



Cavemount Bog

**Cutaway Bog Decommissioning and Rehabilitation Plan
2020**

This document seeks to address the requirements of Condition 10.2 of IPC License Ref.P0503-01:

“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 Cavemount 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 Cavemount Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0503-01, 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 Cavemount 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 Cavemount Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.

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

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Table of Contents

| | |
|--|----|
| 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..... | 17 |
| 3.1.1 Site history..... | 17 |
| 3.1.2 Current land-use..... | 17 |
| 3.1.3. Socio-Economic conditions..... | 17 |
| 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 | 22 |
| 3.3.3 Invasive species | 22 |
| 3.4 Statutory Nature Conservation Designations..... | 22 |
| 3.4.1 Other Nature Conservation Designations | 23 |
| 3.5 Hydrology and Hydrogeology | 23 |
| 3.6 Emissions to surface-water and water-courses..... | 24 |
| 3.7 Fugitive Emissions to air | 25 |
| 3.8 Carbon emissions..... | 25 |
| 3.9 Current ecological rating | 26 |
| 4. Consultation | 27 |
| 4.1 Consultation to date..... | 27 |
| 4.2 Issues raised by Consultees | 27 |
| 4.3 Bord na Moña response to issues raised during consultation | 27 |
| 5. Rehabilitation Goals and Outcomes..... | 28 |
| 6. Scope of Rehabilitation..... | 29 |

| | | |
|------|--|----|
| 6.1 | Key constraints | 29 |
| 6.2 | Key Assumptions | 30 |
| 6.3 | Key Exclusions..... | 30 |
| 7. | Criteria for successful rehabilitation | 31 |
| 7.1. | Criteria for successful rehabilitation to meet EPA IPC licence conditions: | 31 |
| 7.2. | Critical success factors needed to achieve successful rehabilitation as outlined in the plan..... | 35 |
| 8. | Rehabilitation Actions and Time Frame | 36 |
| 8.1 | Short-term planning actions (0-1 years)..... | 37 |
| 8.2 | Short-term practical actions (0-2 years)..... | 38 |
| 8.3 | Long-term (>3 years) | 38 |
| 8.5 | Budget and costing | 44 |
| 9. | Aftercare and Maintenance..... | 45 |
| 9.1 | Programme for monitoring, aftercare and maintenance..... | 45 |
| 9.2 | Rehabilitation plan validation and licence surrender – report as required under condition 10/4 | 46 |
| 10. | References..... | 47 |
| | APPENDIX I: A standard peatland rehabilitation Plan to meet conditions of the IPC Licence | 51 |
| | APPENDIX II: Bog Group Context..... | 56 |
| | APPENDIX III: Ecological Survey Report..... | 62 |
| | APPENDIX IV: Environmental Control Measures to be applied to bog rehabilitation..... | 66 |
| | APPENDIX V: Biosecurity..... | 67 |
| | Appendix VI: Policy and Regulatory Framework | 68 |
| | APPENDIX VII: Decommissioning..... | 75 |
| | APPENDIX VIII: Glossary..... | 78 |
| | APPENDIX IX. Archaeology | 80 |

SUMMARY

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

Site description:

- Cavemount Bog was drained and developed for industrial peat production in the 1970s and has been in active peat production since then. Industrial peat production ceased completely in 2015.
- The site has been developing a mosaic of wetland habitats since peat production ceased.
- Residual peat depths across Cavemount is in general relatively shallow. The majority of the site has been cutaway.
- Cavemount has a gravity drainage regime.
- Part of the site was planted with conifer forestry in the 1980s and is leased to Coillte.
- The site is located adjacent and south of the Grand Canal pNHA.
- Some rehabilitation has already taken place on site to re-wet selected areas and to manage water levels across the site.
- West Cavemount was selected to be part of the INTEREG CarePeat Project. Bord na Moña are an associated partner of this project.
- East Cavemount is being used by the EPA-funded SmartBog project. It is expected that a GHG flux tower will be erected at this site. A flume is already in place.

Rehabilitation goals and outcomes

Bord na Moña 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 Cavemount Bog is **environmental stabilisation** of the site and **optimising climate action benefits**. This will be achieved via intensive **re-wetting**. This is defined as:

- Carrying out intensive rehabilitation with the application of enhanced peat rehabilitation measures to re-wet peat and slow water movement across the site. The site has already developed a mosaic of pioneer cutaway habitats. Rehabilitation will focus on targeted actions to raise water levels and areas where there is still significant bare peat cover. This site is likely to develop wetland habitats dominated by Reed Swamp and poor fen.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on selected areas of residual deeper peat, and fen and Reeds swamp on shallow cutaway peat, and eventually naturally functioning peatland/wetland 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). It is expected that the bog will have reduced emissions (reduced source) and in time develop its carbon sink function, in part, as some peat-forming habitats develop on site. 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 Cavemount Bog.
- EPA IPC Licence - Ref. P0503-01. 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 Cavemount Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of Cavemount Bog. This site is situated a low level relative to the adjacent river and hydrological modelling indicates the bog is suited to wetland development in general.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- Minimising potential impacts on neighbouring land. Some boundary drains around Cavemount Bog will be left unblocked as blocking boundary drains could affect adjacent land.

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 potential 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 wetland, fen, Reed swamp, wet woodland, heath, embryonic *Sphagnum*-rich peat forming communities, scrub and Birch woodland communities, where conditions are suitable, and eventually towards a reduced Carbon source (Climate action verification). Some areas will naturally be dry and develop Birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Cavemount 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
- Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.

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 hydrological and drainage management plan.

- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling, cell-bunding and water level management across the site.
- Initial hydrological modelling indicates that a significant part of the site will develop a mosaic of wetland habitats. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (< 0.2 m where possible). Water-levels will be adjusted at outfalls.
- Phase 2 measures will include fertiliser application and inoculation of *Sphagnum* on target areas.
- 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 (Appendix I), 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 Cavemount 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 for additional rehabilitation.
- 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.
- 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.

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. It is expected that a GHG flux tower will be developed at Cavemount as part of the EPA-funded SmartBog Research Project. 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 out 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 Allen-Clonsast bog group (Ref. P0503-01). 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 Allen-Clonsast bog group (see Appendix II for details of the bog areas within the Allen-Clonsast Bog Group). Cavemount Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

“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 Cavemount 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 critical success factors required for successful rehabilitation;
- Proposed rehabilitation actions;
- Proposed timeframe to implement these actions;
- Budget and Costings; and
- Associated aftercare, maintenance and monitoring.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (PCAS) 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 ecosystems, and eventually a reduced carbon source/carbon sink again. (In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas. These 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.

Cavemount 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 **Cavemount Bog**.

Biodiversity and ecosystem services have been currently identified as the primary land-use at Cavemount. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Cavemount 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 Cavemount Bog ceased completely in 2015. A mosaic of pioneer habitats has been developing across the site. The combination of active enhanced rehabilitation measures and natural colonisation will quickly establish further pioneer vegetation and more mature habitats 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 Cavemount 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 Cavemount 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.

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

DRAFT

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 Cavemount 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.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan, *et al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al.* (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al.* (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Allen Integrated Pollution Control Licence;
- Allen Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie),
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie),
- River Basin Management Plan for Ireland 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, Cavemount Bog was surveyed in August 2010 with updates in 2013 and 2017. Additional surveys and visits have taken place at Cavemount Bog between 2012-2020 to inform rehabilitation planning. A further confirmatory site visit to examine Cavemount Bog took place by BNM Ecologists in Summer 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 Cavemount Bog is contained in Appendix III.

3. SITE DESCRIPTION

Cavemount Bog is located in Co. Offaly, approximately 3km north east of the village of Daingean and 2km south west of the village of Rhode. The bog lies adjacent to the south side of the Grand Canal (see Figure 3.1 & 8.1). The surrounding landscape is a mosaic 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.

The Esker River flows south through the centre of the bog, acting as a dividing boundary between the eastern and western sections. The Tobardaly River flows southwards around the eastern bog boundary before joining the Esker south of the site. The Esker then joins the Daingean River approximately 4.5km south east of Cavemount Bog. The site is linked by rail to Mount Lucas to the south, Esker Bog to the east and Ballybeg Bog to the North (see Fig. 3.1).



Figure 3.1. Location of Cavemount Bog, nearby designated sites and other Bord na Móna bogs in the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Cavemount Bog was originally developed for peat production in the 1970's. Industrial peat production complexly ceased at Cavemount Bog in 2015. The peat was harvested for use in Edenderry Power Station and Derrinlough Brickette Factory, Offaly.

A wetland habitat area was created on the west side of the site on a suitable area of cutaway habitat in 2015. This was achieved by blocking/management of water outfalls and drains.

