

Bord na Móna

Cloonboley Bog

**Cutaway Bog Decommissioning and
Rehabilitation Plan**

2024

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref: P0502-01:

“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 Cloonboley Bog upon cessation of peat production and complements the licence requirement to decommission the site.

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

Industrial peat production has now fully ceased at Cloonboley Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0502-01, due regard was also given to the Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.

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

Bord na Móna have defined the key rehabilitation outcome at Cloonboley 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 Cloonboley Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate part of Cloonboley Bog, located in Co. Roscommon, approximately 2.5 km (at the closest extent) east of Ballinasloe.
- Cloonboley is part of the Derryfadda Bog sub-group, within the overall area covered by the IPC licence (Ref. P0502-01) for the Blackwater Bog group.
- The total area of Cloonboley Bog within the PCAS extent is 572 ha.
- The area of Cloonboley Bog within the PCAS extent comprises four separate bog subsites (Ballydangan Bog North, Ballydangan Bog South, Cranberry Lough Bog and Tonalig South Bog). Part of Cranberry Lough Bog is designated as a pNHA.
- Cloonboley had drains installed (ditched) during the period 1981-84, so that commercial peat harvesting could take place, however no commercial peat harvesting ever took place at this bog and the majority of the bog can be classified as degraded raised bog.
- Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough are included in the Ballydangan Grouse project. Established in 2009, this project aims to prevent the decline and, in the long-term, increase the numbers of Red Grouse and other birds of conservation concern including breeding Curlew on Ballydangan Bog, Co. Roscommon. Relevant areas of Ballydangan Bog are leased to Moore Gun Club, a key stakeholder in this project.
- In September 2013 Bord na Móna began restoring the raised bog habitat, in tandem with the community efforts to maintain the local Grouse population. A comprehensive drain blocking programme was undertaken to rewet Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough, covering an area of 431.6ha, with over 3,744 peat dams installed. The aim of the restoration work was to raise water levels and facilitate the development of active raised bog areas, and to improve the overall habitat for typical peatland bird species, including the Red Grouse. No rehab has taken place at Tonalig South.
- NPWS have identified Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough Bogs as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS, 2014).
- Some peatland rehabilitation including drain blocking has taken place outside the BNM ownership boundary as part of the FarmPeat Project. In addition, some high bog bunds were installed on the high bog at Cloonboley as part of this scheme.
- Bord na Móna are obliged to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies.
- Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton will thrive.

- A large portion of Cloonboley with deeper residual peat has the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- Many Bord na Móna bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed and the environmental conditions have been modified. However, as Cloonboley was never in peat production, residual deep peat remains and there is potential for raised bog restoration.
- On shallower peat around the margins, which have been subjected to domestic turf cutting, other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- As the majority of Cloonboley was drained but never fully developed for industrial peat extraction, Cloonboley has excellent potential for raised bog restoration. Hydrological modelling and interpretation of the habitats onsite indicates that up to 15 ha of Annex I habitat '*Degraded Raised Bog Capable of Regeneration (7120)*' occurs on the bog. This has the potential to become Annex I '*Active Raised Bog (7110)*' following the implementation of rehabilitation measures and rewetting of the deep peat.
- The development or succession of a range of habitats within PCAS extent at Cloonboley Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many peatland and wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.
- Measures proposed for Cloonboley include drain blocking and additional measures required to raise water levels to the surface of the peat (cell bunding for example).
- Bord na Móna plan to carry out this work in 2024.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- This peatland rehabilitation plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater bog group (Derryfadda subgroup) (Ref. P0502-01) (see Appendix II for details of the bog areas within the Blackwater (Derryfadda subgroup) bog group). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the bog within the licensed area. Cloonboley Bog is located in Co. Roscommon

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

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

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

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

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

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

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

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

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

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g., Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

Cloonboley Bog is now proposed to be part of this Scheme (PCAS), and this rehabilitation plan outlines the approach that will be taken.

1.1 Constraints and Limitations

This document covers an area of 572 ha of **Cloonboley Bog** (the 'PCAS extent'). The area of Cloonboley Bog within the PCAS extent comprises four separate bog subsites (Ballydangan Bog North, Ballydangan Bog South, Cranberry Lough Bog and Tonalig South Bog). Part of Cranberry Lough Bog is a designated as pNHA. This rehabilitation plan takes account of the current land-uses of Cloonboley Bog.

The Galway-Athlone railway line intersects Cloonboley in three locations. Several public roads and access tracks traverse the bog or are adjacent to the bog. Rights of way will remain unaffected by PCAS rehabilitation.

Cloonboley Bog comprises drained raised bog that has never been harvested for industrial peat extraction despite the high bog having been ditched in the early 1980's. However, much of the periphery of the bogs within Cloonboley bog have been harvested for domestic turf. There is ongoing turf cutting/turbary around the bog margins.

Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough are included in the Ballydangan Grouse project. Established in 2009, this project aims to prevent the decline and, in the long-term, increase the numbers of Red Grouse and other birds of conservation concern including breeding Curlew on Ballydangan Bog, Co. Roscommon. Relevant areas of Ballydangan Bog are leased to Moore Gun Club, a key stakeholder in this project.

This management is achieved through a range of measures including habitat improvement, predator control, monitoring and disturbance control. Red Grouse numbers have remained stable at Ballydangan since the project inception and the bog now also supports breeding Curlew (6 pairs in 2022) and breeding Lapwing (10 pairs in 2022), based on annual reports from monitoring.

In September 2013 Bord na Móna began restoring the raised bog habitat, in tandem with the community efforts to maintain the local Grouse population. A comprehensive drain blocking programme was undertaken to rewet Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough, covering an area of 431.6ha, with over 3,744 peat dams were installed. The aim of the restoration work was to raise water levels and facilitate the development of active raised bog areas, and to improve the overall habitat for typical peatland bird species including the Red Grouse.

Some peatland rehabilitation including drain blocking has taken place outside the BNM ownership boundary as part of the FarmPeat Project. In addition, some high bog bunds were installed on the high bog at Cloonboley as part of this scheme.

A key constraint is the interaction between the Bord na Móna sites and the surrounding landscape, neighbours and landowners. Care has to be taken that no active rehabilitation management is carried out that could impact adjacent land. This includes any hydrological management on neighbouring farmland, as well as potential changes to the hydrology of surrounding designed sites. However, it is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

Cranberry Lough pNHA lies within the southern part of Cranberry Lough Bog. This pNHA will not be subject to rehabilitation and has been identified as a constraint in rehabilitation mapping.

Rehabilitation in parts of the bog may be constrained due to property issues, right of way or archaeological features. Marginal agricultural land is mapped as a constraint.

2. METHODOLOGY

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

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2009 to 2023 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al.*, 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;

- Hydrological modelling; and
- The development of a Methodology Paper ¹outlining the 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 Cloonboley 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.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- 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.
- Pschenyckj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.

¹ [Supporting Material - BNM Peatlands Climate Action Scheme \(bnmpcas.ie\)](https://www.bnm.ie/bnm/Supporting-Material-BNM-Peatlands-Climate-Action-Scheme)

- 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:

- Blackwater Integrated Pollution Control Licence;
- Blackwater Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2023
- Spatial data in respect of Article 17 reporting, available online at <https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17>.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Cloonboley Bog was surveyed in 2010. Additional ecological walk-over surveys and

visits have taken place at Cloonboley between 2010-2024, with the most recent visit in May 2024. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

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

A more detailed Bord na Móna classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). 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. Bord na Móna classification system will be used to classify marginal cutover habitats at Cloonboley.

High bog vegetation was described and mapped based on raised bog ecotope vegetation community complexes developed by Kelly *et al.* (1995) and outlined in Fernandez *et al.* (2014) with some adaptations. Ecotope mapping methodology followed Fernandez *et al.* (2014).

Site visits have been used to categorise any changes in habitat extent at Cloonboley Bog in 2024. A detailed ecological survey report for the Cloonboley Bog is contained in Appendix III. Note that this report from 2010 refers to the entirety of Cloonboley Bog. Some areas discussed in this report are outside of the PCAS extent.

3. SITE DESCRIPTION

Cloonboley Bog is located in Co. Roscommon, approximately 2.5 km (at the closest extent) NE of the town of Ballinasloe. Cloonboley is part of the Derryfadda Bog Group, within the overall area covered by the IPC licence for the Blackwater Bog group. The area of Cloonboley Bog within the PCAS extent comprises four separate bog subsites (Ballydangan Bog North, Ballydangan Bog South, Cranberry Lough Bog and Tonalig South Bog). Part of Cranberry Lough Bog is designated as Cranberry Lough pNHA. Cloonboley had drains installed (ditched) during the period 1981-84, so that commercial peat harvesting could take place, however no commercial peat harvesting ever took place at this bog, and the majority of the bog can be classified as degraded raised bog.

The total area of Cloonboley bog is 572 ha. Previous rehabilitation has been carried out at Cloonboley. In September 2013 Bord na Móna began restoring the raised bog habitat, in tandem with the community efforts to maintain the local Grouse population. The majority of Cloonboley was previously rehabbed between 2013-2015, as part of the Bord na Móna raised bog restoration program.

The surrounding landscape is a mosaic primarily consisting of low-lying agricultural land (pasture) interspersed with a network of cutover bogs that have also been managed by Bord na Móna for peat production within the Derryfadda Bog Group. There are several raised bogs in the wider area, some of which are largely intact, although most have been utilised for domestic turf cutting and planted with commercial conifer crops in part.

Several mapped EPA watercourses flow along the boundary of the bog as well as between sections of the bog. The Dolanstown Kilkashel stream (EPA Code:26D98) flows in a south-easterly direction outside the south-eastern boundary of the bog. This watercourse flows into the Ballydangan (EPA Code: 26B14) watercourse downstream, eventually discharging to the River Shannon (Upper). The Killeglan 26 (EPA Code: 26K04) stream flows in a north-westerly direction outside the north-western bog boundary. The new river Carrowreagh (EPA Code: 26C04) stream flows between two sections of bog to the north-west of the site, before flowing along the western boundary towards the River Suck. The Gortanbala (EPA Code: 26G48) watercourse flows in a south-westerly direction alongside the north-western lobe of bog before meeting the new River Carrowreagh at the north-western boundary of the bog. The Ardnaglug (EPA Code: 26A55) watercourse flows in a north-westerly direction inside the western bog boundary. This watercourse flows into the new river Carrowreagh (EPA Code: 26C04) stream.

