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

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

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

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

### Scope of rehabilitation

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

- 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. Pollagh Bog is part of the Blackwater Bog group.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Pollagh Bog as defined by Figure 3.1.
- No rehabilitation measures are proposed for Cornalaur Bog as BnM never drained, or developed or carried out any industrial peat extraction on this bog.
- Minimising potential impacts on neighbouring land. Some boundary drains around Pollagh Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Biodiversity and ecosystem services have been identified as the primary land-use by Bord na Móna.

### Rehabilitation goals and outcomes

The key rehabilitation goals and outcomes for this bog are defined as:

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

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

### Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.

- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised 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).
- That the main water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

### Rehabilitation indicators

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat barriers, elevated water levels and re-wetting).
- Stabilising potential emissions from the site (silt run-off). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog.

### Rehabilitation measures: (see Figure Ap-1)

- Blocking field drains in the former industrial production area using a dozer/excavator to create regular peat blockages (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- No measures are planned for the surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

### Timeframe:

- 2021. 1<sup>st</sup> phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2021. 2<sup>nd</sup> phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1<sup>st</sup> phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds.

## Budget and Costing

- Bord na Móna maintains a Provision on its balance sheet to pay for the future costs of 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 2020). 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 basic rehabilitation provision has been allocated to the site based on the area of different cutaway types across the bog.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	93.3
Dry Cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	65.9
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	107.5
Marginal land	MLT1	No work required	33.9
Silt ponds		Silt-ponds	3.2
<b>Total</b>			<b>303.8</b>

## Monitoring, after-care and maintenance

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

## Validation and IPC Licence surrender

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

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

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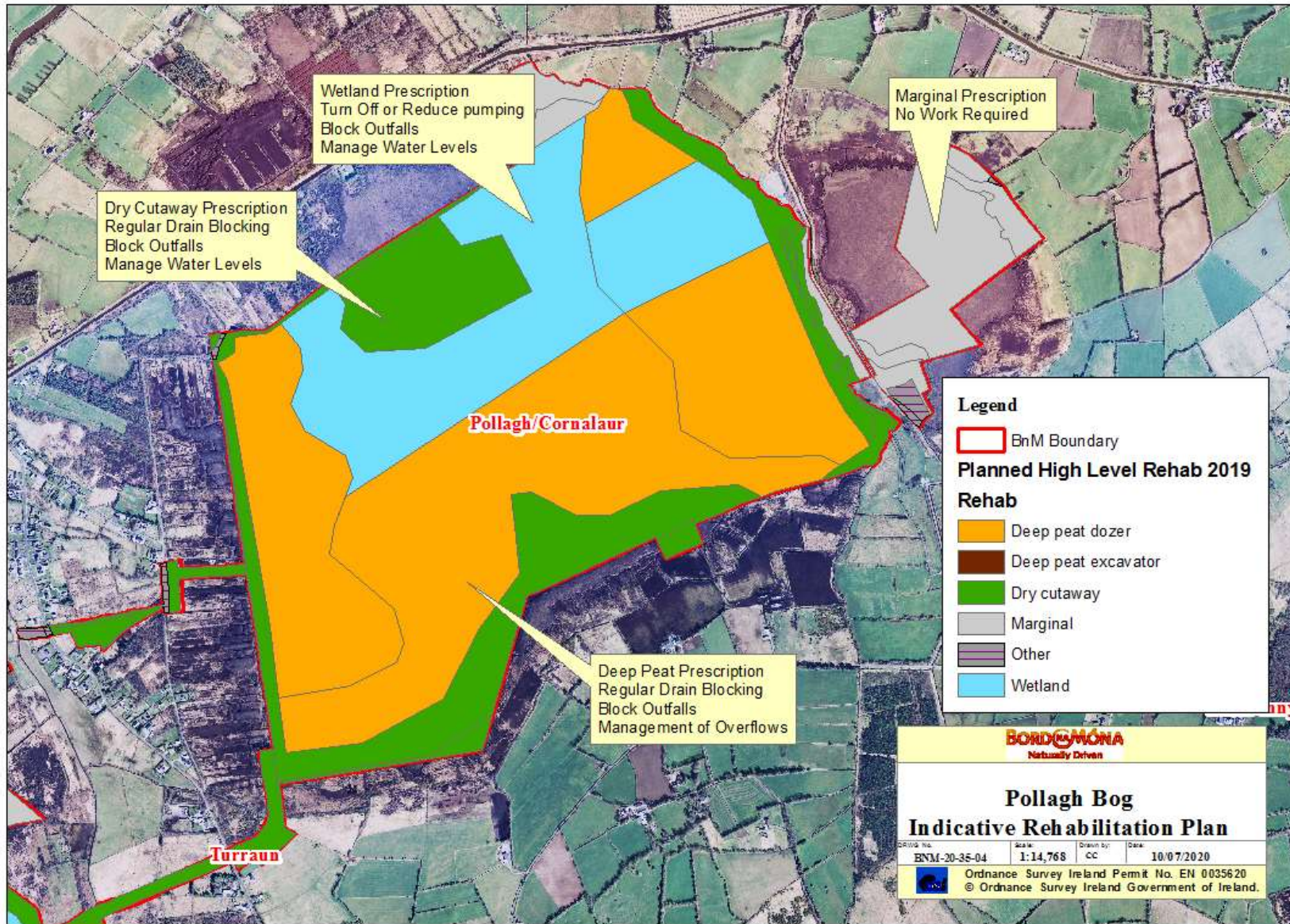