3.1.2 Current land-use

Industrial peat production ceased at Cavemount Bog in 2015. Some areas of Cavemount Bog in the south, east and west is actively being cut for private turbary, however, this is outside the BnM boundary (see Figure 3.1, 3.2 & 8.1). A BnM railway bisects the site (Figure 3.5).

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 land use for Cavemount Bog by Bord na Móna.

There is a section of land located on the east of Cavemount Bog used by Coilte for forestry. This land parcel (see fig. 3.6) is beyond the scope of this rehab plan.

Cavemount has been selected to part of the SmartBog Project.

A small area on the site was designated as a Birch woodland development compenstatary area as part of a Forest Service Felling Liscence that was granted for the clearance of Birch woodland and scrub at Mountlucas Windfarm. Birch woodland is developing naturally in this area.

There are no known rights of way 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.

In respect of Cavemount 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

According to GSI, three different geological bands form the underlying bedrock layers at Cavemount Bog. The major bedrock groups are Dark Limestone and Shale, Thick Limestone and Oolitic Limestone¹. The dominant soil type and sub-soils present at Cavemount are classed as ‘Raised Bog Cutover Peat’. The main residual peat type exposed on this site is fen peat. Parts of the site are underlain with limestone tills, as these sub-soils are exposed around the margins of the site. The sub-soils along the southern margin are limestone-based sands and gravels deposited by the river. Shell marl is exposed along some drains in the cutaway area through the eastern basin.

3.2.2 Peat type and depths

The majority of the cutaway has been cutaway. Fen peat and exposed underlying sub-soil are now exposed across the site. Peat depths (2015) generally vary across the site (Figure 8.2). Approximately 75% of the site has a peat depth of <1m. A small proportion of the site has deeper residual peat (> 2 m) and is located at western part of the site.

3.3 Key Biodiversity Features of Interest

Cavemount Bog has now developed a mosaic of mainly wetland cutaway habitats. Much of the site is shallow open water, pioneer wetland vegetation bare peat and developing Birch scrub and woodland.

3.3.1 Current habitats

Cavemount bog is divided into two main cutaway sections by the Esker River, each forming a shallow basin. Habitats present on the former production area of Cavemount Bog are listed here in order of dominance; poor fen mosaics dominated Bog Cotton, poor fen dominated by Bottle Sedge and Soft Rush, wet scrub, emerging Birch scrub, open water (OW) with surrounding emergent poor fen vegetation, Reed swamp and bare peat. The marginal habitats include: conifer plantation (Coillte plantation), Birch woodland, scrub (gorse and Birch scrub developing of dry high bog around margins), raised bog, cutover bog, improved grassland (minor areas along boundaries where boundary overlaps adjacent fields) and depositing river (Esker Stream).

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



Figure 3.2. View of typical cutaway peat surface with revegetating drainage channel across Cavemount Bog (2018).



Figure 3.3.. View of east wetlands with emerging vegetation at Cavemount Bog (2018).

A habitat map of Cavemount Bog is shown in Figure 3.4, overleaf.

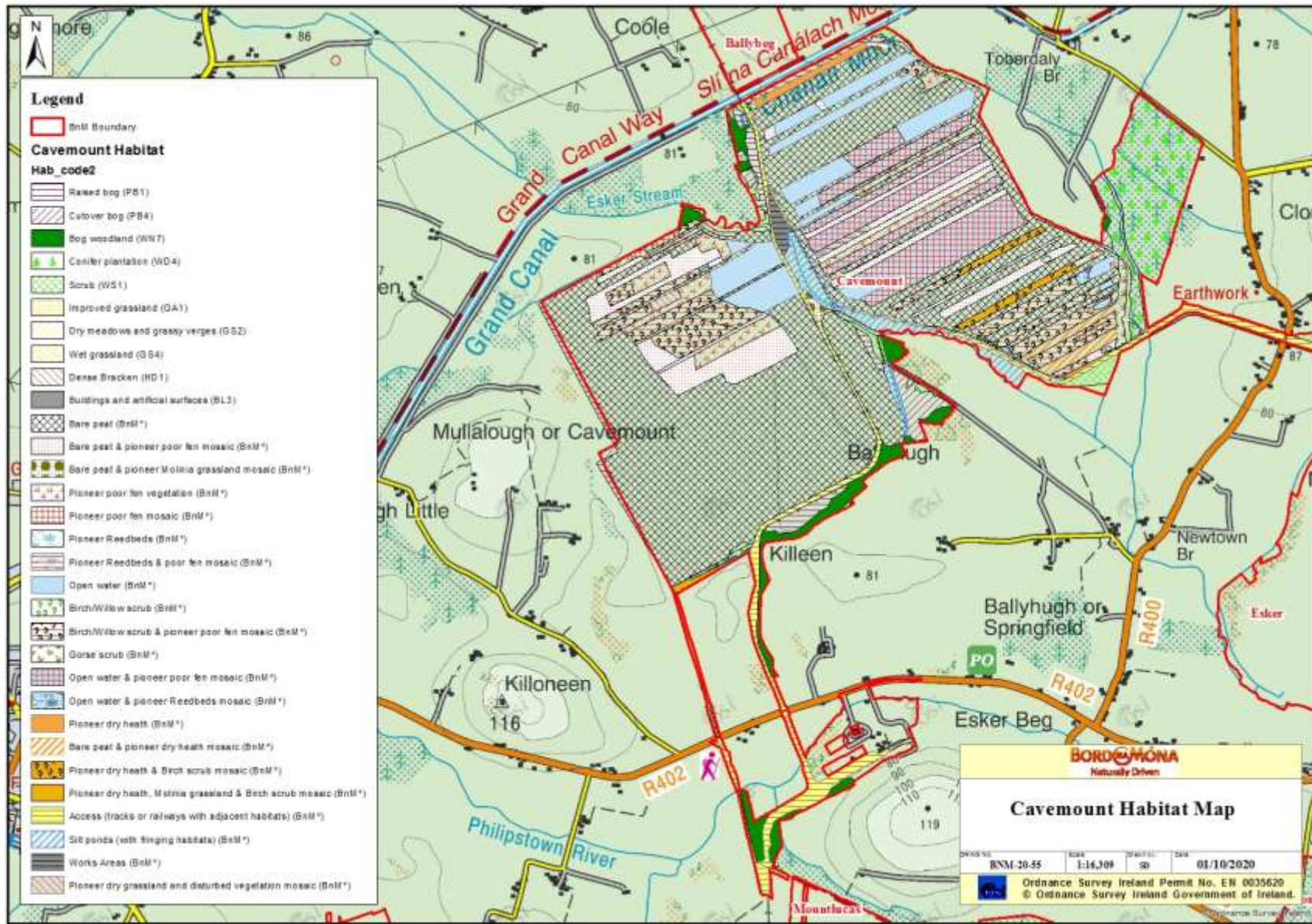


Figure 3.4. Habitat map of Cavemount Bog showing Bord na Móna habitat categorisation