Cloonboley Bog has a gravity drainage regime. See Drawing number *BNM-DR-25-05-RP-01: Cloonboley Bog Site Location*, included in the accompanying Mapbook², which illustrates the location of Cloonboley in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Cloonboley had drains installed (ditched) during the period 1981-84, so that commercial peat harvesting could take place, however no commercial peat harvesting ever took place at this bog, and the majority of the bog can be classified as degraded raised bog.

² Cloonboley Bog Rehab Plan GIS Map Book 2023

3.1.2 *Current land-use*

The extent of the PCAS rehabilitation at Cloonboley comprises 571.8 ha.

Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough are included in the Ballydangan Grouse project. Established in 2009, this project aims to prevent the decline and, in the long-term, increase the numbers of Red Grouse and other birds of conservation concern including breeding Curlew on Ballydangan Bog, Co. Roscommon. Relevant management areas at Ballydangan Bog are leased to Moore Gun Club, a key stakeholder in this project.

NPWS have identified Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough Bogs as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS, 2014).

There is extensive known turbarry/turf cutting around the margins of Cloonboley.

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 Cloonboley Bog, jobs would have included those around activities to drain the bog in preparation for peat production, along with site oversight and management.

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

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

There are approximately 1400 people working in Bord na Móna at present. There are approximately 225 roles directly involved in PCAS.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology at Cloonboley Bog is predominantly Waulsortian Limestones, with a small part of Ballydangan North underlain by Visean Limestones³. The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'.

3.2.2 Peat type and depths

Although Cloonboley Bog was drain for peat production, no commercial peat extraction has been undertaken. Most of the site retains relatively deep peat reserves of *Sphagnum* peat with some smaller pockets of shallow residual peat depths around the margins where the peat has been cutaway due to domestic turf-cutting/turbary (see mapbook drawing no. *BNM-DR-25-05-RP-04-Peat Depths*). The majority of Cloonboley has very deep peat deposits with the range of thickness encountered varying from 0.69 m on some cutover areas up to 8.99 m in some areas of the high bog.

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

The most common vegetation communities⁴ present at Cloonboley include:

- Raised bog (PB1) (Plates 3.1-3.4)
- Cutover Bog (PB4) (Plate 3.1)
- Scrub (WS1) on old Cutover bog
- Bog woodland (WN7) (on Cutover bog)
- Rich fen and flush (PF1) (part of high bog at Ballydangan and found in Cranberry Lough)
- Poor fen and flush (PF2) (part of the high bog)
- Transition mire and quaking bog (PF3)
- Mesotrophic lake (FL3) (Cranberry Lough)
- Reed and Large Sedge swamps (FS1)
- Dry Heath (HH1) (part of high bog on some mounds)
- Wet grassland (GS4) (reclaimed cutover bog and access routes)
- Improved grassland (GA1) (access routes)
- Wet Willow-Alder-Ash Woodland (WN6)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)
- Oak-Ash-Hazel Woodland (WN2)
- Dry Calcareous and Neutral Grassland (GS1)
- Drainage ditches (FW4)

³ <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>

⁴ Codes refer BnM classification of pioneer habitats of production bog or Fossitt habitats where relevant.

- Dense Bracken (HD1)

Hydrological modelling and interpretation of the habitats onsite indicates that up to 15 ha of Annex I habitat 'Degraded Raised Bog Capable of Regeneration (7120)' occurs on the bog. This has the potential to become Annex I 'Active Raised Bog (7110)' following the implementation of rehabilitation measures and rewetting of the deep peat. See Drawing number *BNM-DR-25-05-RP-17 Current Habitat Map*, included in the accompanying Mapbook, which illustrates the habitats at the Bog.

Photos of Habitats at Cloonboley



Plate 3.1 Raised bog at Tonalig South Bog. Note the cutover bog fringes the high bog.



Plate 3.2 Cranberry Lough Raised bog, view looking south.

Photos of Habitats at Cloonboley



Plate 3.3 Ballydangan South Bog, southern section, view looking west.



Plate 3.4 Ballydangan North Bog, view looking northwest.

3.3.2 *Species of conservation interest*

A number of species of conservation concern utilize the habitats available at Cloonboley Bog. The following is a summary of the records of species available within both BnM records and those of the National Biodiversity Data Centre.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. NBDC Records for red-listed⁵ bird species of conservation concern recorded from within a custom polygon of Cloonboley bog include Meadow Pipit (*Anthus pratensis*), Kestrel (*Falco tinnunculus*), Snipe (*Gallinago gallinago*), Red Grouse (*Lagopus lagopus*), Curlew (*Numenius arquata*) and Lapwing (*Vanellus vanellus*). The Annex I listed species of the EU habitats directive, Golden Plover (*Pluvialis apricaria*) (also red listed), Greater White-fronted Goose (*Anser albifrons*) and Hen Harrier (*Circus cyaneus*) have also been recorded within this custom polygon.

BNM records for bird species of conservation interest at the bog include Greenfinch, Mallard, Red Grouse, Snipe, Long-eared Owl, Curlew, Skylark, Meadow Pipit. Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough are included in the Ballydangan Grouse project. Established in 2009, this project aims to prevent the decline and, in the long-term, increase the numbers of Red Grouse and other birds of conservation concern including breeding Curlew on Ballydangan Bog, Co. Roscommon. Red Grouse numbers have remained stable at Ballydangan since the project inception and the bog now also supports breeding Curlew (6 pairs in 2022) and breeding Lapwing (10 pairs in 2022).

BNM/NBDC Records for mammal species at the bog include Eurasian Badger (*Meles meles*), European Otter (*Lutra lutra*), Irish Hare (*Lepus timidus* subsp. *hibernicus*), Fox (*Vulpes vulpes*), and Fallow deer (*Dama dama*). Butterfly species of conservation interest recorded at Cloonboley include Dingy Skipper (*Erynnis tages*), Large Heath (*Coenonympha tullia*), Marsh Fritillary (*Euphydryas aurinia*), Small Heath (*Coenonympha pamphilus*) and Wall (*Lasiommata megera*). Amphibian species Common Frog (*Rana temporaria*) has also been recorded at the bog. Plant species of conservation interest include Serrated Wintergreen (*Orthilia secunda*), a critically endangered species has been recorded in Ballydangan South. Fir Clubmoss (*Huperzia selago*) has also been recorded in Ballydangan South in high bog.

Peatland rehabilitation may result in positive quality effects on the relative abundance or proportion of species of conservation concern utilising bogs post rehabilitation. This may include Red or Amber listed species of breeding wader along with wintering species including Swans and other wildfowl⁶.

3.3.3 Invasive species

The invasive species *Rhododendron ponticum* has been recorded at Cloonboley Bog, along the southwestern margins of Ballydangan North. In addition, the invasive mammal American Mink (*Mustela vison*) has also been recorded. A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS extent is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

⁵ Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

⁶ Scheme Year 1 Monitoring and Verification Report - https://www.bnmpcas.ie/wp-content/uploads/sites/18/2023/08/Annual-Monitoring-Report_Final-Rev-A_Redacted.pdf

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Cloonboley bog. The nearest EU Designated sites to Cloonboley bog are as follows:

- Castlesampson Esker SAC (site code: 001625) - 1.7km north
- Ballynamona Bog and Corkip Lough SAC (Site code: 002339) - 5.4km northeast
- River Shannon Callows SAC (Site Code: 000216) - 6.4km south
- Killeglan Grassland SAC (site code: 002214) - 5.9km northwest
- Suck River Callows SPA (Site Code: 004097) - 2km west
- Middle Shannon Callows SPA (Site Code: 004096) - 6.4km south

Part of Cranberry Lough Bog is designated as Cranberry Lough pNHA (site code: 001630). Cranberry Lough is a unique and botanically rich lake occupying a low-lying area within the raised bog. The eastern side of the lake is formed by the dry margins of the bog which is colonised mainly by Heather (*Calluna vulgaris*). The western side of the site is bounded by a mature conifer plantation. In between the lake and forestry, an extensive area of reed-beds has developed adjacent to the raised bog which on the western side is colonised by tall willow (*Salix* spp.) scrub.

A number of additional designated sites also occur in the wider area around Cloonboley bog including:

- Castlesampson Esker pNHA (site code: 001625) - 1.7km north
- Suck River Callows NHA (site code: 000222) - 2km west
- River Shannon Callows pNHA (Site Code: 000216) - 6.4km south

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 Cloonboley Bog (i.e., within 3km).

3.5 Hydrology and Hydrogeology

The Cloonboley subsites Ballydangan Bog North and Tonalig South Bog both lie in the Upper Shannon catchment (catchment ID: 26D) as defined by the EPA under the Water Framework Directive (WFD) and are situated within the Suck_SC_070 sub-catchment.

The subsites Ballydangan Bog South and Cranberry Lough Bog also partially lie in this catchment/sub-catchment; however, the majority of these subsites fall into the Upper Shannon catchment (catchment ID: 26G) and the Shannon [Lower]_SC_020 sub-catchment.

Cloonboley bog was never in active commercial peat extraction and as such did not require the installation of silt control measures. The main surface water outlets will discharge to the Cuilleen Stream (IE_SH_26C170400 CUILLEEN_STREAM_010) and the Ballydangan River (IE_SH_26B140100 BALLYDANGAN_010) and to the north the River Suck (IE_SH_26S071400 SUCK_140).

The Cuilleen Stream_010 and Ballydangan River_010 are poor Status, with the River Suck being Moderate Status – Water Framework Directive, (BNM-DR-25-RP-05-WQ01: Water Quality Map)

Surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the attached water quality map (*BNM-DR-25-05-RP-13: General Drainage Map*).

GSI data indicates that Waulsortian Limestones (massive unbedded lime-mudstone) underlies Tonalig South, Ballydangan Bog South and Cranberry Lough Bog. The majority of Ballydangan Bog is underlain by Waulsortian Limestones with the northern section underlain by Visean Limestones (undifferentiated).