Figure Ap-1. Indicative Standard rehabilitation plan for Pollagh Bog.



## APPENDIX II: BOG 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 Bog 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.

Much of the Boora Bog complex became cutaway as it was in 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](http://www.loughboora.com).

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Ferbane, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory.

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. These areas are also outlined on Figure AI-2 (Map of the Boora Bog Group).

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

Bog Name	Area (ha)	Indicative Peat Production Status and land-use
Killaun	359.5	Killaun is currently a horticultural peat bog and industrial peat production is expected to continue in the future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora	1,842.4	Milled peat production has ceased in Boora East. Milled peat production is anticipated to continue in part of Boora West for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).  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.
Pollagh/Cornalaur	280.8	Industrial peat production ceased at Pollagh Bog in 2019. There is some Emerging naturally colonising cutaway.  Cornalaur was never developed or in peat extraction.
Noggusboy	917.4	Industrial peat production ceased at Noggusboy Bog West in 2019. 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.  Industrial peat production is expected to continue at Noggusboy East in the future, depending on future milled peat resource requirements (subject to

		current substitute consent applications and future planning applications for industrial peat production). There is some emerging naturally colonising cutaway.
Drinagh	1,339.1	Industrial peat production ceased at Drinagh Bog in 2019. 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.
Killaranny	242.8	Milled peat production is anticipated to continue at Killaranny into the future, depending on future peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.
Oughter	352.9	Oughter Bog has not been in peat production since 2012. Industrial peat extraction has now ceased at Oughter Bog. The site has naturally been re-wetting and there is already significant natural colonisation.
Galros	191.5	Milled peat production is anticipated to continue at Galros Bog for the foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). Some naturally emerging cutaway habitats are developing in part of the site.
Clongawny More	987.2	Industrial peat production ceased at Clongawny More Bog in 2019. 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. Bord na Moña currently have submitted an application for renewable energy development on this bog.
Derrinboy	305.7	Milled peat production is anticipated to continue at Derrinboy Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production). Derrinboy Bog supplies horticultural peat.
Moneitta	707.5	Milled peat production is anticipated to continue at Moneitta Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production).
Boora_Lemanaghan_Rail_Link	6.9	Not applicable
Derries	368.2	Milled peat production has now ceased at the Derries Bog and the bog is considered cutaway. 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.
Turraun	534.5	Milled peat production has now ceased at Turraun Bog and the bog is considered cutaway. 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.
Derryclure	327.6	Milled peat production is anticipated to continue at Derryclure Bog for the foreseeable future, depending on future milled peat resource requirements (subject to current substitute consent applications and future planning