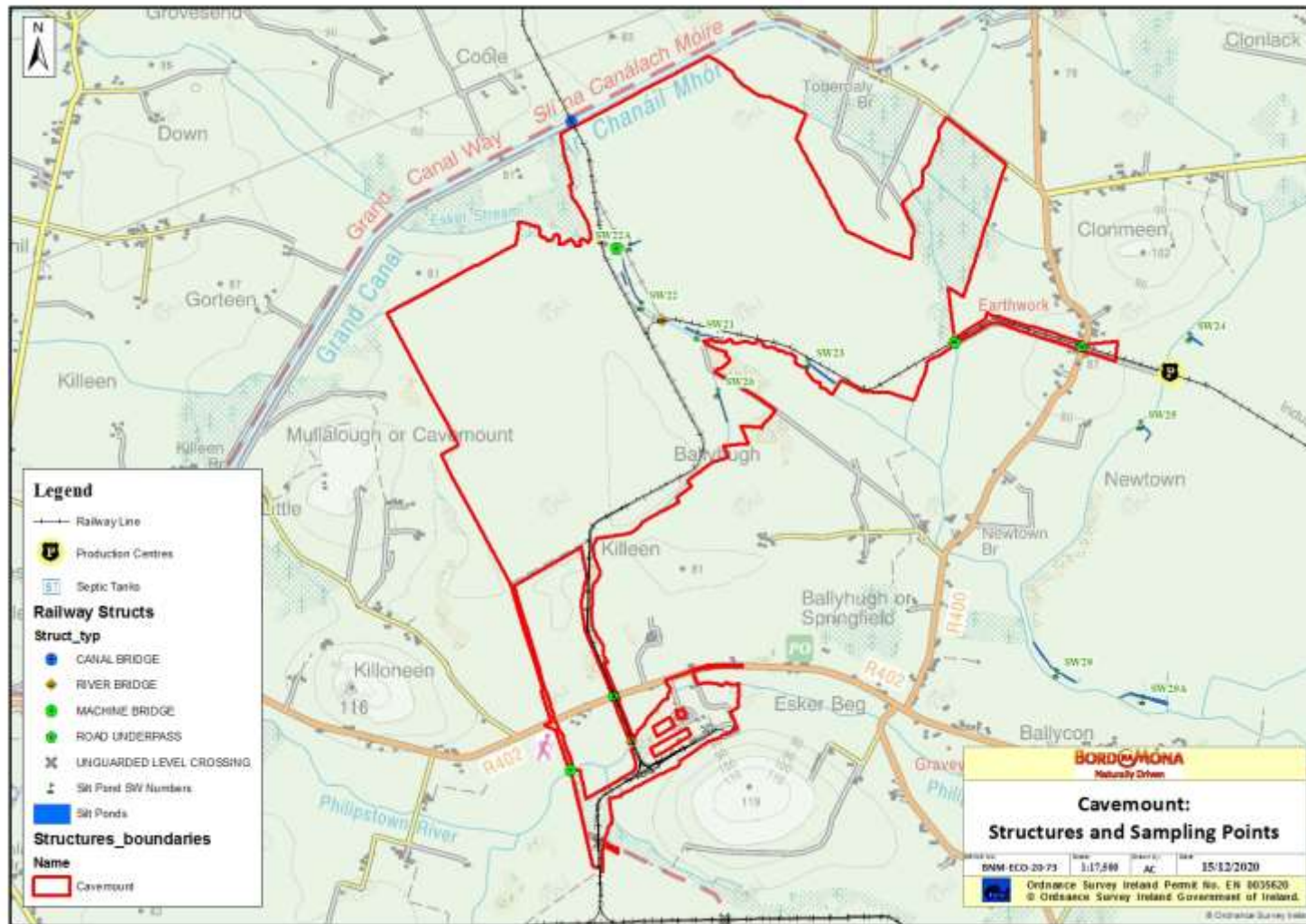


Figure 3.5. Map of Cavemount Bog showing structures and designated emission points.

3.3.2 Species of conservation interest

Records from BnM commissioned surveys indicate that the wet areas offer a refuge to significant flocks of Whooper Swans (listed on Annex I of the EU Birds Directive). Peak numbers for Cavemount Bog in December 2013 were 259 Whooper Swans (1% flyaway threshold is 270 individuals (Crowe & Holt, 2013; Wetlands International, 2015; Crowe *et al.*, 2015). The wetland also attracted small numbers of wildfowl with mainly Mallard, Wigeon and Teal. Raptor species, including Hen Harrier *Circus cyaneus*, also use the site during Winter months (Biosphere Environmental Services 2013, 2014).

During summer wader species such as Lapwing, Redshank, Ringed Plover and Snipe have been recorded attempting to breed on site. Black Headed Gull have also been recorded breeding on site during the Summer months. There have been records of Merlin during spring but breeding, at least on site, is not considered likely due to an absence of suitable nesting habitats.

Terrestrial mammals recorded on site include; BnM ecologists have recorded signs of Otter *Lutra lutra*, Badger *Meles meles*, Hare *Lepus timidus hibernicus*, Rabbit *Oryctolagus cuniculus*, Fox *Vulpes vulpes*, Pine Marten *Martes martes* and Red Squirrel *Sciurus vulgaris*.

No bat species records for Cavemount Bog can be found in BnM records or on the national biodiversity data centre website. This is likely due to recording deficiencies rather than lack of bat species present, as the habitat available provides suitable commuting corridors and foraging opportunities.

Smooth Newt *Lissotriton vulgaris*, Common frog *Rana temporaria* and Common Lizard *Zootoca vivipara* have been recorded on or close to (within 1k of site) site at Cavemount Bog.

Green Veined White *Pieris napi* and The Wall Brown *Lasioommata megera* were both recorded during routine habitat surveys.

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. A broad range of common garden escapees/Invasive Alien Species are occasionally detected on or close to former peat production sites. All invasive alien species detected will be treated in line with Best Practice during PCAS activities, where necessary.

Records exist for American Mink *Mustela vison*, Fallow Deer *Dama dama*, Jenkins' Spire Snail *Potamopyrgus antipodarum* and Sycamore *Acer pseudoplatanus* in the general area of Cavemount Bog but these species are unlikely to be further dispersed during or as a result of PCAS activities. Records within the NDBC data bank for the area show that Zebra Mussel *Dreissena polymorpha*, an invasive aquatic invertebrate species and Japanese Knotweed *Falopia japonica*, an invasive vascular plant species, have been identified in habitats surrounding Cavemount Bog. No other invasive alien species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species, likely to be further dispersed during or as a result of PCAS activities has been recorded at Cavemount Bog.

3.4 Statutory Nature Conservation Designations

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

The Grand Canal pNHA (NPWS site code 002104) is located adjacent to Cavemount Bog along the northern site boundary (Figure 3.1). There is some site overlap between the designated area and the BnM property. However this overlapping area mainly contains production bog, which is of no value to the NHA and should be excluded. There is a small band of dried raised bog (high bog) (PB1) between the canal corridor and the production bog that does have limited ecological value.

3.4.1 Other Nature Conservation Designations

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

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

3.5 Hydrology and Hydrogeology

Cavemount Bog has a gravity drainage regime. Initial hydrological modelling (Figures 8.3 & 8.4) indicates that Cavemount East is a large basin that has capacity to develop wetland habitats. Cavemount West has areas that are modelled as re-wetting along with drier more elevated areas. It is likely that a portion of these basins will re-wet with deeper water, creating a mosaic of wetland habitats, and the site will be prone to seasonal inundation. Anecdotally, Cavemount 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. This is particularly prevalent in Cavemount East, where there are also frequent ecological indicators of alkaline water chemistry (some rich fen indicators).

Cavemount Bog is located in the River Barrow Catchment. The production area of the bog forms one catchment area. The bog has field drains running in an approximate east-west orientation. The drains direct water flow toward six onsite silt ponds. Silt ponds are present on site to manage discharges to neighbouring water-courses. After filtration/silt reduction is complete, water is discharged into the central channel of the Esker River (See fig. 3.6). The Grand Canal feeder also flows across the north of Cavemount Bog. However, this feeder is perched at a higher level than the above stream and there is no inflow from the production bog.

Cavemount bog is located in an area with a series of three separate locally important bedrock aquifers. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m³/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

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 Cavemount 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 aimed at managing and maintaining the silt pond network. The silt that builds up in silt ponds is excavated on a regular basis by Bord na Móna to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during 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.

Cavemount bog has 5 treated surface water outlets to the Esker Stream IE_SE_14E010200 which in turn feeds the Figile river IE_SE_14F010300. Peat extraction was identified as a pressure in the second cycle of the river basin management plan for the Esker Stream but is not indicated as remaining so in the third cycle, currently under preparation. However the Figile river is indicated as remaining under pressure from peat extraction.

There are no exceedances in the IPC Licence limits for Suspended solids and Ammonia resulting from surface water monitoring. As part of the rehabilitation plan and validation, surface water quality will be monitored to establish an expected stabilization or improvement in water quality parameters. The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.0mg/l and COD 100mg/l. From an analysis of any monitoring over the past 3 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 levels for ammonia and COD (Table 3.1).

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).

Table 3.1.

| Bog | SW | Monitoring | pH | SS | TS | Ammonia | TP | COD | Colour |
|-----------|--------|------------|-----|----|-----|---------|------|-----|--------|
| Cavemount | SW-20 | Q4 18 | 7.8 | 5 | 298 | 0.02 | 0.05 | 85 | 325 |
| Cavemount | SW-22 | Q4 18 | 7.4 | 5 | 252 | 0.08 | 0.05 | 73 | 270 |
| Cavemount | SW-22A | Q4 18 | 7.6 | 5 | 272 | 0.16 | 0.05 | 75 | 89 |
| Cavemount | SW-20 | Q1 17 | 8.1 | 5 | 260 | 0.07 | 0.08 | 56 | 132 |
| Cavemount | SW-20 | Q1 2020 | 7.7 | 4 | 216 | 0.063 | 0.06 | 78 | 262 |
| Cavemount | SW-22 | Q1 2020 | 7 | 2 | 137 | 0.118 | 0.06 | 84 | 297 |
| Cavemount | SW-22A | Q1 2020 | 7.2 | 2 | 150 | 0.087 | 0.06 | 84 | 285 |

Water quality of water discharges from restored peatlands normally improves as a result of bog rehabilitation and restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). 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 Cavemount Bog has been completed. The rehabilitation of the bog is expected to have a positive impact on status of the key downstream water body receptors, due to greater water attenuation on site. This in turn is expected to support the retention of the current and future status of Cavemount Bog water quality.