Waulsortian Limestones is classified as a locally important aquifer - bedrock which is moderately productive only in local zones. Visean Limestones (undifferentiated) is classified as a regionally important aquifer - karstified (conduit).

Geological Survey of Ireland (GSI) mapping identifies several karst features on Cloonboley Bog. Enclosed depressions occur on Ballydangan South; a swallow hole occurs on Tonalig South. Several other karst features also occur within 1km of the bog including a springs, enclosed depressions and wells.

Quaternary sediment maps show Cloonboley Bog is underlain by peat, with some pockets of eskers comprised of gravels of basic reaction, in the Ballydangan South subsite. Cloonboley Bog is surrounded by inorganic deposits, including till derived from limestones and gravels derived from limestone. GSI groundwater mapping indicates that there is generally low vulnerability on Cloonboley Bog with moderate and higher vulnerability in the immediate surrounding areas.

3.6 Emissions to surface-water and watercourses

Details of any surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the water quality map in the accompanying mapbook. See Drawing number *BNM-DR-25-05-RP-02: Structures and Sampling*, along with Drawing number *BNM-DR-25-05-RP-WQ01: Water Quality Map* included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Cloonboley.

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

Peat extraction was not identified, as pressure in the second cycle of the river basin management plan is indicated as remaining so in the third cycle, currently under preparation.

There are no emission value's associated with this bog.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutover/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 aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Bog restoration is also expected

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

Water will still discharge from designated emission points when rehabilitation at Cloonboley Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points. While water quality improvements assist in meeting water frameworks directive ambitions and targets, they can also improve drinking water sources in applicable catchments with drained peatlands and the potential for associated reduction in treatment requirements at drinking water treatment facilities.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

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

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

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

Milled peat extraction never commenced on this bog when it was licensed in 1998. Once the rehabilitation has been completed and monitoring continues for up to 2 years, any identifiable trends will be able to be analysed and reported on.

In the preparation of this monitoring programme, Bord na Mona have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their monitoring programme and these are included in the Water Quality Map, *BNM-DR-25-05-RP-WQ01*.

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

Monitoring results will be maintained, trended every six months and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual

Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD.

These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.

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

Success criteria:

The key water quality success criteria associated with this enhanced rehabilitation are as follow:

- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that any At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

As the monthly monitoring program at Cloonboley Bog continues in 2024 and during the rehabilitation works planned for 2024, further trending will be produced to verify any ongoing trends.

3.7 Fugitive Emissions to air

None.

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible, and re-vegetate all areas (whether wet or dry). Collectively, blocking drains, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink into a carbon source (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). A natural peatland can take in 0.1 to 1.1 t of carbon as CO₂-C /ha/yr while drainage and extraction can create large source of carbon dioxide releasing 1.3 to 2.2 t of carbon as CO₂-C /ha/yr (based on Tier 1 Emission factors, Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO₂-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO₂ emissions from drained peatlands or increased methane (CH₄) emissions from rewetted industrial peatlands.

However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO₂ emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO₂ emissions reductions. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

The EPA-funded CarbonRestore Project (Renou-Wilson et al. 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO₂ and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018). Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting at this site to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Cloonboley bog will become a reduced carbon source/part carbon sink following rehabilitation. Much of this site is raised bog in poorer condition and has potential for raised bog restoration, with cutover along the margins. A range of different habitats is expected to develop in these marginal areas cutover bog areas. Birch woodland is expected to develop on drier, more elevated areas. The potential of any raised bog/cutover bog to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

Cloonboley bog is an exceptional site due to the presence of several Annex I habitats in relatively good condition and as such is considered to be **nationally important**. NPWS have identified Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough Bogs as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS, 2014).

Cloonboley has previously undergone rehabilitation and contains raised bog that supports the priority EU Annex I listed habitat ‘active raised bogs (7110)’ deemed to be of **national importance**. A considerable extent of high bog is in relatively good condition and qualifies as the Annex I EU Habitats Directive habitat – ‘*degraded raised bogs still capable of regeneration*’ (7120). A Rich fen/flush (PF1) on Ballydangan Bog may qualify as the Annex I priority habitat ‘*Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*’ (7210).

Doo Lough, which contains Transition Mire and Quaking bog (PF3) towards the eastern side of Northern Ballydangan Bog also qualifies as an Annex I EU Habitats Directive habitat – ‘*transition mires and quaking bogs*’ (7140). The Annex II EU Habitats Directive habitat – ‘*Depressions on the peat substrates of the Rhynchosporion*’ (7150) – associated with parts of the high bog on Ballydangan, Northern Ballydangan Bog and Cranberry Lough bogs. Cloonboley is also of importance to several species of conservation concern, supporting breeding Red Grouse Curlew and Lapwing.

Cloonboley overlaps Cranberry Lough pNHA, a site of national importance. This small pNHA has Cranberry Lough as its core conservation interest and contains a mosaic of diverse habitats around its edge, including some rare/notable plant species. Some of the vegetation within the lough could probably be classified as transition mire and quaking bog and alkaline fen which could also qualify as Annex I habitat.

Marginal cutover bog at Cloonboley Bog can be rated as having a **local importance (lower value)** as it is dominated by bare peat. The Birch woodland (WN7) and scrub provide semi-natural habitat and provide refuge for wildlife are classified as **local importance (higher value)**.

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.

Stakeholders were notified when the draft plan was finalised internally by Bord na Móna and invited to make submissions on the objectives and content of this plan in relation to Cloonboley Bog. The draft plans and final versions of the rehab plans will be available on the Bord na Móna website (www.pcasinfo.ie).

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

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Various meetings with Moore Gun Club and stakeholders involved with the Ballydangan Grouse Project.

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

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed. Further to the above, as a means of further notification for those based near to any proposed PCAS activities, a leaflet detailing PCAS plans for Cloonboley Bog, contact details and the PCAS website address was delivered to each house within a 1 km radius of the bogs.

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

4.3 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not commenced.

Draft

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g., suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as ‘*at risk*’ from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures including drain-blocking to encourage raised bog restoration and the development of active raised bog habitat.
- Integrating rehabilitation measures with current land-use.
- Optimising hydrological conditions for the protection of any exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- The main goal and outcome of this 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.

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

- It will take some time for stable naturally functioning habitats to fully develop at Cloonboley Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland’s climate action.
- Cloonboley has previously undergone rehabilitation and contains raised bog that supports the priority EU Annex I listed habitat ‘active raised bogs (7110)’ deemed to be of international importance. Re-wetting (and other proposed measures) of supporting raised bog habitat, will further improve the condition of this active raised bog.
- Cloonboley Bog has the potential to further develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Hydrological modelling and interpretation of the habitats onsite indicates that up to 15 ha of Annex I habitat ‘*Degraded Raised Bog Capable of Regeneration (7120)*’ occurs on the bog. This has the potential to become Annex I ‘*Active Raised Bog (7110)*’ following the implementation of rehabilitation measures and rewetting of the deep peat.
- Rehabilitation will also, in the longer-term, support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as 'At Risk' from peatlands and from peat extraction are likely to have several contributory sources of impacts (private peat extraction and Bord na Móna). Reducing pressures due to former peat extraction activities at Cloonboley Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g., Newtown/Loughgore) in 2024, and rehabilitation has taken place in several nearby bogs between 2021-2023, including Turrur-Derrymore, Derryfadda and Castlegar bogs. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

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

- The area of Cloonboley Bog.
- EPA IPC Licence - Ref. P0502-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Cloonboley Bog is part of the Blackwater (Derryfadda subgroup) bog group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Cloonboley bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Cloonboley Bog mean that raised bog restoration and deep peat measures are the most suitable rehabilitation approach for this site. Cloonboley Bog has a gravity drainage regime and has residual deep peat.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Cloonboley Bog as environmental stabilisation, optimising residual peat re-wetting, and the development of active raised bog along with the development of embryonic *Sphagnum*-rich raised bog vegetation communities.
- Rehabilitation of Cloonboley 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.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites, like Cloonboley Bog, where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. At Cloonboley Bog, some areas were drained but never harvested. Other areas were used for domestic turf cutting. The variation in drainage regime across these land use types will create unique hydrological conditions that create differing rehabilitation requirements.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land. Marginal agricultural land is mapped as a constraint.

- **Archaeology.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology at Cloonboley Bog. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** The Galway-Athlone railway line intersects Cloonboley in three locations. Several public roads and access tracks traverse the bog or are adjacent to the bog. Rights of way will remain unaffected by PCAS rehabilitation. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that these remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Other land-use.** Ballydangan Bog North, Ballydangan Bog South and Cranberry Lough are included in the Ballydangan Grouse project. Established in 2009, this project aims to prevent the decline and, in the long-term, increase the numbers of Red Grouse and other birds of conservation concern including breeding Curlew on Ballydangan Bog, Co. Roscommon. Relevant areas of Ballydangan Bog are leased to Moore Gun Club, a key stakeholder in this project. This management is achieved through a range of measures including habitat improvement, predator control, monitoring and disturbance control.
- **Designated sites.** Cranberry Lough pNHA lies within the southern part of Cranberry Lough Bog. This pNHA will not be subject to rehabilitation and has been identified as a constraint in rehabilitation mapping.
- **Sensitive habitats or species.** The presence of ecologically sensitive species may affect the extent or timing of the rehabilitation measures. Some sensitive ecological receptors if present may require protection through the provision of Environmental Restriction Zones (or ERZ's).
- **Invasive species.** *Rhododendron ponticum* has been recorded along the southwestern margins of Ballydangan North. Appropriate best practice measures will be implemented on site during any site restoration works in order to avoid the spread of this species.
- **Turbary.** Some areas of active turbary are excluded as they are currently being 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 Cloonboley Bog.
- **Previously rehabbed areas.** Some areas that have undergone previous rehabilitation have been excluded from the PCAS rehabilitation and are mapped as constraints on the rehab maps. These include areas where no additional rehabilitation work is required or areas where ground conditions are too wet for machinery access.

6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project.

- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Cloonboley Bog. The plan covers the short-term rehabilitation actions and an additional monitoring and after-care programme to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Cloonboley 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 criteria/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** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by Bord na Móna as:

- stabilisation of bare peat areas via targeted active management (e.g., drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- Improvement of the condition of raised bog habitat; and
- mitigation of potential key emissions (e.g., suspended solids).