		applications for industrial peat production. Derryclure Bog supplies horticultural peat.
Lemanaghan	1,253.7	Milled peat production is anticipated to continue at Lemanaghan for the foreseeable future, depending on future milled peat resource requirements. (subject to current substitute consent applications and future planning applications for industrial peat production There is some naturally emerging cutaway habitats.
Belair North	565.7	Milled peat production is anticipated to continue at Bellair North for the foreseeable future, depending on future peat resource requirements (subject to current substitute consent applications and future planning applications for industrial peat production. There are relatively deep peat resources still present in Bellair North.
Derrybrat	171.6	Milled peat production has now ceased at Derrybrat and the bog is considered cutaway. The site has been partially rehabilitated and there is already significant natural colonisation. Some Coillte conifer forestry has been developed on the site.
Belair South	228.8	Milled peat production has now ceased at Bellair South Bog and the bog is considered cutaway.
<b>Total</b>	<b>10,984</b>	

## APPENDIX III: ECOLOGICAL SURVEY REPORT

<b>Ecological Survey Report</b>			
<i>Note: This report outlines a baseline 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>			
<b>Bog Name:</b>	<b><u>Pollagh</u></b>	<b>Area (ha):</b>	304Ha (752.4 acres)
<b>Works Name:</b>	Boora	<b>County:</b>	Offaly
<b>Recorder(s):</b>	MMC & DF	<b>Survey Date(s):</b>	26 & 27/01/2011
<b>Habitats present (in order of dominance)</b>			
The most common habitats present at this site include:			
<ul style="list-style-type: none"> <li>• (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).</li> <li>• Bare peat</li> <li>• Scrub (eGor, eBir, oBir and cBir)</li> <li>• PJeff, pRos</li> <li>• gCal</li> <li>• pPhrag</li> <li>• Dry heath</li> <li>• Silt traps</li> <li>• Rip</li> <li>• Temporary open water</li> <li>• (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)</li> <li>• Raised bog (PB1)</li> <li>• Cutaway bog (PB4)</li> <li>• Wet grassland (GS4)</li> <li>• Birch woodland (WN7)</li> <li>• Buildings and artificial surfaces</li> </ul>			
<b>Description of site</b>			
<p>Pollagh/Cornalaur bog is located in Co. Offaly, adjacent to the village of Pollagh and adjacent to the south side of the Grand Canal. Other adjacent BnM bogs include Turraun, which is located to the SW of Pollagh, while Oughter and Kilaranny are located to the south of the site. The main feature of the surrounding landscape is the Grand Canal, which is positioned to the north of the bog. A feeder channel into the canal actually separates Pollagh production bog from an adjacent undeveloped high bog in Cornalaur, to the east. The surrounding landscape of this area is fairly low-lying and dominated by secondary peatland habitats and reclaimed grassland, with some drier grassland found on mineral soils that overlay glacial mounds and ridges through the area.</p>			
<b>Pollagh</b>			

Pollagh bog is a relatively deep basin that is dominated by bare peat and production bog. This bog has some drainage problems and a pump is being installed at the eastern side to lower the water level. Pollagh is also spring-fed (possibly related to the former soak system), which has created drainage problems for production.