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 was a drained (degraded) peatland with some active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural peatland which acts as a modest carbon sink into a cutaway ecosystem which is a large source of carbon dioxide (2–5 t C/ha/year) (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). Furthermore, they are also a significant source of methane (Huttunen *et al.*, 2003; Laine *et al.*, 2007a) as a consequence of the conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

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

GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO₂ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

It is expected that Cavemount Bog will become a reduced Carbon source following rehabilitation. The site only has potential to become a carbon sink in part 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. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The eastern side of the site has been rated as having a Nationally Important ecological value (B) due to its usage by breeding and wintering wetland birds (Biosphere Environmental Services 2013, 2014). The western side of the site contains wetland and Birch woodland/scrub cutaway habitat and can be rated as having high local ecological value (D).

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 wetland, some embryonic *Sphagnum*-rich habitat and other habitats.

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 can 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 Cavemount Bog.

There has been ongoing general consultation about peatland rehabilitation, biodiversity, research and other issues over the years about Cavemount Bog with various stakeholders in relation to:

- Wintering wader and wildfowl usage through surveys of the site by Birdwatch Ireland and others (commissioned by BnM).
- Use of Cavemount as a Birch woodland compensatory area as part of a Forest Service felling licence.
- Site visit with Offaly Naturalists Field Club in 2018.
- The inclusion of Cavemount Bog within the Carepeat Intereg Project. Site visit to Cavemount with the WFD Working Group in 2019.
- Sites visits to discuss potential future rehabilitation with NPWS 2018/2019.
- Site visit with the CarePeat Interreg Project team in 2019.
- Site visits to Cavemount wiuth the SmartBog Project Research Team in 2019/2020.

Local stakeholders will also be identified through ongoing engagement with neighbours whose land adjoins Cavemount 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 can be invited to submit their comments or observations in relation to the proposed rehabilitation at Cavemount Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Cavemount 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 Cavemount 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, water level management, 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 residual deep peat.
- Optimising hydrological conditions for the development of Reed Swamp and fen and other wetland habitats 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 and wetland 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 small 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. Some areas will naturally be dry and develop Birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Cavemount 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 a reduced carbon source. *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. P0503-01. 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. Cavemount Bog is part of the Allen-Clonsast 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 Cavemount 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 Cavemount Bog is defined by Figure 3.1
- The local environmental conditions of Cavemount Bog identify wetland rehabilitation as the most suitable rehabilitation approach for the majority of 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 Cavemount 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 residual peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils**.
- Enhanced Rehabilitation of Cavemount 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 Cavemount Bog, a significant portion of peat has been removed leaving a largely un-vegetated surface over peat deposits of varying depth. Some previous rehabilitation efforts combined with natural colonisation has resulted in the development of pioneering scrub, open water/wetland, 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. 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 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 Cavemount 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 Cavemount Bog, and therefore neither the canal feeder or the canal itself will be directly 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 appraisal of the proposed rehabilitation at Cavemount Bog is being carried out (Appendix IX). There are several archaeological features known from this bog. Rehabilitation in these zones will be avoided or minimised (peat barriers located to avoid damage to any archaeological features) (Figure 8.5).

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 stabilisation and residual peat re-wetting. 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 Cavemount Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

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

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation, and,
- mitigation of potential 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 (1) the trajectory of deep peat re-wetting towards the establishment of embryonic *Sphagnum*-rich peat-forming habitat in suitable conditions, and (2) the trajectory of peat re-wetting towards the establishment of naturally functioning peatland habitats (fen and Reed swamp).

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 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, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that can be attributable to the rehabilitation works undertaken on this bog, based the monitoring results of these inputs. This will be measured by the EPA WFD monitoring programme.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the 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. A GHG flux tower is expected to be developed at Cavemount to measure wetland cutaway GHG fluxes as part of the EPA Smart Bog Project. A flume has already been constructed to measure fluvial carbon and other water quality parameters.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including fen, Reed swamp and wetland, scrub, wet woodland, 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 Cavemount 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.

| Criteria type | Criteria | Target | Measured by | Expected Time-frame |
|----------------------|---|---|--|----------------------------|
| 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. Started in advance of the proposed rehabilitation. | 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, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that can be attributable to the rehabilitation works undertaken on this bog, based the monitoring | EPA WFD monitoring programme | WFD schedule |

| | | results of these inputs. | | |
|-----------------------------|--|---|---|-----------|
| 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 | 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

- **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 training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on 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 Cavemount Bog will include:

- Re-wetting the drier residual 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-alignment of piped drainage and management of overall hydrological conditions across the site.
- Optimise water retention in wetland areas, including placement of berms where required.
- 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.
- Inoculation of *Sphagnum* on suitable deep residual peat.
- The majority of the bog has already undergone significant natural colonisation and the development of pioneer habitats is already significantly progressed in particular sections so seeding of Reeds and other vegetation is not required.
- 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 Cavemount 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 Cavemount Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

| Type | | Enhanced Rehabilitation Measure | Extent (Ha) |
|---------------|------|---|--------------|
| Deep peat | DPT4 | Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation | 17.4 |
| Dry cutaway | DCT1 | Blocking outfalls and managing water levels with overflow pipes | 16.3 |
| Dry cutaway | DCT2 | Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment | 66.2 |
| Wetland | WLT2 | 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 | 241.3 |
| 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 | 14.5 |
| Wetland | WLT4 | More intensive drain blocking (7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes | 37.4 |
| Marginal land | MLT1 | No work required (Marginal land including Silt Ponds) | 112.2 |
| Silt ponds | | Silt ponds | 7.5 |
| Other | | Archeology | 0.1 |
| Total | | | 512.9 |

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 Cavemount Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See Figure 8.5) for an indicative view of the application of different rehabilitation methodologies).
- Carry out a hydrology and 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;
- 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 Cavemount Bog (See Figure 8.1).
- 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 needed, 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 best practice environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- 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 inoculation of *Sphagnum* on residual deep peat
- Silt-ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential 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. Aerial photo of Cavemount Bog. The majority of the bog is bare peat, with areas of vegetation and some areas of open water.



Figure 8.2. Peat Depth Map for Cavemount Bog (2008). There are pockets of deep residual peat (western area). The remainder of the site is shallow cutaway.