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions

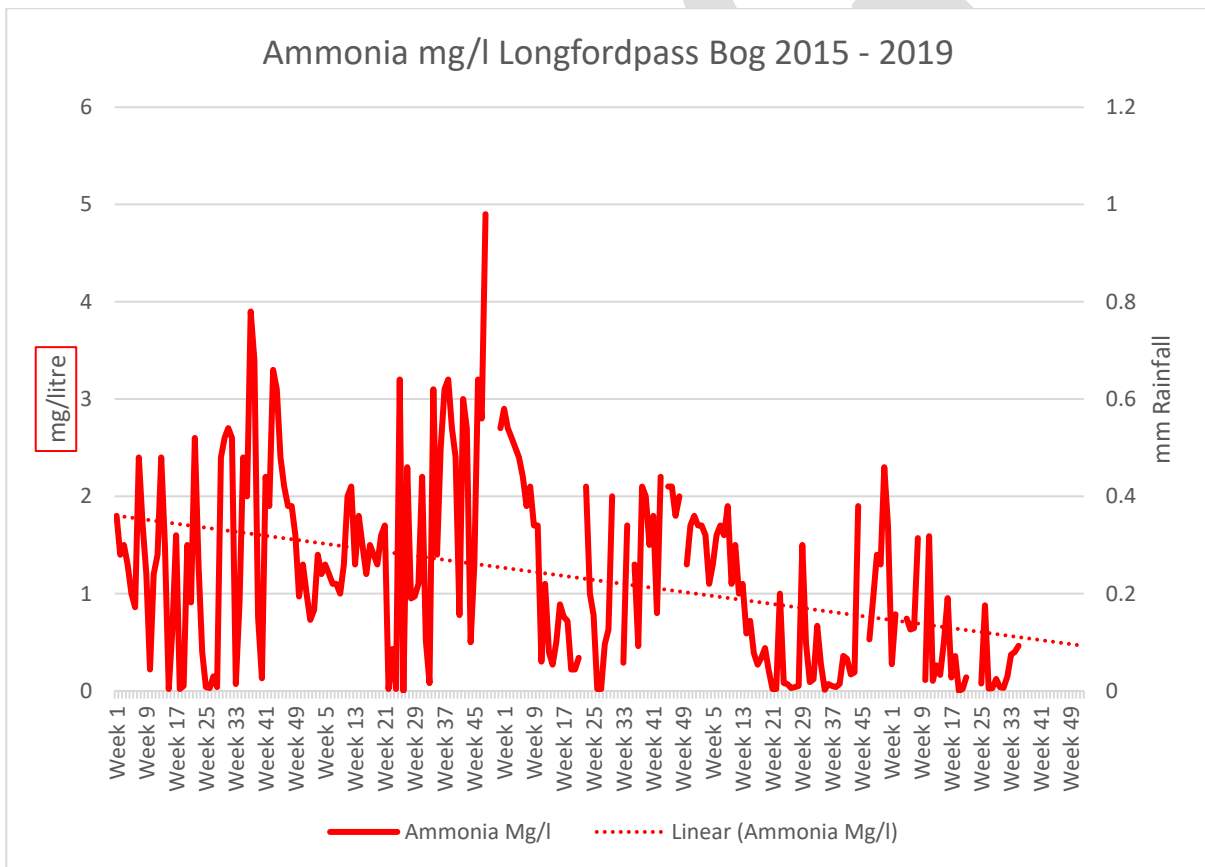
- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful 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 stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will

be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Plate 7-1 and Plate 7-2).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the past 4 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

As the monthly monitoring program at Cloonboley Bog continues in 2023 during the rehabilitation works planned for 2023, further trending will be produced to verify any ongoing trends.



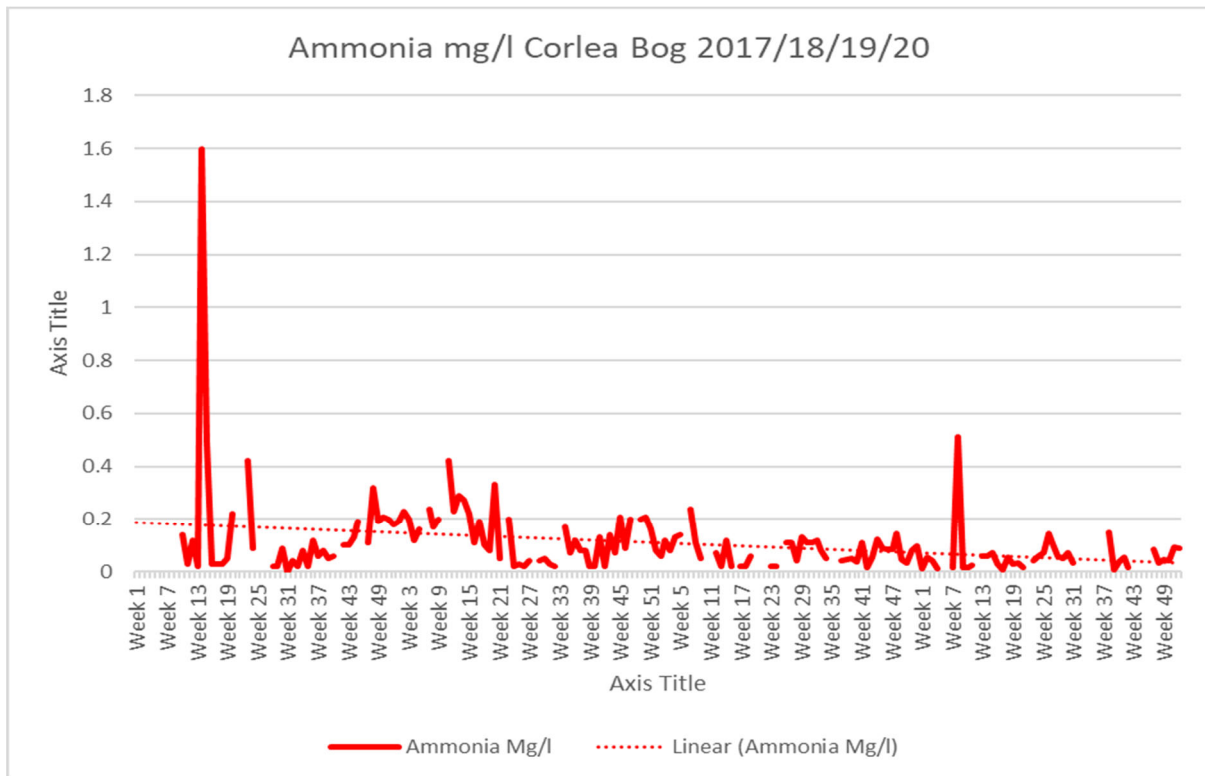


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising and maximising residual peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the bog towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and Ecotope mapping. This bog condition assessment (ecotope mapping) 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. A similar condition assessment will be carried out on the cutover part of the bog. Baseline monitoring will be carried out after rehabilitation has been 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 assessments and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including raised bog, embryonic *Sphagnum*-rich peatland communities and Birch woodland, where conditions are suitable. Some of these habitats already exist on the bog (albeit in sub-optimal quality) and other cutover parts of the bog have already, in part, established pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Cloonboley Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/raised bog habitat condition

assessment. Baseline monitoring 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.

- 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.

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Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
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.	2024-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2024-2025
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	No decline in the WFD status of the local river catchment related to this bog	EPA WFD monitoring programme	WFD schedule
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2024-2025
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	2024-2025

Criteria type	Criteria	Target	Measured by	Expected Timeframe
			compared against this baseline.	

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

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

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

- **Funding to pay for resources required to deliver the planned rehabilitation (Bord na Móna and external).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be 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.** 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 a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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

A number of illustrative figures have been produced to inform rehab planning and design, including aerial photography, peat depths, lidar surface maps, and depression analysis modelling; these are included in the accompanying mapbook as the drawings referenced below:

BNM-DR-25-05-RP-22: Aerial Imagery 2020

BNM-DR-25-05-RP-04: Peat Depths

BNM-DR-25-05-RP-03: LiDAR Map

BNM-DR-25-05-RP-09: Depression Analysis

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled *BNM-DR-25-05-RP-05: Rehabilitation Measures* in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Cloonboley Bog will include (see Table 8.1):

- Raised bog restoration measures including intensive drain-blocking (7/100 m);
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;
- Monitor excavator disturbance caused by the bog restoration measures across the bog. Reduce long-term impacts by alternating routes across the bog.
- Cloonboley bog was never in active commercial peat extraction and as such did not require the installation of silt ponds. Silt control measures will be implemented and maintained during the rehabilitation phase. During the monitoring and verification phase silt control measures will be continually inspected and maintained, where appropriate.

Table 8-1 Types of and areas for enhanced rehabilitation measures at Cloonboley bog.

Type	Code	Enhanced Rehabilitation Measure	Extent* (Ha)
Deep Peat Raised Bog	DPT2	More intensive drain blocking (max 7/100 m), modifying outfalls and managing overflows	25.8
Additional Work	AW2	Targeted Drain Blocking	175.9
Marginal land	MLT1	No work required	19.04
Constraint	Constraint	Constraints	351.07
Total			571.8

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

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

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme 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 (The Scheme PCAS) will be applied to Cloonboley Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out, any issues identified resolved and the rehabilitation plan adapted.
- A review of unknown archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements will be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. grouse, breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan will be carried out.
- Track implementation and enforcement of the relevant IPC Licence conditions, and other environmental control measures during the implementation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include drain blocking, in addition to additional measures in cutover bog. 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.
- Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt control measures will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- Submit an ex post report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an ex ante estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below).
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.4 Timeframe

- **2024:** Short-term planning actions.
- **2024-2025:** Short-term practical actions.
- **2025-2026:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.

8.5 Budget and costing

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

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

Bord na Móna maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning. This is updated every year - for more information see the Bord na Móna Annual Report (Bord na Móna 2023). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site (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, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbouring 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, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e., reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of surface water emission points will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for

rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

- Vegetation and habitat monitoring. It is proposed that sites can be monitored against this baseline in the future.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

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

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

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

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

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

Scope of rehabilitation

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

- The area of Cloonboley bog.
- EPA IPC Licence - Ref. P0502-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Cloonboley bog is part of the Blackwater (Derryfadda subgroup) bog group.
- The current condition of Cloonboley bog.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Cloonboley bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Cloonboley bog is environmental stabilisation of the site via raised bog restoration. 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 habitats.