There is a small area of production-related bog towards the north-west corner of the site that extends along the northern boundary of the site. The majority of this area is over some higher ground and glacial gravel is exposed in a few places. The oldest section of vegetation on the highest ground is mainly vegetated by typical cutaway habitats such as open Birch and Willow scrub and poor fen vegetation dominated by Soft Rush and Bog Cotton. Some of the cutaway vegetation in this area is relatively wet (drainage impeded?) and there are pools within the open Birch scrub in places. *Calliergonella cuspidata* dominates the moss flora in the wetter area and the drier areas have typical species such as *Polytrichum juniperum*, *Polytrichum commune*, *Campylopus introflexus* and *Rhytidiadelphus squarrosus*. Some of the drier poor fen also has frequent grass cover with Creeping Bent and Cocksfoot. Bulrush and Common Reed are spread throughout this area in the drains with several clumps of Common Reed present. Broom is one untypical species found within the drier scrub and along the marginal high bog. Towards the western side there is some lower ground that is partially re-wetted with Bog Cotton-dominated poor fen and some shallow pools.

Along the eastern boundary there is a narrow strip of land adjacent to the stream that has not been in production. The stream channel is in poor condition as it has been 'cleaned' in the past with deep vertical banks and the channel is quite silty. The majority of this area contains scrub (WS1), Bracken and some Dry Heath (HH1). There is also a small area (possibly diverse) of wet grassland (GS4) present adjacent to the stream. Some of this land has recently been cleared of vegetation and silt ponds and a new pump is being constructed. A zone to the edge of the stream channel has been cleared of vegetation, leaving no buffer. Within the adjacent production bog where were small pools of temporary re-wetted bog.

The southern boundary is almost entirely bare peat apart from some small sections of remnant raised bog that are within the BnM property.

### **Cornalaur**

This is a relatively large area of undeveloped high bog that is located to the east of Pollagh. Bord na Móna only own a portion of the overall high bog. The high bog is in relatively good condition, although the majority of the high bog would be classified as sub-marginal or degraded raised bog. Some small Pine trees are scattered over the high bog. There is no recent peat-cutting along the western side of the site but both the southern and eastern sides are being cut. There is still a significant elevated dome present

The central area has a relatively well-developed micro-topography with tall hummocks. *Sphagnum* is mainly represented by *S. capillifolium* and *S. papillosum*, with *S. cuspidatum* only found in some small hollows. Some relic hummocks of *S. fuscum* and *S. imbricatum* are present in the central area. This is a small depression in the central area that is wetter where there may be some surface pooling of water. In this section both Common Bog Cotton and Hair's-tail Bog Cotton are more prominent in the vegetation with Heather. There are some old pools present that have now degraded and are infilling hollows with *S. cuspidatum* and *S. magellanicum*.

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

The Grand Canal pNHA (NPWS site code 2104) is located to the north of this site and part of the designated area along the canal is adjacent to the northern Pollagh BnM boundary. A small drainage channel feeds into the canal and flows along the east side of the production bog, separating Pollagh from Cornalaur. This feeder is also within the pNHA designation.

### **Adjacent habitats and land-use**

The surrounding landscape is dominated by farmland with improved grassland. Much of the improved grassland has been developed from peatland. Adjacent habitats include scrub (WS1), Birch woodland (WN7), improved

grassland (GA1) and wet grassland (GS4). There are also some high bog (PB1) remnants and active cutover bog (PB4) around the margins that are not in ownership by BnM.

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

- The majority of the bog drains towards a stream flowing along the east side of the bog. This stream flows under the Grand Canal and is part of the River Brosna catchment. The stream and adjacent riparian zone are in poor condition and the stream bed is quite silted. There have been recent BnM work along the edge of the stream with clearance of vegetation and creation of new silt ponds.
- The Grand Canal feeder also flows between Pollagh and Cornalaur. However, this feeder is perched at a higher level than the above stream and there is no inflow from the production bog. The feeder bed has been supported by impermeable plastic (see pictures).

#### **Peat type and sub-soils**

Blue-silt Clay and Gravel have been exposed along the edges of the stream. Gravel Sub-soil has been exposed in places within the production-related cutaway area.