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

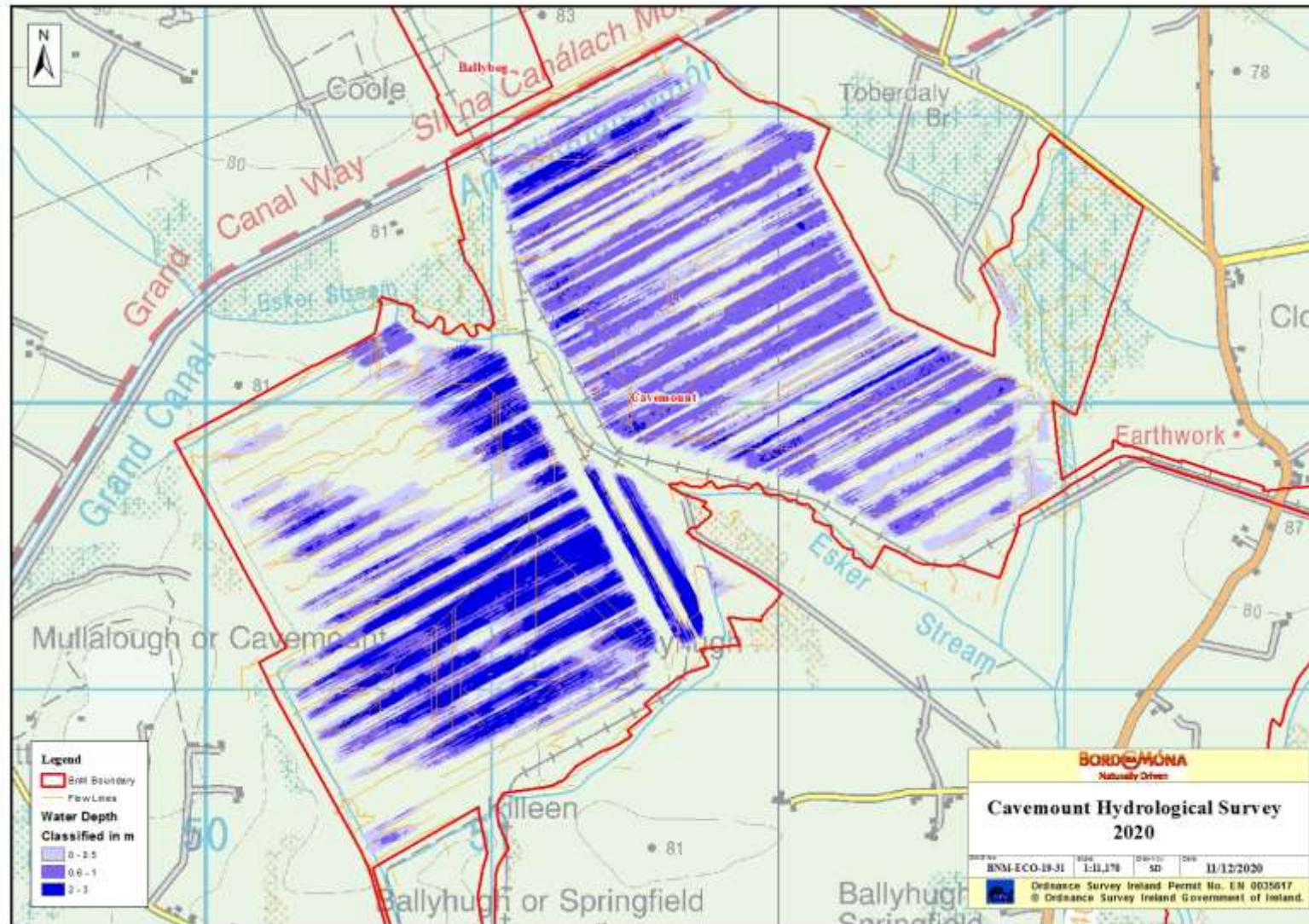


Figure 8.4. Hydrological modelling for Cavemount Bog showing range of expected water depths based on current topography and key flow-paths. Both Cavemount East and West are modelled as basins that have the potential to develop wetland habitats.

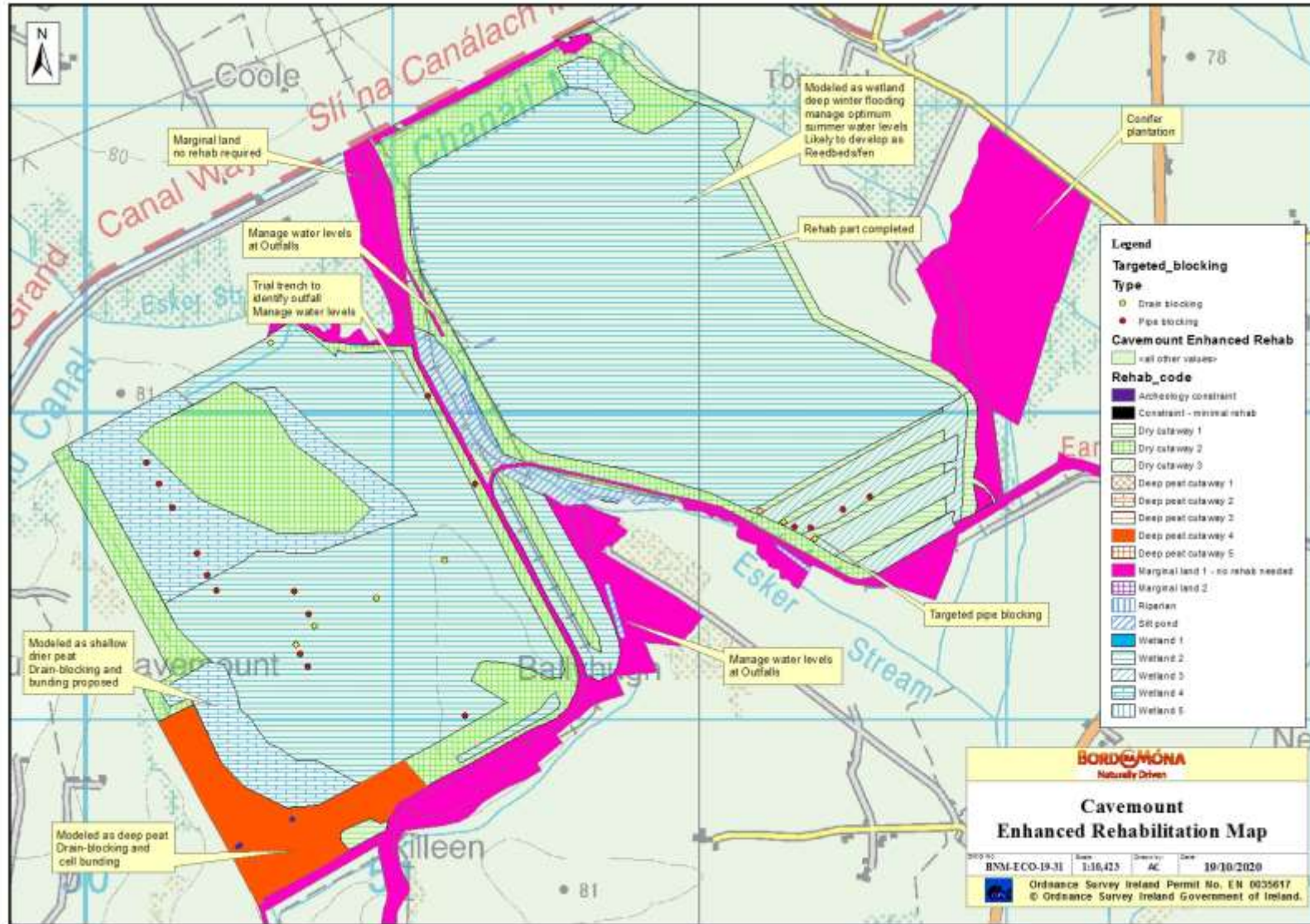


Figure 8.5. Indicative Enhanced Rehabilitation Plan. *Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.*

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 different cutaway types (See Appendix I).

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial 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. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. This will start in advance of the proposed rehabilitation. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- 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.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. 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 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 aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced,

where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the 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. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.
- 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. P0503-01. 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. Cavemount Bog is part of the Allen - Clonsast 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 Cavemount Bog as defined by Figure 3.1.
- Minimising potential impacts on neighbouring land. Some boundary drains around Cavemount 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 goal and outcome for Cavemount Bog is environmental stabilisation of the site via wetland creation and residual peat re-wetting. This is defined as:

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

The outcome is setting the site on a trajectory towards establishment of natural wetland/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 (e.g. silt). 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 parts of 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 to manage water levels across the site.
- 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.
- No measures are proposed for areas that have already stabilised.
- 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. 1st phase of rehabilitation. Field drain blocking with dozer/excavator.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st 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 required. 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 areas.

| Type | Code | Description | Area (Ha) |
|-------------------|------|--|--------------|
| Dry Cutaway | DCT1 | Blocking outfalls and managing water levels with overflow pipes | 82.5 |
| Deep peat cutaway | DPT1 | Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes | 17.4 |
| Wetland | WLT1 | Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes | 293.3 |
| Marginal land | MLT1 | No work required | 112.2 |
| Silt ponds | | Silt-ponds | 7.5 |
| Total | | | 512.9 |

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.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment and planning procedures.

Validation and IPC Licence surrender

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

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

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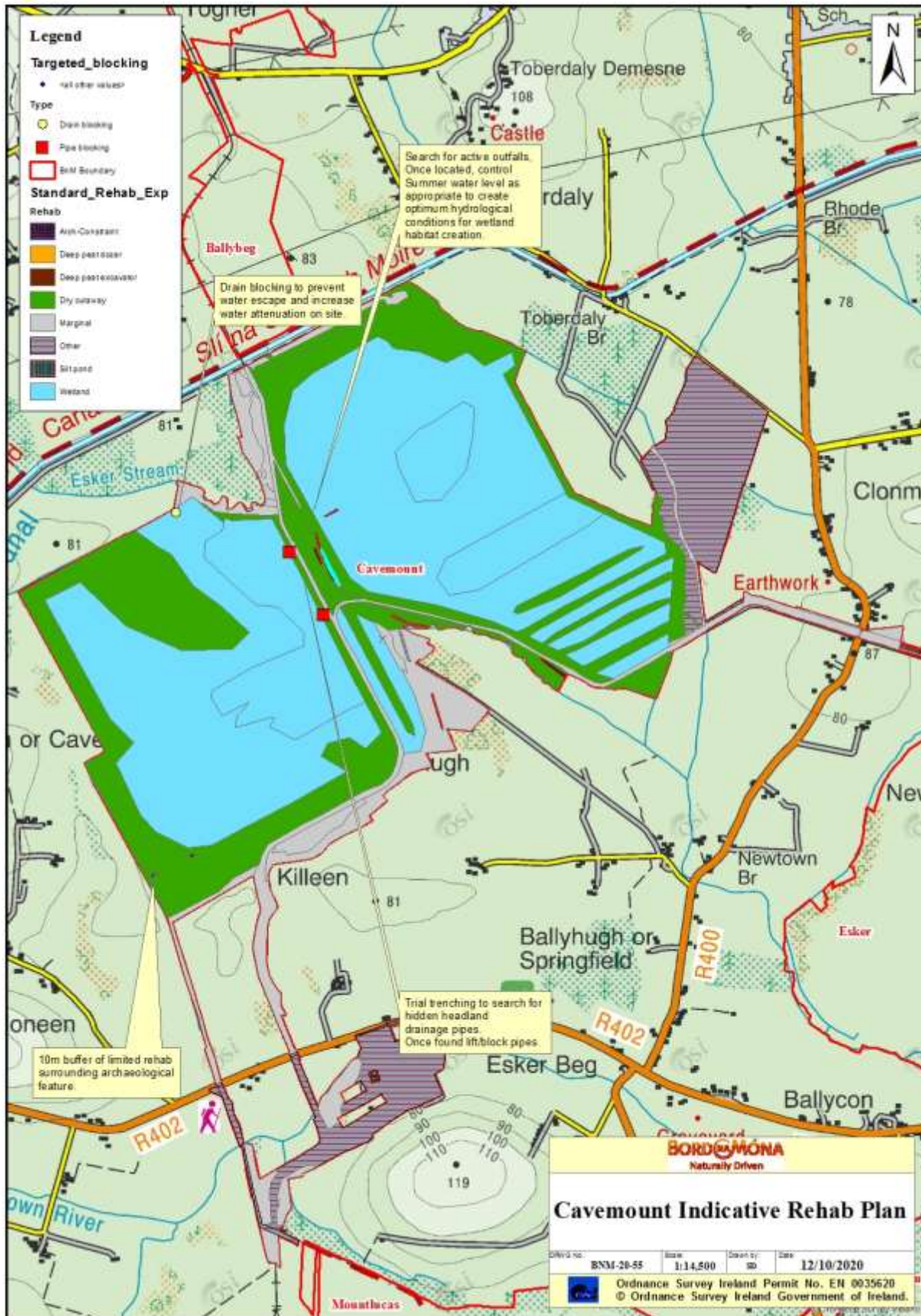