Criteria for successful rehabilitation:

- Rewetting of areas formerly drained for industrial peat extraction to offset potential run off of suspended solids and to encourage raised bog restoration.

- 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 raised bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are 'At Risk' from peatlands and peat extraction. The success criteria will be that the 'At Risk' classification will see improvements in the associated pressures from this peatland or if remaining 'At Risk', that there is an improving trajectory in the pressure from this peatland.

Rehabilitation targets

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

Rehabilitation measures:

- Blocking field drains in the drained raised bog using regular peat blockages (three blockages per 100 m) along each field drain to re-wet peat.
- No measures are planned for the other surrounding marginal peatland habitats.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.

Timeframe:

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

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep Peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	25.75
Additional Works	AW2	Targeted drain blocking	175.91
Marginal land	MLT1	No work required	19.04
Constraint	Constraint	Other Constraints	351.07

Type	Code	Description	Area (Ha)
Total			571.8

See Drawing number *BNM-DR-25-05-RP-20: Standard Rehab Measures* included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

Monitoring, after-care and maintenance

- There will be initial quarterly monitoring assessments of the site to determine the general status of the site, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- 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.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

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

APPENDIX II. BOG GROUP CONTEXT

The Blackwater Bog Group IPC Licensed area is made up of three sub-groups (Attymon, Blackwater and Derryfadda) and have been in industrial peat production for several decades. The majority of sites are situated alongside the Shannon and Suck Rivers within counties Roscommon, Galway, Westmeath and Offaly and cover an overall area of 15,515 ha. Each bog area further comprises a range of habitats from raised bog, bare milled peat production areas, re-colonising cutaway to workshops areas and transport infrastructure. Industrial peat extraction from these sites mainly supplied ESB power stations at Shannonbridge (WOP) and Lanesborough (LRP).

Industrial peat extraction in the Blackwater Bog Group ceased in 2019. Remaining milled peat stocks were supplied to Shannonbridge (WOP) and Lanesborough (LRP) during 2020. Both power stations closed at the end of 2020. Decommissioning and rehabilitation for the Blackwater Bog Group at part of PCAS started in 2021. Several bogs have been rehabilitated in previous years.

Six bogs were initially drained but never been used for industrial peat production: Kellysgrove, Tirrur-Derrymore, Newtown-Loughgore, Cloonboley, Killeglan and Derrydoo-Woodlough. The latter three bogs are classed as restored raised bogs, still contain active bog habitat (that qualifies as the Annex I EU Habitats Directive habitat) and now form the core of the Bord na Móna Raised Bog Restoration Project due to their high biodiversity value and bog restoration potential. NPWS have identified the Cloonboley bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014⁷).

Several sections of Tirrur-Derrymore bog have been leased to NPWS for domestic turf cutting as part of the SAC turf-cutting compensation scheme. Turf-cutters from neighbouring SACs have been relocated to this site by NPWS. Several other bogs are being assessed for similar use.

The depth of remnant peat within Blackwater bog units will have a very significant impact on the development of these sites, with deeper peat (Derryfadda milled peat production bogs) having potential for the establishment of embryonic peat-forming (*Sphagnum*-rich) vegetation communities. Milled peat cutaway (such as at Blackwater) develops in a somewhat different way as in places the underlying gravel is exposed, there is significant alkaline influence on the water chemistry and in many of these cutaway bogs will develop fen and wetlands due to the local topography, hydrology and water chemistry.

A breakdown of the component bog areas for the Blackwater Bog Group IPC Licence Ref. PO502-01 is outlined in Table Ap-2.

Table Ap-2a: *Blackwater Bog Group names, area and indicative status (Attymon sub-group)*

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Attymon	336	Cutover Bog Industrial peat production commenced at Attymon Bog in 1941 and ceased in 2019. Attymon is a deep peat cutover bog.	Attymon Bog formerly supplied fuel sod peat. Coillte have developed a portion of the former production area for conifer forestry. Rehabilitation ongoing	2019	Draft 2024

⁷ <http://www.npws.ie/peatlandsturf-cutting/nationalraisedbogsacmanagementplan/>

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Cloonkeen	252	Cutover Bog Industrial peat production commenced at Cloonkeen Bog in 1953 and ceased in 2019. Cloonkeen Bog is a deep peat cutover bog.	Cloonkeen Bog formerly supplied fuel sod peat. Coillte have developed a portion of the former production area for conifer forestry. Rehabilitation ongoing	2019	To be finalised 2024
Derrydoo-Woodlough	452	Development Bog Derrydoo-Woodlough Bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (bog restoration) now complete.	N/A	Finalised 2012
Tirur-Derrymore	422	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	This bog has significant raised bog restoration potential. Section leased to NPWS as a SAC turf-cutting relocation site.	N/A	Finalised 2023
Newtown-Loughgore	448	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Some sod turf production Bog restoration was carried out in 2019-2020 Rehabilitation (bog restoration) nearly complete.	2020	To be finalised 2024
Killeglan	581	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete 2 nd phase of rehabilitation planned for 2023	N/A	Finalised 2024
Cloonboley 1	675	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place on the main section.	A small sub-section has been used for sod turf production. Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	2020	Draft 2024
Cloonboley2	203	Development Bog This bog was drained in the 1980s in anticipation of industrial peat production. No industrial peat harvesting ever took place.	Bog restoration was carried out in 2013-2014 Rehabilitation (raised bog restoration) complete	N/A	Draft 2016

Table Ap-2b: Blackwater Bog Group names, area and indicative status (Blackwater sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballaghurt	597	Cutaway Bog Industrial peat production commenced at Ballaghurt Bog in 1981. The majority of the site is cutaway with some residual deeper peat	Ballaghurt Bog formerly supplied a range of commercial functions including horticultural peat and fuel peat. Pioneer cutaway vegetation communities are naturally developing on some cutaway areas.	2020	Finalised 2023
Belmont	316	Cutaway Bog Industrial peat production commenced at Belmont Bog during the 1950's. The majority of the site is cutaway.	There are some areas of pioneer cutaway vegetation communities naturally colonising cutaway sections. Coillte have developed a portion of the bog for forestry. Rehabilitation has been completed	2020	Finalised 2021 Rehab complete 2021
Blackwater	2,303	Cutaway Bog Industrial peat production commenced at Blackwater Bog during the 1950's. The majority of the site is cutaway.	Bloomhill Bog formerly supplied milled horticultural peat and fuel peat. There is extensive development of emergent cutaway vegetation communities across the former production area. The site has been used for experimental forestry (BOGFOR) and other conifer plantations. Part of the site was rehabilitated with lake and wetland creation. An ash facility took ash from Shannonbridge Power station Rehabilitation ongoing	2020	Finalised 2022
Bloomhill	883	Cutover Bog Industrial peat production commenced at Bloomhill Bog during 1981. The majority of the site still has relatively deep residual peat.	Bloomhill Bog formerly supplied milled horticultural peat and fuel peat. Much of the former peat production area is bare peat. Rehabilitation ongoing	2020	Finalised 2022 Rehab complete 2022/23
Bunahinly-Kilgarvan	389	Cutover Bog Industrial peat production commenced at Bunahinly-Kilgarvan Bog during the 1990's. Residual Deep peat remains on these bogs.	Bunahinly-Kilgarvan formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Part of Bunahinly has been re-wetted.	2020	Finalised 2022 Rehab complete 2022/23
Glebe	132	Cutover Bog Industrial peat production commenced at Glebe Bog during the 1990's. Residual deep peat remains on these bogs.	Glebe Bog formerly supplied milled; horticultural peat and fuel peat. Glebe bog is still listed as a pNHA. Much of the former production area is bare peat.	2020	Finalised 2023
Clooniff	523	Cutover & cutaway Bog Industrial peat production commenced at Clooniff Bog during the 1970's. A mosaic of variable peat depths remains on this bog.	Clooniff Bog formerly milled fuel peat. Much of the former production area is bare peat or wetland. Some emergent vegetation communities are naturally colonising cutaway areas. Reduced	2020	Finalised 2021 Rehab complete 2021/22

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			pumping has created a large wetland in one area. Rehabilitation ongoing		
Cornafulla	460	Cutover Bog Industrial peat production commenced at Cornafulla Bog in 1987. This bog still retains relatively deep residual peat.	Cornafulla Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area or cutaway is bare peat.	2020	Draft 2017
Cornaveagh	492	Cutover Bog Industrial peat production commenced at Cornaveagh Bog in 1970's and ceased in 2020. This bog still retains relatively deep residual peat.	Cornaveagh Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat.	2020	Draft 2017
Culliaghmore	442	Cutover Bog Industrial peat production commenced at Culliaghmore Bog in 1960's and ceased in 2020. Much of this bog is cutaway, with some pockets of deeper residual peat.	Culliaghmore Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2017
Garryduff	970	Cutaway Bog Industrial peat production commenced at Garryduff Bog in 1960's. The majority of this bog is cutaway.	Much of the former production area footprint or cutaway is bare peat. Extensive natural development of pioneer cutaway vegetation communities is present on cutaway areas. Rehabilitation ongoing.	2020	Finalised 2021 Rehab complete 2021/22
Kellysgrove	201	Development Bog Kellysgrove Bog was drained in the 1980s in anticipation of industrial peat production. No peat harvesting ever took place.	The site retains degraded raised bog vegetation. Kellysgrove Bog retains significant raised bog restoration potential. A way-marked walking trail is positioned along the old Ballinasloe Canal. Rehabilitation measures have been completed at Kellysgrove in 2021.	2020	Finalised 2021 Rehab complete 2021/22
Kilmacshane	1,294	Cutaway Bog Industrial peat production commenced at Kilmacshane Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Kilmacshane Bog formerly supplied milled horticultural peat and fuel peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas and water levels have risen as pumping reduced, creating wetlands. Rehabilitation measures have commenced at Kilmacshane in 2021.	2014	Finalised 2021 Rehab complete 2021/22
Lismanny	449	Cutaway Bog Industrial peat production commenced at Lismanny Bog in 1960's. The majority of this bog is cutaway with some pockets of deeper peat remaining.	Lismanny Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas.	2020	Draft 2021