#### **Fauna biodiversity**

##### **Birds**

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

- Kestrel
- Kingfisher (along the eastern stream)
- Snipe (3)
- Whooper Swan (6) (flying over site)
- Mallard (4)
- Other species present included Blackbird, Rook, Blue Tit, Wren, Pheasant and Wood Pigeon.
- Some of the younger cutaway vegetation surrounding the scrub in the production-related area may be suitable for breeding waders as there are unused bare peat fields and adjacent wet pools with emergent poor fen vegetation present.

##### **Mammals**

- Signs of Fox, Rabbit and Badger were noted on the site.
- Hares were observed on the site and there are frequent signs of Hares around the cutaway with browsing of Birch and Willow saplings. .
- Mink and Otter have been recorded from the adjacent section of the Grand Canal in the past and would be likely to visit the site on occasion (inland Water Ways – Grand Canal Ecological study)

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

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

## APPENDIX V: BIOSECURITY

No invasive species have been recorded at Pollagh Bog.

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 inspecting and washing vehicles prior to entering sites.

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague<sup>2</sup> and Zebra Mussel will be adhered with throughout all rehabilitation works and activities.

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<sup>2</sup> <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>



## APPENDIX VI: POLICY AND REGULATORY FRAMEWORK

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

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

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

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

### 1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the 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. The bog is part of the Boora Bog 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) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands, referred to as the 'Peatlands Climate Action Scheme'. The proposed Scheme includes lands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the proposed Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the proposed Scheme, and supported by the Climate Action Fund across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). This proposed 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 proposed Scheme.

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

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

### **3 National Climate 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. 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 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.

## **5 National River Basin Management Plan 2018-2021 (Water Framework Directive)**

The National River Basin Management Plan (2018-2021) (Department of Housing, Planning, Community and Local Government 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP outlines 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) is part of the WFD (2018-2021) programme of measures. The NRBMP takes account of the fact that Bord na Móna is 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 rehabilitation target is set to be superseded by the acceleration of the Bord na Móna de-carbonisation programme and the proposed **Scheme**.

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

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

The National Biodiversity Action Plan 2016-2022 has a vision that biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally. Ireland's 2<sup>nd</sup> National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

## **7 National conservation designations**

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

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

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This

will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects.

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

## **9 All-Ireland Pollinator Plan 2015-2020**

The All-Ireland Pollinator Plan 2015-2020 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. There are several Bord na Móna specific actions in this plan including the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

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

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

Pollagh Bog is located in an area zoned by Offaly County Council as open countryside.

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

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

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

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.

Bord na Móna will endeavour to adhere to this code of practise during the peatland rehabilitation phase and appropriate archaeology mitigation is carried out before and during cutaway peatland rehabilitation. An

Archaeological Impact Assessment has been carried out for the proposed rehabilitation at this site (Appendix IX). The recommendations of this assessment have been incorporated into the rehabilitation plan to minimise impacts on known archaeology.

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

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

One example of a key CBD target is:

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

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

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

The Pollagh Bog Rehabilitation Plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity policies.

## 13 Bord na Móna commitments

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

The company announced that 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 will 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 has also committed to a significantly larger rehabilitation target. This is 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 plan to restore a further 1,000 hectares of raised bog habitat by 2025. These targets are significant in both timing and scale and are indicative of Bord na Móna's increased new ambition in this area.

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.

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

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

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

## APPENDIX VII: DECOMMISSIONING

### 1. Condition 10 Decommissioning

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

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

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

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

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

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

Item	Description	Pollagh Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management via Levelling
4	Decommissioning or Removal of Buildings and Compounds	Decommission and Removal of Porto-cabin tea centre and materials store
6	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
7	Decommissioning and Removal of Bog Pump Sites	Not Applicable



8	Decommissioning or Removal of Septic Tanks	De-sludge Septic Tank
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In addition, condition 7 of the license 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.