Figure Ap-1. Indicative Standard rehabilitation plan for Cavemount Bog.

APPENDIX II: BOG GROUP CONTEXT

The Allen -Clonsast Bog Group is located mainly in counties Offaly and Westmeath. Garrymore Bog is located in Co. Laois. All the associated bogs are located in the River Barrow Catchment area except Clonad Bog which is located in the Lower Shannon River Catchment.

The Allen- Clonsast Bog Group is one of the first developed bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of bogs to fuel power station and supply peat for the horticultural industry. The Allen - Clonsast bogs were developed for the supply of milled peat to the Edenderry Power Station, Croghan Power Station (now decommissioned) and the Croghan Briquette factory (now decommissioned).

Much of the Allen -Clonsast Bog complex became cutaway as long term peat production activity reduced the peat reserves on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen -Clonsast Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management 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 Allen - Clonsast, it was found that these require financial investment that exceeds any potential commercial output value. A windfarm has been constructed at Mountlucas Bog and another windfarm project is currently in development at Cloncreen.

The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by Bord na Móna. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

A breakdown of the component bog areas for the Allen - Clonsast Bog Group IPC License Ref. P0503-01, and current, indicative Peat Production Status, is outlined in Table Ap-2.

Table Ap-2: Allen- Clonsast Bog Group names, area and indicative status

| Bog Name | Area (ha) | Indicative Peat Production Status and land-use |
|------------|-----------|---|
| Ballycon | 282 | Industrial peat harvesting ceased in 2001. Rehabilitation works were carried out in 2006. Drain blocking and bund construction resulted in the creation of wetland habitat. Re-wetting has resulted in the development of a mosaic of vegetation, wetland and other cutaway habitats. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. This site is a Biodiversity Area. Transport link. |
| Ballykeane | 455 | Production bog. Milled peat production is anticipated to continue at Ballykeane 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). Part of the site is cutaway and has started to develop pioneer vegetation. Part of Ballykeane Bog is being used as a herb production trial. |
| Cavemount | 503 | Industrial milled peat production at Cavemount completely ceased in 2015. Rehabilitation has been carried out across a portion of the site. The site is now developing as a wetland. Nationally important for wintering and breeding wetland birds. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. |
| Clonad | 461 | Production bog. |

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| | | <p>Milled peat production is anticipated to continue at Clonad 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).</p> <p>Part of the site is cutaway and has started to develop pioneer vegetation.</p> |
| Cloncreen | 1029 | <p>Industrial milled peat production ceased at Cloncreen in 2018. The site has developed a mosaic of pioneer cutaway habitats.</p> <p>Cloncreen Windfarm. Planning Permissions was granted in 2016.</p> <p>Construction has started on 22 turbines (Approx. 75 MW) at various locations around the site in association with linking road infrastructure, a sub-station and power-lines.</p> <p>Transport link.</p> |
| Clonsast | 1537 | <p>Industrial peat production on Clonsast ceased in the 1980s. There are still a railway, travel paths, silt-ponds and drainage channels maintained on site. Clonsast has now established a mosaic of mature cutaway habitats.</p> <p>A significant portion of the site has been leased to Coillte and planted with conifer forestry in the 1980s.</p> <p>BnM re-wetted a section of bog in 2018.</p> <p>Bord na Moña formerly operated a farm at Clonsast. Farmland was developed on rehabilitated cutaway bog. The farm venture ceased in the 1980's and the farmland was sold.</p> <p>Transport link.</p> |
| Clonsast Bulge | 382 | <p>Cutaway/Bog remnant.</p> <p>80% developed for conifer forestry in the 1980s – Coillte.</p> <p>Bog remnant – Clonavoe Bog – biodiversity area.</p> |
| Clonsast North | 192 | <p>Industrial milled peat was last produced on Clonsast North in the 1990s</p> <p>Cutaway – naturally colonising – mosaic of Birch woodland and wetland</p> <p>The site was partially rehabilitated in 2018.</p> <p>Transport link.</p> |
| Daingean_Derries | 313 | <p>Production bog.</p> <p>Some bog restoration completed in 2017-2018.</p> <p>Milled peat production is anticipated to continue at Daingean Derries 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).</p> |
| Daingean_Rathdrum | 381 | <p>Production bog.</p> <p>Milled peat production is anticipated to continue at Daingean Rathdrum 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).</p> <p>Transport link</p> |
| Daingean_Townparks | 91 | <p>Daingean Bog NHA (intact raised bog)</p> <p>Transport link</p> |
| Daingean Raillink | 5 | Transport link |
| Derrycricket | 190 | <p>Cutaway – Peat extraction at Derrycricket ceased in the 1980s.</p> <p>80% developed for conifer forestry in the 1980s – Coillte.</p> <p>Transport link.</p> |
| Derrylea | 672 | <p>Production bog.</p> <p>Derrylea bog was developed in 1998. As a result, deep peat reserves persist in places. The majority of the exposed bog is still red/brown <i>Sphagnum</i> peat.</p> <p>Some rehabilitation has been completed around the margins of the bog.</p> <p>Milled peat production is anticipated to continue at Derrylea Bog for the</p> |

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| | | foreseeable future, depending on future milled peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). |
| Derryounce | 416 | Cutaway – Peat extraction at Derryounce ceased in the 1980s. 80% developed for conifer forestry in the 1980s – Coillte. Rehabilitation carried out to create a lake. Derryounce Lake Amenity area – leased to Portarlington Community Development Association. Transport link. |
| Esker | 571 | Production bog. Milled peat production is anticipated to continue at Esker 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). Transport link. |
| Garryhinch | 807 | Large areas cutaway, mostly vegetated. Milled peat production at Garryhinch ceased in the 1980s. Extensive sod peat production across the site in the past few years. |
| Garrymore | 286 | Production bog. Milled peat production is anticipated to continue at Garrymore 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). |
| Mountlucas | 1230 | Peat production ceased across a significant part of the site before 2005. This area has developed a mosaic of cutaway habitats with Birch woodland dominant. Part of the site was in milled peat production until 2019. Milled peat production is anticipated to continue at Mountlucas 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). Rehab carried out in association with windfarm construction – small wetland features. The Mountlucas windfarm is now operational since 2014. A public amenity walking route was developed on the existing windfarm. This was opened in 2015. Bord na Móna have developed an aquaculture project in partnership with Bord lascaigh Mhara at Mount Lucas Bog and have also developed herb production trials. Transport link. |
| Total | | |

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry. A second section of peatland is found further east (Timahoe North and South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by Bord na Móna for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has also had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied at old power station at Allenwood (now demolished). Much of the peatland around Lullymore is now cutaway. An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog.

Agricultural grassland was also established in this area by Bord na Móna. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte. Part of Timahoe South Bog has been re-developed as a waste disposal and composting facility (Drehid). Bord na Móna is currently developing a project with ESB to develop solar energy at Timahoe North bog. This project has recently got planning permission. Wetlands have been created in part of Lullymore Bog. An amenity area has also been created at Lullymore that has now been leased to the Lullymore Heritage and Discovery Centre. Bord na Móna have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small section of Lullybeg cutaway is currently being managed by Butterfly Conservation Ireland for butterfly conservation and to maintain the status of Marsh Fritillary (butterfly species of conservation interest) on the site. Bord na Móna also maintains transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group.