Table Ap-2c: Blackwater Bog Group names, area and indicative status (Derryfadda sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryfadda	610	Cutover bog Industrial peat production commenced at Derryfadda Bog in 1980's. This bog still retains residual deep peat.	Derryfadda Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. Some pioneer cutaway vegetation communities are naturally colonising cutaway areas. Rehabilitation ongoing.	2020	Finalised 2022 Rehab complete 2022/23
Boughill	415	Cutover bog Industrial peat production commenced at Boughill Bog in 2008. This bog still retains residual deep peat.	Boughill Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint or cutaway is bare peat.	2020	Draft 2017
Castlegar	517	Cutover bog Industrial peat production commenced at Castlegar Bog in 2001. This bog still retains residual deep peat.	Castlegar Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area is bare peat. The adjacent Annaghbeg Bog NHA is an intact undrained raised bog Rehabilitation measures have commenced at Castlegar in 2021.	2019	Finalised 2021 Rehab complete 2021/22
Gowla	650	Cutover bog Industrial peat production by BnM commenced at Gowla Bog in 1970's. Development for sugar production was in place at Gowla since the 1950's. This bog still retains residual deep peat.	Gowla Bog formerly supplied milled horticultural peat and fuel peat. Much of the former production area footprint is bare peat.	2020	Finalised 2024

See Drawing number *BNM-DR-25-05-RP-24: Blackwater (Derryfadda subgroup) Bog Group*, included in the accompanying Mapbook which illustrates the location of Cloonboley bog and the Blackwater (Derryfadda subgroup) Bog Group in context to the surrounding area.

APPENDIX III. ECOLOGICAL SURVEY REPORT

Note: this ecological survey report refers to the entirety of Cloonboley Bog. The area of Cloonboley Bog within the PCAS extent comprises four separate bog subsites only - Ballydangan Bog North, Ballydangan Bog South, Cranberry Lough Bog and Tonalig South Bog.

Ecological Survey Report			
Bog Name:	<u>Cloonboley 1</u>	Area (ha):	814 Hectares
Works Name:	Derryfadda	County:	Roscommon
Recorder(s):	MMC & DF	Survey Date(s):	26 th , 28 th & 29 th January 2010
Photos:	Photos taken – see L:\AI_Data\Boora\Ecology Team\Photos\Cloonboley1		
Review status: checked by CF <input type="checkbox"/> discussed with TE <input type="checkbox"/> discussed with Works manager <input type="checkbox"/>			
<p>Peat production programme and outlook</p> <p>Ballydangan, Northern Ballydangan and Cranberry Lough bogs have all had drains installed (ditched) during the period 1981-84, so that commercial peat harvesting could take place. To date no commercial peat harvesting has taken place. The bogs are currently considered as development bogs held in reserve, although their status may change when the peat resource study is finalised.</p> <p>Large areas of Tonlemone and Tonalig Bogs have been heavily subjected to domestic sod peat cutting over a long period of time. The area around Tonalig has been leased to domestic peat cutting from (or is under supervision by) Bord na Móna. There have been recent extensive drainage works in the cutover bog around this section.</p>			
<p>Key biodiversity features of interest</p> <ul style="list-style-type: none"> Ballydangan bog is an exceptional site due to the presence of several Annex I habitats in relatively good condition. A considerable extent of high bog in relatively good condition that has been ditched in the late 1980's but still retains typical raised bog characteristics (that qualifies as the Annex I EU Habitats Directive habitat – 'degraded raised bogs still capable of regeneration' – 7120). (Number codes refer to EU habitat classification system – European Commission 1996). A very significant area (potentially 10-15 ha) of relic active raised bog mainly on Ballydangan Bog, with smaller portions on Northern Ballydangan and Cranberry Lough Bogs. This habitat qualifies as the Annex I EU Habitats Directive habitat – 'active raised bog' (7110). This extent of active raised bog on Ballydangan is comparable to the extent of <i>active</i> raised bog found on some Raised bog cSACs in Roscommon. A Rich fen/flush (PF1) on Ballydangan Bog associated with the raised bog that has unusual hydrological characteristics and has influenced the vegetation creating communities not normally associated with typical flushes of raised bogs (the presence of Black Bog-rush and Saw Sedge) (0.5 ha). This habitat type may qualify as the Annex I priority habitat '*Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>' (7210). The presence of an intact natural transition between raised bog vegetation and this rich fen vegetation is notable. Doo Lough, which contains Transition Mire and Quaking bog (PF3) towards the eastern side of Northern Ballydangan Bog also qualifies as an Annex I EU Habitats Directive habitat-'transition mires and quaking bogs' -7140. Doo Lough also contains a Red Data Book species - Narrow-leaved Marsh Orchid (<i>Dactylorhiza traunsteinerioides</i>) as well as another notable species Bog Sedge (<i>Carex limosa</i>). 			

- There are also indications that Doo Lough is used by the Annex I species - Greenland White-fronted Geese.
- The presence of a fifth Annex II EU Habitats Directive habitat – ‘Depressions on the peat substrates of the Rhynchosporion (7150) – associated with parts of the high bog on Ballydangan, Northern Ballydangan Bog and Cranberry Lough bogs.
- Cranberry Lough pNHA. This small pNHA has Cranberry Lough as its core conservation interest and contains a mosaic of diverse habitats around its edge, including some rare/notable plant species. This small pNHA is partially within the Bord na Móna property. The area owned by Bord na Móna includes part of the actual lake and a complex mosaic of habitats including Reed and large sedge swamps (FS1), Wet willow-alder-ash woodland (WN6), Alkaline Fen (PF1) and old cutover bog (PB4). Some of the vegetation within the lough could probably be classified as Transition mire and quaking bog (PF3). Several of these habitats could also qualify as some of the Annex I habitats listed above, although they would be relatively small in extent. This small wetland is also used by some wetland bird species.
- The use of Ballydangan Bog and Northern Ballydangan Bog by Red Grouse (Red-listed bird species of breeding concern in Ireland) is notable. It is suspected that this species is breeding on the site and the National Heritage Council has now funded a project to enhance suitable habitat on Ballydangan Bog for this species. This project is being carried out by the Roscommon Regional Game Council and Moore Gun Club. See, ‘Red Grouse Conservation Plan for Ballydangan Bog, County Roscommon for 2010-2015’ by David Scallan.
- Possible signs of Otter using Cranberry Lough.

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Raised bog (PB1) (Codes refer to Heritage Council habitat classification, (Fossitt 2000), See Appendix I.)
- Cutover Bog (PB4)
- Scrub (WS1) on old Cutover bog
- Bog woodland (WN7) (on Cutover bog)
- Rich fen and flush (PF1) (part of high bog at Ballydangan and found in Cranberry Lough)
- Poor fen and flush (PF2) (part of the high bog)
- Transition mire and quaking bog (PF3)
- Mesotrophic lake (FL3) (Cranberry Lough)
- Reed and Large Sedge swamps (FS1)
- Dry Heath (HH1) (part of high bog on some mounds)
- Wet grassland (GS4) (reclaimed cutover bog and access routes)
- Improved grassland (GA1) (access routes)
- Wet Willow-Alder-Ash Woodland (WN6)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)
- Oak-Ash-Hazel Woodland (WN2)
- Dry Calcareous and Neutral Grassland (GS1)
- Drainage ditches (FW4)
- Dense Bracken (HD1)

Description of site

This is a large, widely spread site that comprises five main sub-sites or bogs. The site is situated in Co. Roscommon, approximately 5km NE from the town of Ballinasloe. The old Galway-Dublin Road (N6) and the new Galway-Dublin motorway (M6) pass to the south of Cloonboley 1, while the Galway-Athlone railway line intersects the site in three locations. Cloonboley 1 is linked together by a narrow strip of land linking the sites that crosses farmland which was originally acquired by Bord na Mona to provide access between the various bogs. The various bogs are labelled as sub-sites according to the main town-lands.

Ballydangan Bog

This is the largest bog in Cloonboley 1 and is separated from Northern Ballydangan Bog to the north by the Galway–Athlone railway line. A minor public road along the western boundary separates Ballydangan Bog from Cranberry Island Bog.

The narrow, western end of this section along the railway line is made up of a mixture of habitats, primarily wet grassland (GS4), wet heath (HH3) and scrub (WS1) along with some small patches of dry calcareous and neutral grassland (GS1). The majority of this area is old cutover bog that has now developed secondary habitats. The wet grassland is dominated by Purple Moor-grass in places but also contains several other vegetation types including some species-rich area. There are small patches with elements of rich fen such as Black Bog-rush. The scrub is dominated by Gorse. The southern margins of the bog were mostly cutover bog and a number of secondary cutover habitats had developed such as scrub (WS1), bog woodland (WN7) and wet grassland (GS4).

The majority of the high bog can be classified as raised bog (PB1). It contains features typical of both the two main sub-types of raised bogs, Western type and True Midlands type (Cross 1990). Indicators such as the presence of Bog Rosemary, Cranberry and *S. magellanicum* are indicative of True Midlands bogs whereas other indicators such as the relative abundance of Carnation Sedge and the variable surface topography with the presence of some ridges are indicative of Western type raised bogs. In the early 1980's drains were installed in order to drain the bog in preparation for large scale industrial peat harvesting by Bord na Mona. However to date no industrial peat harvesting has taken place.

Ballydangan Bog has several main topographical features. A small mound containing scrub/woodland is located at the west side. The high bog is separated into two main sections by a large mineral ridge along the northern boundary (this comprises excluded farmland, grazed by cattle) and a rich fen/flush system (PF1) that criss-crosses the central area. The eastern half also contains raised bog and has a high ridge with drier Heather-dominated dry heath (HH1) (burned at the time of the survey) and a smaller poor flush (PF2) located in the NE corner.