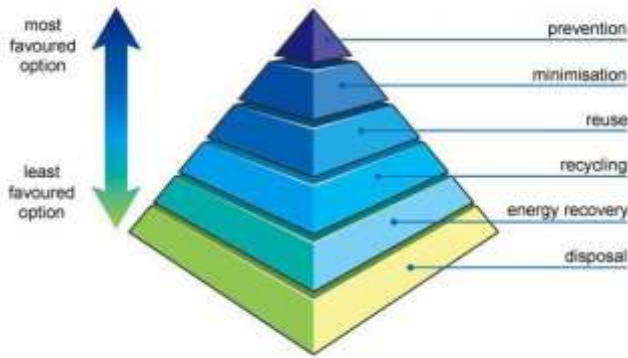
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

**2. Enhanced Decommissioning.**

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

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

## APPENDIX VIII: GLOSSARY

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

**Deep peat cutover bog.** Deep peat 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 *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

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

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

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

**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 turbarry). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

**Rehabilitation:** Rehabilitation is defined in general by Bord na Móna as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general

in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status). This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

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

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

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

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

## APPENDIX IX. ARCHAEOLOGY

### Role of the Archaeological Liaison Officer

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




# Code of Practice

22

# 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.



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

**1) Purpose**

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

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

**2) Procedure**

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

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

Your Archaeological Liaison Officer is .....

**3) Records**

Revision Index			
Revision	Date	Description of change	Approved
1	13/09/2020	First release	EMcD
2			

**Archaeological Impact Assessment of Proposed Bog Rehabilitation at Oughter Bog, Co. Offaly. Dr. Charles Mount. Nov 2020.**

Draft





**Archaeological Impact Assessment of Proposed Bog  
Decommissioning and Rehabilitation at Pollagh Bog, Co.  
Offaly**

**Report For**

**Bord Na Móna Energy Ltd.**

**Author**

**Dr. Charles Mount**

**Bord Na Móna Project Archaeologist**



## Introduction

This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.303 hectares at Pollagh Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to re-wet peat as outlined in the draft Methodology Paper (EDRRS). These enhanced measures for Pollagh Bog will include:

- Re-wetting the deep peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water.
- In some areas, a cut-and-fill cell bunding technique is proposed. The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels.
- Re-wetting some deep peat areas of the bog through regular field drain blocking using a dozer/excavator to create three peat barriers every 100 m along each field drain.
- Re-alignment of piped drainage.
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- Seeding of vegetation and inoculation of Sphagnum.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Pollagh Bog. It may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated.

Pollagh Bog is located immediately south of the Grand Canal, south-east of Pollagh village and 8km east of Ferbane, Co. Offaly. An unclassified road from Pollagh to the R357 runs along the western extent of the bog and east of the L4602 road. The bog occupies the townlands of Derrycooly, Cornalaur and Ballincur on OS 6 inch sheets Offaly 15 and 16.

## Methodology

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

- The Bord na Móna Peatland Survey
- The Bord na Móna excavation programme
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage



- The Excavations database
- Previous assessments

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

## Desktop assessment

### Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This Record was published by the Minister in 1995 and includes sites and monuments that were known in Pollagh Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area or vicinity (see Fig. 1). The closest RMP to the rehabilitation area OF015-007---- an Enclosure in Pollagh townland, is located more than c.0.8km north of the rehabilitation area.