There are three land units within the Clonsast Bogs sub-group that are active (Daingean_Rail_Link, Daingean_Townparks) or inactive (Clonsast Power Stn Railway) transport links. Timahoe McNally in the Lullymore Bogs sub-group is also a transport link with associated farmland.

Table Ap-2: Allen - Lullymore Bog Group names, area and indicative status

| Bog Name | Area (ha) | Indicative Peat Production Status and land-use |
|-------------|-----------|---|
| Ballydermot | 885 | Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Ballydermot Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024 |
| Barnaran | 491 | Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Barnaran Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024 |
| Blackriver | 728 | Production bog, emerging naturally colonising cutaway. Peat production is anticipated to continue at Blackriver 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). There is a rail transport link through the site. Under consideration for future renewable energy development. Rehabilitation at this site to start when peat production ceases. 2021-2024 |
| Codd | 557 | Production bog, Peat production is anticipated to continue at Codd Bog for the foreseeable future, depending on future milled and sod peat resource requirements, |

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| | | <p>(subject to current substitute consent applications and future planning applications for industrial peat production).</p> <p>There is a rail transport link through the site.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation at this site to start when peat production ceases. 2021-2024</p> <p>The proposed Irish Water pipeline crosses this bog.</p> |
| Derrybrennan | 194 | <p>Cutaway emerging – naturally colonising. Peat production has ceased.</p> <p>BnM Coillte forestry trial.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation anticipated to start in 2021-2024.</p> <p>The proposed Irish Water pipeline crosses this bog.</p> |
| Glashabaun North | 505 | <p>Production bog, emerging naturally colonising cutaway</p> <p>Peat production is anticipated to continue at Glashabaun North Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production).</p> <p>Part developed for conifer forestry in the 1980s – Coillte.</p> <p>There is a rail transport link through the site.</p> <p>Long Derries SAC – Some rehabilitation (bog restoration in a remnant) was carried out on the margins of Long Derries in 2018.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation at this site to start when peat production ceases. 2021-2024</p> |
| Glashabaun South | 560 | <p>Fragmented milled peat production, emerging naturally colonising cutaway.</p> <p>Peat production is anticipated to continue at Glashabaun South Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production).</p> <p>Part developed for conifer forestry in the 1980s – Coillte.</p> <p>There is a rail transport link through the site.</p> <p>Cutaway emerging – naturally colonising.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation at this site to start when peat production ceases. 2021-2024</p> <p>The proposed Irish Water pipeline crosses this bog.</p> |
| Killinagh | 243 | <p>Cutaway – mosaic of cutaway habitats developing.</p> <p>Peat production has ceased.</p> <p>Forestry trial.</p> <p>There is a rail transport link through the site.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation anticipated to start in 2021-2024.</p> |
| Lodge | 429 | <p>Production bog, emerging naturally colonising cutaway</p> <p>Peat production is anticipated to continue at Lodge Bog for the foreseeable future, depending on future milled and sod peat resource requirements, (subject to current substitute consent applications and future planning applications for industrial peat production).</p> <p>There is a rail transport link through the site.</p> <p>Wetlands cutaway rehab trial.</p> <p>BedaMoss Sphagnum inoculation trial.</p> <p>Under consideration for future renewable energy development.</p> <p>Rehabilitation at this site to start when peat production ceases. 2021-2024</p> |
| Lullybeg | 267 | <p>Cutaway – mosaic of cutaway habitats developing.</p> <p>Peat production has ceased.</p> <p>Butterfly Conservation Ireland Area.</p> |

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|-----------------|-------------|--|
| | | Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024. |
| Lullymore | 175 | Peat production has ceased. Part developed for conifer forestry in the 1980s – Coillte. Cutaway – mosaic of cutaway habitats developing – Biodiversity Area. Wetlands rehabilitation trial. Carbon Flux research. Part-leased to Lullymore Heritage and Discovery Park – amenity. Additional enhanced rehabilitation being considered for this site. 2021-2024 |
| Ticknevin | 458 | Cutaway - Peat production has ceased. There is a rail transport link through the site. Cloncannon bog – biodiversity area. Under consideration for future renewable energy development. Rehabilitation anticipated to start in 2021-2024. |
| Timahoe McNally | 43 | There is a rail transport link through the site. Farmland. |
| Timahoe North | 798 | Former industrial sod peat bog – peat production ceased in 1980s – site has established a mosaic of cutaway habitats. Sod peat production for domestic use in parts. BnM Solar energy project – Planning permission granted 2020 Rehabilitation anticipated to start in 2021-2024. The proposed Irish Water pipeline crosses this bog. |
| Timahoe South | 1703 | Former industrial sod peat bog – peat production ceased in 1980s – site has established a mosaic of cutaway habitats. Resource Recovery (Drehid Facility). Rehabilitation anticipated to start in 2021-2024. The proposed Irish Water pipeline crosses this bog. |
| Total | 8036 | |

APPENDIX III: ECOLOGICAL SURVEY REPORT

| Ecological Survey Report | | | |
|--|------------------|------------------------|--------------------------------|
| <i>Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.</i> | | | |
| Bog Name: | Cavemount | Area (ha): | 503.5 ha (1243.8 acres) |
| Works Name: | Derrygreenagh | County: | Co. Offaly |
| Recorder(s): | MMC & DF | Survey Date(s): | 13/08/2010, 1013, updated 2017 |
| Habitats present (in order of dominance) | | | |
| The most common habitats present on production bog and cutaway at this site include: | | | |
| <ul style="list-style-type: none"> • Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog). • Pioneer poor fen communities dominated by Marsh Arrowgrass and Bog Cotton (pTrig, pEang) in northern section, frequently in mosaic with bare peat. Smaller amounts of poor fen dominated by Bottle Sedge and Soft Rush (pRos, pJeff) on the site. • Emerging Birch scrub (eBir) • Small patches of open water (OW) with surrounding emergent poor fen vegetation (pEang, pRos) and some Reedbeds with Reedmace (pTyph). • Dry heath (dHeath) dominated by Heather • Gorse scrub (eGor) • Silt Ponds (Silt) with associated habitats such as scrub (WS1), Bracken (HD1), rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss). | | | |
| The most common habitats present around the margins of the production bog and in other sections of this site include: | | | |
| <ul style="list-style-type: none"> • Conifer plantation (WD4) (Coillte conifer plantation) (Codes refer to Heritage Council habitat classification, Fossitt 2000) • Birch woodland (WN7) • Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins) • Raised bog (PB1) (several fragments) • Dense Bracken (HD1) • Cutover bog (PB4) (several small fragments) • Improved grassland (GA1) (minor areas along boundaries where boundary overlaps adjacent fields) • Depositing river (Esker Stream) (FL2) | | | |
| Description of site | | | |
| Cavemount is located 3 km south-west of Rhode in Co. Offaly. Croghan Hill is located 3 km to the north-east of the site and the Grand Canal is situated adjacent to its northern boundary. Cavemount is situated in a group of BnM bogs that form part of the Derrygreenagh group with Ballybeg to the north, Mount Lucas to the south and Esker to the east. | | | |
| Cavemount is divided into three main sections by the natural topography of the site. The two main areas of production bog are bisected by the Esker Stream, which flows south-east through the site and creates a South- | | | |

western section and North-eastern section. The third section is located to the north-east of the site and is a conifer plantation planted by Coillte. The Cavemount BnM property also includes a series of travel paths, tracks and railways that connect the site to adjoining Esker and Mount Lucas bogs. Part of this peatland to the south of the site is leased to Klasmann-Deilmann from BnM but was not surveyed as part of this property.

Eastern section of production bog

This section is a mixture of fields that are recently out of production and developing pioneer poor fen communities intermingled with high fields, and some more established cutaway towards the southern end. The natural topography of the site and its production status has had a significant effect on the landscape and habitat development of this section. Wetland with open water and pioneer emergent vegetation (pRos, pPhrag, pEang) has now developed across the majority of this area. High fields are also now re-vegetating with pioneer vegetation (pJeff & DisCF/DisWill, gAn-Ho).

The lowest ground towards the southern end has the most established cutaway vegetation. The central zone has a fairly regular pattern of several (2-4) fields in production and bare peat separated by groups of several fields that are developing pioneer poor fen communities. Pioneer vegetation is at an early stage and is represented by Marsh Arrowgrass and or clumps or swards of Bog Cotton. Both these communities may dominate on their own or may be found in mosaic with each other and frequently with bare peat, depending on how long they have been out of production. Some of these fields are wet and somewhat quaky in places. Reedmace appears along some of the drains but is generally quite minor in cover. There are several small patches of Common Reed also developing in these fields. Some fields that were vegetated previously have gone back into production but more and more fields seem to be coming out of production.