The majority of the western half of the site can be classified as *degraded* raised bog with large sections relatively dry and degraded. The *Sphagnum* cover is low in this habitat. However, this eastern half has not been burned for some time and the *Cladonia* lichen cover was relatively high in places (25-75%). There is also very little colonisation of the high bog by Birch and conifer saplings. In the degraded sections the drains were empty, had running water or were filled with water. Carnation Sedge is a prominent feature of the vegetation. However, moving in a west to east direction across the bog the surface conditions change, from dry areas with a covering of tall/leggy Heather to wet pools containing *S. cuspidatum* and drains that were in-filling with *Sphagnum* spp. The wetter pools were mostly found within the western section of the site adjacent to the mineral island and this area can be considered potentially *active* raised bog. In the wettest sections the pools were infilled and the bog was quaking. There was also relic inter-connecting pool complexes with abundant lawns of *S. magellanicum* and *S. papillosum* as well as extensive *S. cuspidatum* in the pools. White-beaked Sedge was prominent around these pools. Species such as *Aulacomnium palustre*, Cranberry and Bog Rosemary were also present. Some relic large hummocks of *S. imbricatum* and *S. fuscum* were also present. This area is a former central complex of raised bog and other positive indicators such as hummock-pool topography was still well-developed. Some of the largest mounds contained Crowberry. The extent of this wet area was significant. There were signs of degradation, particularly around the edges. This wet active bog area also contains some smaller flushes (poor flush) that were indicated by the presence of Purple Moor-grass, the appearance of Common Reed and other typical flush species, and the development of very large hummocks of moss. Actively flowing drains were noted to the north of this area in the degraded bog close to the railway line. There is a slight slope with a northern aspect on the high bog that becomes more pronounced towards the railway.

There is a smaller area of active raised bog to the NE of the flush. This area is also quite wet and quaking. However, there are more signs of damage as this section has been burned in the past 10 years and some of the larger *Sphagnum* hummocks have not recovered. There are also more signs of degradation within the potentially active raised bog area with the presence of pools with algal mats and degraded *Sphagnum* cover.

A very small patch of trees (classified as Oak-Ash-Hazel woodland -WN2) is located on the western edge of the flush. This woodland is situated on a low mineral island with a limestone outcrop and consisted of old coppice Oak (*Quercus robur*) and Grey Willow along with Bramble, Honeysuckle, Creeping Bent, Hart's Tongue Fern, Tufted Hard-grass, Bracken and Cocks Foot. Bloody Crane's Bill (*Geranium sanguineum*) was also present in the wooded area. This woodland has been grazed by cattle and possibly deer in the recent past. The fen/flush was relatively dry and is probably perched on a thin layer of bog that is influenced by springs from the underlying Limestone bedrock or from the adjacent mineral mound.

The raised bog gently slopes eastwards towards a drier ridge that is dominated by Heather. This ridge is classified as dry heath (HH1). The majority of this area has been burned within the past 5 years and is quite damaged. The burn has enhanced this area for Red grouse by providing suitable young Heather and signs of feeding (scattered Red Grouse droppings) were frequently noted in parts of this area. There is a significant slope (northern aspect) from this ridge towards the railway line to the north and to the east side of the bog. This is a typical feature of western type raised bogs. A Poor flush (PF2) is located to the NE of the Dry Heath ridge that was also burned. The vegetation of this flush was dominated by Purple Moor-grass and the central zone also had scattered Birch and Willow scrub.

Ballydangan Bog – rich fen area and associated habitats (06/07/2010)

A large flushed area has developed in the central section that runs through the bog in a north-south direction. An old burn line was noted on the high bog to the west of this flush. The majority of this area can be classified as poor flush as it is dominated by Purple Moorgrass and Bog Myrtle (PF2). This vegetation type was prevalent towards the southern half of the flushed system. Birch and Willow were scattered throughout the area. Other species present included Tormentil, Bog Asphodel, Yellow Rattle, Cranberry, Bog Rosemary, Cross-leaved Heath, Bog Bean, Glaucous Sedge, Bog Cotton, Compact Rush, Soft Rush, Devil's-bit, Velvet Bent, Many-headed Woodrush and Common Spotted Orchid (*Dactylorhiza fuchsii*). Species such as Bottle Sedge and Black Bog-rush begin to appear towards the middle section and Saw Sedge was also noted within some of the drains.

Towards the northern side there was a small area that was dominated by both Saw Sedge and Bog Bog-rush and could be classified as rich fen (PF1). This habitat type may qualify as the Annex I priority habitat '*Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*' (7210). It is a relatively narrow band of habitat that is only 5 m wide at its southern end and up to 40 m wide towards the northern end. This habitat type may have developed along a natural drainage feature within the flush that is providing base-rich ground water. Other species found in this habitat included Bog Myrtle, Milkwort, Cross-leaved heath, Soft Rush, *Sphagnum* spp. growing in hummocks (*S. subnitens*, *S. papillosum*), other moss species (*Hylocomium splendens*, *Polytrichum* spp.), *Cladonia* lichen species, Heather, Creeping Bent, Common Reed, Bilberry, Bog Rosemary, Bog Bean, Common Reed, Lesser Spearwort, Compact Rush, Spear Moss, Water Horsetail, Marsh Arrowgrass, Jointed Rush, Yellow Sedge, Round-leaved Sundew, Flea Sedge, Dioecious Sedge, Star Sedge, Bottle Sedge and Common Sedge. This list includes both species typical of more acidic habitats and species typical of base-rich habitats. The fen area was grazed and poached by cattle that were grazing the bog. In general the fen was relatively dry and firm underfoot but there still were some large hummocks of moss present.

The fen area was also ditched and these drains contain somewhat different vegetation due to the presence of standing water (although they were dry at the time of the summer visit). Several possibly natural pools (or possibly part of the drainage system) also contained similar vegetation. Species such as Lesser Tussock Sedge (*Carex diandra*) and Bog Sedge (*Carex limosa*) were noted in the drains along with Pondweed, Jointed Rush, Bog Bean and Bladderwort. Stoneworts covered the base of some of these drains. Sections around the edges of the drains and pools had extensive cover of the base-rich indicator moss *Campylium stellatum*, which also grew as hummocks within the drains. There was also some cover

of *Scorpidium scorpioides* in the drains and pools. *Ctenidium molluscum* was also present. The areas around these drains or pools were quaking in places (although the pools and drains were empty of water (after a dry period).

Towards the southern end of this system there is a small drain that flows along the old access track onto the bog. A small part of this bog was still open and contained some transition mire-type (PF3) vegetation in pools. Lesser Tussock Sedge and Yellow Sedge were both prominent on 'islands' or hummocks within the pools. There was also some *Scorpidium scorpioides* present in the drain as well as some *Scorpidium* sp. (*Drepanocladus* sp.)

Northern Ballydangan Bog

This section is located to the north of the Ballydangan section. The Galway – Athlone railway line dissects these two sections of bog. This section is similar to Ballydangan in that the majority of the site is raised bog (PB1), with cutover bog sections located along the margins, particularly to the north and south of the bog. The southern sections of cutover appeared to be older than the northern cutover sections that are being actively used for domestic turf cutting. A drainage system was installed in this bog in the early 1980s in order to prepare the bog for industrial peat production but to date no industrial peat production has occurred on this section of bog.

Northern Ballydangan Bog also has several distinctive topographical features. The majority of the raised bog is sloped and has a western aspect towards a drainage ditch/stream that divides the bog into two main sections. The western section is also sloped towards this drain, with an eastern aspect. The eastern section has a small poor flush (PF2) located in the southern part of the high bog adjacent to a higher ridge containing dry heath (HH1) and vegetated by dense Heather and some Birch scrub. Doo Lough is located in the NE part of this bog. This lough has been classified as transitional mire and quaking bog (PF3) and has a quaking scraw of vegetation. The water levels are likely to vary.

The western side of the bog is mainly degraded raised bog. The majority of this section is ditched apart from some sections around the fringes. There is a small active flush habitat located in the north-east corner that is probably a secondary feature caused by the drainage. There is some evidence of old relic pool systems in one section of the bog but they are quite degraded and infilled with ordinary vegetation. A small area may have developed secondary *Sphagnum* growth due to the drainage, but this area was also degrading and the sphagnum cover was not extensive. Rhododendron has formed a large patch of scrub along the southern boundary. A line of scrub has vegetated the area along the drainage ditch separating this part of the bog from the eastern side. This is likely to have been some old peat cutting along this drainage ditch/stream on both sides.

The western side is also dominated by degraded raised bog. Drainage in this section was less intensive and some marginal areas were not drained at all. Part of the high bog appeared to have been burned within the past three years. Grouse seemed to be using this section as droppings were observed on the dry heath (HH1) ridge. There was a small section where *Sphagnum* cover was higher and the bog was much wetter and potentially active. The drains were infilling within this area with *S. cuspidatum* and *S. magellanicum*. The vegetation may have been connected to the nearby flush as there were few typical pool complexes and the *Sphagnum* cover was dominated by large hummocks of *S. capillifolium* and *S. papillosum* covered with Heather. The Heather within this area was also somewhat flushed. The adjacent poor flush was dominated by Purple Moor-grass and was relatively dry. Characteristic species such as hummocks of *Polytrichum* moss were present.

Doo Lough 02/07/2010

Doo Lough is a small former lough located near the edge of Ballydangan North Bog that is slowly terrestrializing. The high bog around the lough was ditched by Bord na Móna and there were likely to be some older drains in this area. The lough is now located close to the edge of the high bog due to turf cutting in this area in the past. There is a small outflow drain that seems to be stable at present. This area now contains transition mire (PF3) vegetation in the former lake basin with a quaking mat of vegetation surrounded by a band of poor flush (PF2) vegetation. The transition mire habitat also qualifies as an Annex I EU Habitats Directive habitat-'transition mires and quaking bogs' -7140.

The poor fen margin forms a natural transition from the high bog and is dominated by Purple Moorgrass and Bog Myrtle, with patches of Birch and Willow scrub. There is gradual zonation along a hydrological gradient down to the lake basin with typical changes in vegetation community type. Other species present include typical poor fen species such as Gorse, Heather, Bog Asphodel, Cross-leaved Heath, Tormentil, Cranberry, Star Sedge, Devil's-bit, Yellow Rattle, Glaucous Sedge and Multi-flowered Wood-rush. *Sphagnum* cover increases towards the basin in this zone and *S. palustre* and *S. subnitens* were both present. Large hummocks of *Aulacomnium palustre* and *Polytrichum juniperum* are also present. The ground also becomes quaky towards the basin.