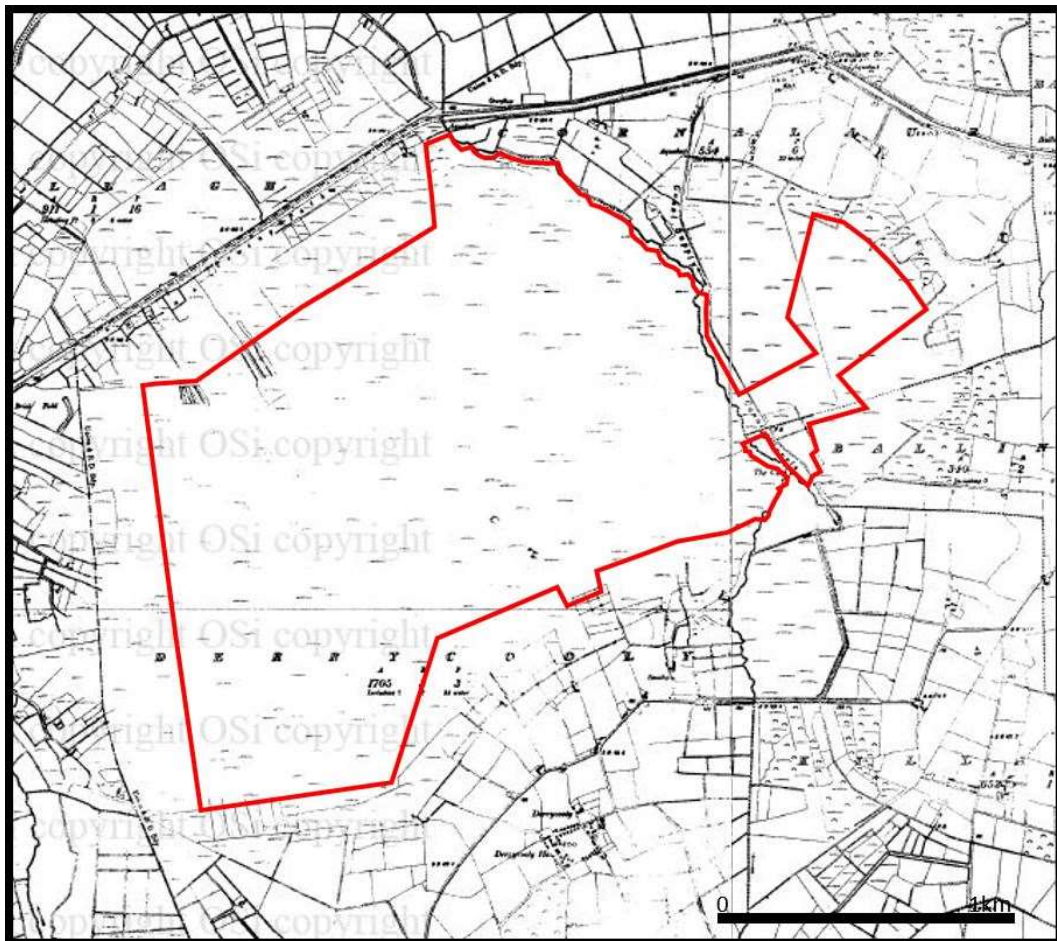


Fig. 1. Pollagh Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets No. 15 and 16. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the area or vicinity.



### Peatland survey

Pollagh Bog was surveyed by the Irish Archaeological Wetland Unit in 1997 as part of the Archaeological Survey of Ireland Peatland Survey. There were no archaeological sites recorded during the survey. No further archaeological work has taken place since 1997.

### Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 30th of October 2020. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are no monuments entered in the SMR in the proposed rehabilitation area (See Fig. 2).