The southern portion of this section contains the most established cutaway vegetation. This area is classified as production-related cutaway on the land-use maps. This portion contains groups of high fields being vegetated by dry heath (dHeath) with scattered Heather cover. Some of the edges of these high fields are being vegetated by Purple Moorgrass-dominated grassland. The high fields are separated by groups of low fields that contain a range of poor fen communities and Birch scrub. Habitat development within these groups of low fields generally features drier habitats towards the west (River) side and gradual transition to wetter habitats and some open water towards the eastern (conifer plantation) side. The drier vegetation generally contains Birch scrub (eBir, oBir) in mosaic with poor fen (pEang, pRos) and some dry grassland (pioneer *Anthoxanthum-Holcus-Equisetum* community). Within these low fields there are some drains where shell marl is exposed. The edges of these drains, where it is dry, are being vegetated with a Yellow Sedge-dominated community (similar to a potential poor fen community but without brown mosses). There is generally a gradual transition from dry vegetation with Birch scrub to poor fen without scrub that merges with the large pools of open water. These pools are surrounded by emergent poor fen (mainly Bottle Sedge and Bog Cotton) and also some patches of Reedbeds with Reedmace. The ends of these fields are being vegetated by Gorse scrub (eGor) and some Birch and Heather. Notable species found in this area include Greater Tussock-sedge and Star Sedge (in and along drains) and may be an indication that some of this wetland vegetation will further diversify into rich fen.

The area separating the two main section of production bog contains a mixture of disturbed habitats associated with silt ponds, flood defences along the Esker Stream and with access routes. There are several embankments created with spoil that are vegetated with rank grassland and Bracken. There is potential for Otter and Kingfisher along the river, although no signs of either species were noted during this survey.

The northern margin contains a small band of high bog that acts as a buffer between the production bog and the adjacent Grand Canal. This high bog is quite dry and is dominated by heather. Some of it may have been harvested in the past and there are still some signs of old fields present on it, although it has since revegetated. Scrub, Birch woodland and small fragments of disturbed high bog with Heather make up most of the other marginal zones.

Western section of production bog

This section of the bog is now cutaway. A raised area of marl has been exposed as a result of peat production, this raised area is becoming revegetated with Birch and Soft Rush and these species are also becoming established in many of the drains in this area. Cutaway on both sides of this raised ridge has re-wetted and contains open water and some pioneer poor fen (Rushes) and other emergent vegetation.

The northern section has more established vegetation dominated by Birch scrub and poor fen (pJeff). Wetlands have developed along the railway embankment.

| |
|--|
| <p>An area of raised bog, Birch woodland, scrub and railway line is located along the southern boundary of the site. The woodland is mature with Birch, Scots Pine and Willow with a ground flora of Bramble and Bracken. The small section of remnant raised bog is dry and degraded and has been burned in recent years. Some areas of Gorse scrub, Birch Scrub, dry heath and Molinia dominated grassland were also located along the southern boundary of the site.</p> <p>The northern boundary was a mosaic of habitats such as wet grassland (GS4), Birch woodland (WN7) along with pioneer poor fen habitats on cutaway (pEang, pPhrag, pRos and pJeff). The Esker stream flows along a section of the northern boundary of the site, this stream has been heavily modified in the past but did contain sections of riffles and pools, coarse fish, most likely Roach, were observed in this stream.</p> <p>The eastern boundary of the site contained some thin sections of raised bog remnant. These sections of remnant raised bog were dry and degraded and were dominated with tall leggy heather.</p> <p>Access route to the south</p> <p>A long stretch of railway line connects this site to the Mount Lucas site further south. This section of railway line is bordered on both sides by narrow fringes of Birch woodland (WN7), Oak Ash Hazel woodland (WN2) and wet grassland. The railway line is still in active use but did not contain any rare plant species such as Blue Fleabane or Basil Thyme.</p> |
| <p>Designated areas on site (cSAC, NHA, pNHA, SPA other)</p> <p>The Grand Canal pNHA (NPWS site code 002104)</p> <p>This designated area is located along the northern site boundary. There is some site overlap between the designated area and the BnM property. However this overlapping area mainly contains production bog, which is of no value to the NHA and should be excluded. There is a small band of dried raised bog (high bog) (PB1) between the canal corridor and the production bog that does have limited ecological value.</p> |
| <p>Adjacent habitats and land-use</p> <p>The surrounding landscape is typically low-lying and is dominated by farmland with improved grassland. Adjacent habitats include those of reclaimed cutover bog such as conifer plantation (WD4), 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. A large area of peatland towards the southern end of the site is leased from BnM to Klasmann-Deilmann and is harvested for horticultural peat. The Grand Canal is located adjacent to the northern boundary. The margins around the production bog are typically dominated by scrub (WS1) and Birch woodland (WN7) developing on peat remnants.</p> |
| <p>Watercourses (major water features on/off site)</p> <ul style="list-style-type: none"> • The Esker Stream (river) flows through the centre of the site and divides the site into two main sections. • The bog and this river are within the River Barrow catchment. • A tributary of The Esker Stream flows along the eastern boundary and through the conifer plantation. This stream is in poor condition and is filled with emergent vegetation. |
| <p>Peat type and sub-soils</p> <p>The main peat type exposed on this site is fen peat. The site is likely to be underlain with limestone tills, as these sub-soils are exposed around the margins of the site. The sub-soils along the southern margin are limestone-based sands and gravels lain down by the river. Shell Marl was exposed along some drains in the cutaway area of the northern section. Extensive pioneer poor fen dominated by Marsh Arrowgrass was found over much of the northern section and this community is also associated with sites with shell marl.</p> |

Fauna biodiversity**Birds**

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

- Swallow
- Snipe (2)
- Heron
- Other more common species included Swallow, Wren, Coal Tit, Blue Tit, Meadow Pipit, Reed Bunting and Finches

Mammals

- Signs of Fox, Rabbit and Badger were noted on the site.
- A Hare was observed on the site and there are frequent signs of Hares around the site.
- Mink and Otter have been noted on the site in the past, particularly along the Esker Stream and its tributary.

Other Species

- Green-veined White
- Wall Brown

Activities on the site

Activities on the site include:

- Maintenance of the BnM railways and other infrastructure.

References

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

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 banded 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 banded 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 Moña staff and updated as required.

APPENDIX V: BIOSECURITY

No invasive plant species have been recorded at Cavemount 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'.

For a list of the invasive alien species recorded at Cavemount Bog see section 3.3.3. of the main text. American Mink, Fallow Deer, Jenkins' Spire Snail and Sycamore have all been recorded close to Cavemount Bog but are considered unlikely to proliferate or spread as a direct result of PCAS Activities. Japanese Knotweed and Zebra Mussel have also been recorded (information on NBDC website) in habitats close to Cavemount Bog. All activities during the PCAS will adhere to Best Practice with regard to these species for the duration of the project.

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 plague² and Zebra Mussel will be adhered with throughout all rehabilitation activities.

² <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 Allen/Clonsast bog group (Ref. PO-503 SB). 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 Allen/Clonsast 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 (PCAS)**.

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 2nd 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.

Cavemount 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 is being 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. In addition, Bord na Móna will adhere to the Archaeology Code of Practise relating to management of stray archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

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

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

The Cavemount 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 | Cavemount 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 |
| 5 | Decommissioning Fuel Tanks and associated facilities | Decommissioning and De-Gassing Mobile Fuel Tanks |
| 6 | Decommissioning and Removal of Bog Pump Sites | Not Applicable |
| 7 | Decommissioning or Removal of Septic Tanks | De-sludge Septic Tank |

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.

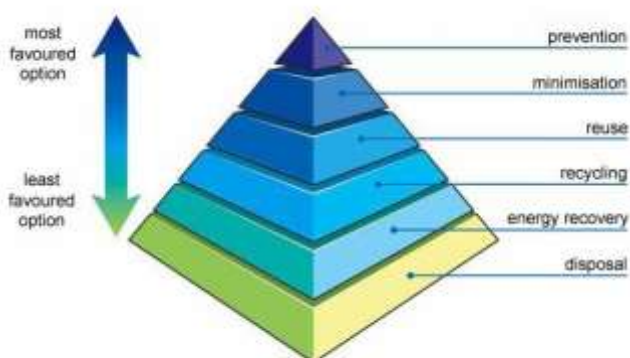
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 | Cavemount Decommissioning Plan |
|------|--|--|
| 1 | Removal of Railway Lines | Removal of Railway Lines |
| 2 | Decommissioning Bridges and Underpasses | Where feasible |
| 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.



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

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is

3) Records

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

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

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