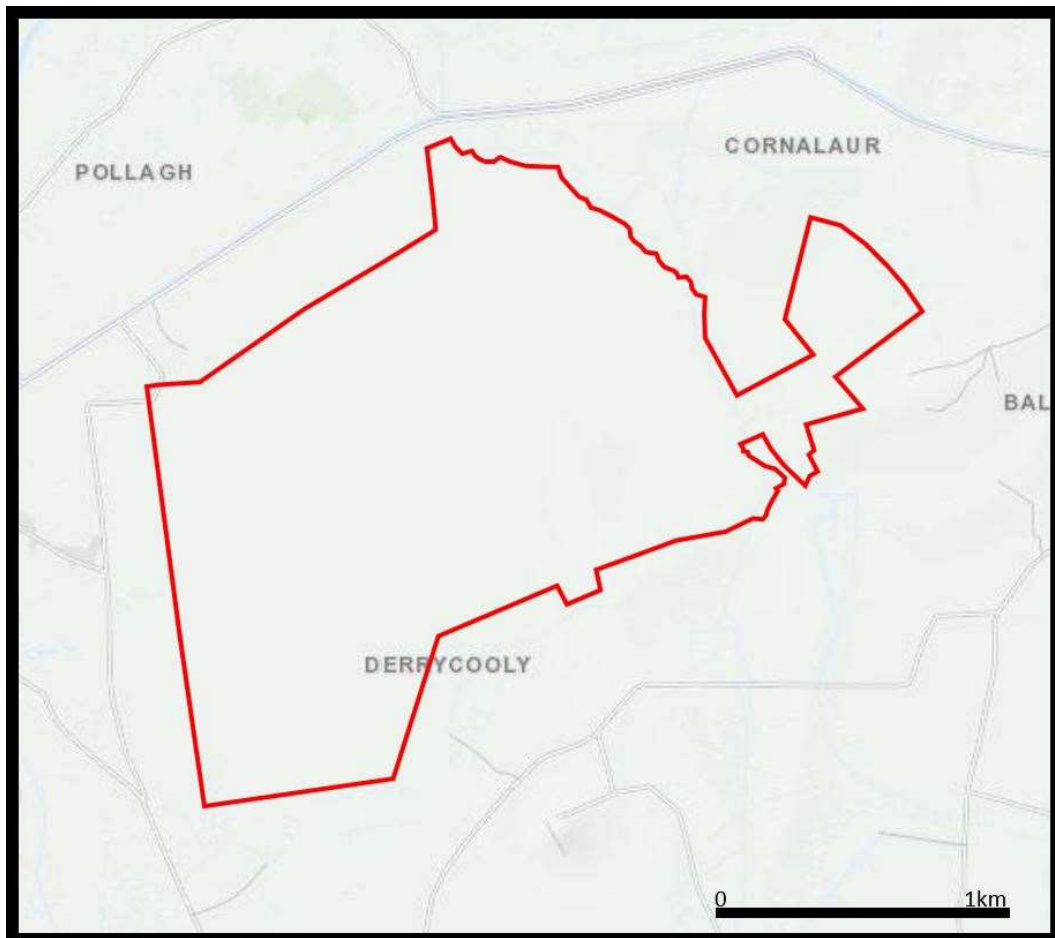


Fig. 2. Pollagh Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There are no SMRs in the area.

### Archaeological investigations

Reports of archaeological excavations and licensed monitoring in the study area listed in the excavations database at [excavations.ie](http://excavations.ie) were examined as part of the assessment. There are no reports of archaeological investigations carried out in the rehabilitation area.



### **Reported finds**

A single archaeological find from Pollagh Bog was reported to the National Museum of Ireland in the twentieth century and is recorded in the Museum Topographical Files. A stone mortar (1970:170) from dryland in Ballincur townland was found in surface soil. It is roughly cylindrical with convex sides, a flat plain rim, flat base, and a simple horizontal hand grip.

### **Previous assessments**

Pollagh bog has been the subject of an Environmental Impact Assessment Report carried out by Irish Archaeological Consultancy Limited in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment identified no extant archaeological material in the rehabilitation area but concluded that:

*While there are no records of archaeological sites within Pollagh Bog, wetlands and Peatlands are considered as Areas of Archaeological Potential for their potential to contain archaeological organic preserved remains. Wetlands also provide a significant resource for environmental analysis. It must be considered therefore that there remains a moderate potential for additional buried features to be uncovered during the course of any future development works in Pollagh Bog.*

### **Impact assessment**

There are no known items of archaeological heritage in the rehabilitation area. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. 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.

### **Recommendations**

Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

### **Conclusion**

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are no known items of archaeological heritage in the rehabilitation area. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

### **References**

DAHGI 1995. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Offaly.



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

Dr. Charles Mount  
2 November 2020