More typical transition mire and wetland species being to appear in the wetter habitat such as frequent Marsh Cinquefoil, Lesser Spearwort, Water Horsetail, Marsh Horsetail and Bog Bean. These species appear in small pools and open areas with extensive Purple Moorgrass, Bog Cotton and *Sphagnum* sp. in places. Other species present include Common Sedge, Marsh Thistle, Yellow Sedge, Cuckoo Flower, Marsh Bedstraw and Creeping Bent.

The former zone gradually becomes dominated by sedges such as Lesser Tussock Sedge (*Carex diandra*) and Bottle Sedge. This vegetation type dominates most of the transition mire. Other species present include Bog Cotton, Bog Bean, Marsh Pennywort, Water Horsetail and Marsh Marigold. The edge of this zone contains brown mosses such as *Scorpidium scorpioides*, *Campylium stellatum*, *Fissidens* sp., and other *Scorpidium* species. Further out, *Calliergonella cuspidata* dominates the moss cover. Some *Sphagnum* spp. and *Aulacomnium palustre* hummocks are present. In the central area some Reedmace begins to appear. There is also a small area vegetated with Creeping Bent.

The south-western area contains a different vegetation type where Bog Bean and *Sphagnum* cover dominates. This area is likely to be a zone where there is some input of acidic water from the bog. There is also a large clump of Saw Sedge where a drainage ditch/stream enters the lough along the western edge. The south-east margin contains a small band of Black bog-rush-dominated vegetation that could be considered rich fen (PF1). The eastern transition mire margin also contains Bog Sedge (*Carex limosa*), Flea Sedge, Creeping Willow, Marsh Lousewort, Jointed Rush, Bog Thistle (*Cirsium dissectum*), Dioecious Sedge (*Carex dioica*) and Narrow-leaved Marsh Orchid (*Dactylorhiza traunsteinerioides*). This latter species is listed in the Red Data Book (Curtis and McGough 1988) as rare and has not been recorded from this 10 grid square before. Other Marsh Orchid species may also be present (with spotted leaves).

The lough is connected to another small wetland adjacent to the railway (to the south of the lough) via an old drain. This small wetland also contains similar wet quaking transition mire vegetation with a zonation from poor fen vegetation. This wetland also contains more frequent Common Reed. Saw Sedge was present but rare. The wetland drains towards Doo Lough via the drain.

Geese droppings were noted along the edges of this habitat during the winter survey and subsequent local information has indicated that the site is used by Greenland White-fronted Geese.

Cranberry Lough Bog

This bog is located to the south west of the previous two bogs and is separated from Ballydangan by a public road along its north eastern boundary. The majority of this site is degraded raised bog (PB1) and as with the previous sites this bog was drained in the late 1980's with the objective of commencing commercial peat harvesting, although no actual commercial peat harvesting has taken place to date. This section of high bog is elongated in an N-S orientation and is surrounded by old cutover bog, other secondary cutover habitats and some reclaimed grassland. Some of the old cutover bog along the northern boundary and adjacent to the road is developing secondary rich fen characteristics. The main topographical features of this section of bog include the small lough (Cranberry Lough) at the southern end of the high bog (which is partially within the Bord na Móna boundary. Some Coillte conifer plantation has been developed on the high bog (outside the BnM boundary) but adjacent to the lough. (This plantation has potential to be a Coillte biodiversity area as it is partially within the pNHA). There has been a dump /storage area from quarried limestone developed on cutover adjacent to the Bord na Móna property at the NE corner. This dump partially spills over the Bord na Móna boundary into cutover bog.

The majority of the high bog has been ditched and is in poor and degraded condition, particularly in the southern half. This section is relatively dry and there are indications of older disturbance from drainage/ peat cutting in the 19th-20th century prior to drain development by Bord na Móna. Bog Myrtle has spread onto the high bog in the central section, either along disturbed drainage ditches or on relic old flush features. Along the central axis there are some wet areas where there is high *Sphagnum* cover and the drains are partially infilling, but these are relatively small and are inter-mingled with relic pools in degraded condition with algal mats or no water. There is also likely to be some secondary *Sphagnum* spp. growth in places due to the drainage and localised pooling of water.

The northern section still contains a small relic hummock-pool complex that is quite wet (although it was not quaking significantly) (Photos taken). This area could be considered as active raised bog as the *Sphagnum* spp. cover is quite high. It is similar to the other pool complexes in that the drains are infilling with *S. cuspidatum* and *S. magellanicum* and there are still relic pools with both these species and also *S. papillosum*. Some large hummocks with *S. imbricatum* and *S. fuscum* are also present in this area. There were also signs of degradation within this area with algal mats present in some of the pools. Subsidence may be a feature of this section of active bog.

In the south eastern corner of the site lies a lake known as Cranberry Lough (Photos taken). This area actually consists of two small lakes with a small band of vegetation (described as floating scraw from previous descriptions but now seems quite terrestrialised) between the water bodies. The largest lake is the most northerly one and is bounded with raised Bog (PB1) to the east and north, while an extensive area of Reed and large sedge swamp (FS1) and wet Willow-Alder-Ash woodland (WN6) occur on the western side of the lake. Further to the west a conifer plantation is well established comprising mainly Lodgepole Pine. Immediately to the south lies some raised bog (PB1), scrub (WS1) and transition mire and quaking bog (PF3). The smaller lake is bounded by reed and large sedge swamp (FP1), raised bog (PB1), and scrub (WS1). Patches of Saw Sedge occur in both lakes. The lakes are best classified as mesotrophic lakes (FL3), although a site visit at an appropriate time of year is necessary to accurately classify these habitats. Evidence of Fox, Badger and possibly Otter were noted close to the lakes, while 19 Mallard were counted in the area of the larger lake. A small section of bog woodland (WN7) is located between the two lakes; this woodland was a mixture of mature Scots Pine and Willow.

A mineral island occurs to the east of the site, only a small portion of which is within the Bord na Mona boundary. This area is mainly comprised of Oak-Ash-Hazel Woodland (WN2) but it is worth noting that very little woodland is contained within the BnM boundary. The small section that is within the boundary is best classed as dry calcareous and neutral grassland (GS1). Horses and cattle have access to this bog from its eastern boundary.

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

The Cranberry Lough area is classed as a pNHA. This pNHA is notable for the presence of several botanically-rich habitats including the lough, transition mire and alkaline fen. The acid/alkaline transition is a notable ecological feature at this site. Lesser Tussock-sedge (*Carex diandra*) and Bog Sedge (*Carex limosa*) have both been recorded on the site. The lough also attracts waterfowl and Whooper Swans have been known to use the site. The western side of the lough has been planted with conifer plantation.

A description of the site is found in the original ASI County report for Roscommon (http://www.npws.ie/en/media/NPWS/Publications/ASI/Media_5135,en.PDF).

Cranberry Lough is listed in the IPCC Fen Database (<http://www.ipcc.ie/fen2000surveylist.html>).

Adjacent habitats and land-use

Habitats around the margins of the site include Improved grassland (GA1) and wet grassland (GS4) that are both grazed by cattle. Much of this grassland is grazed during the summer and fodder is also cut. Other typical marginal peatland habitats are present including remnant raised bog (PB1), cutover Bog (PB4) and Scrub (WS1). Some naturally developed bog woodland has developed in places around the margins of the site on the remnant high bog. There is some active peat cutting

by private individuals on high bog both inside and outside the BnM boundary. Sections of commercial conifer plantations (Coillte-owned and private) are located along the boundaries of the BnM properties in numerous locations.

The Galway - Dublin railway line dissects the site at two locations.

Watercourses (major water features on/off site)

- Doo Lough is located in Northern Ballydangan Bog and is connected to a flush site further south via a stream. The Lough which is listed as a seasonal lake on the OSI Discovery series map drains into the Killeglan River which in turn flows into the River Suck. This site is classified as transitional mire and quaking bog (PF3).
- There are several fen/flush systems on both Ballydangan bog and Northern Ballydangan Bog along with smaller flush systems. These are probably complex natural hydrological systems and the majority of the flushes can be classified as poor flush (PF2). However, there is some evidence of spring enrichment in the largest flush (Ballydangan bog) with the appearance of Saw Sedge and Black Bog-rush, both indicators of rich fen and flush (PF1). This habitat is quite extensive and deserves to be classified as a rich fen in its own right.
- There are no major watercourses on or adjacent to the site. The bog is in the Shannon catchment. This area has a complex hydrology and there are several small lakes in the area with seasonally changing water levels.
- A small stream runs through Northern Ballydangan Bog and divides it into two main sections. This stream appears to have been modified in the past in order to enhance drainage on the bog. Another shorter stream connects the flush area to the south with Doo Lough.
- Cranberry Lough is really two small water bodies.
- A small river flows through Tonlemone and Tonalig bogs, this river flows into the River Suck.

Fauna biodiversity

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

- 30 Greenfinch on the Cranberry Lough Bog
- 19 Mallard at Cranberry Lough
- Numerous Red Grouse droppings on the burnt (dry Heath) sections of Ballydangan Bog, while smaller numbers of droppings were also reported from the burned over (dry Heath) sections of Northern Ballydangan Bog. Only a single group of droppings were noted within the actual raised bog habitat.
- Geese droppings around the edges of Doo Lough.
- Numerous Snipe observed (>20).
- Long-eared Owl on Ballydangan bog.
- Other more common birds were noted on the site. These included Blackbird, Grey Crow, Pheasant, Rook, Blue Tit, Reed Bunting and Meadow Pipit.

06/07/2010

- Curlew (8)
- Skylark
- Meadow Pipit
- Grasshopper Warbler

<p>Mammals</p> <ul style="list-style-type: none"> • Signs of Fox and Badger observed on in various locations around the site. Mammal trails across the high bog were frequent. • Deer tracks (most likely Fallow deer) noted at various locations around the site. • A possible Otter spraint next to Cranberry Lough. • Hare droppings and Hare sightings were relatively common on sections of high bog.
<p>Fungal biodiversity</p> <p>The ecological survey was not carried out during appropriate weather conditions for a fungal survey.</p>
<p>Activities on the site</p> <p>Activities on the site include:</p> <ul style="list-style-type: none"> • Ballydangan Red Grouse Project • Active private turf cutting. This is occurring in parts of all of the sub-sites. Large areas of raised bog are still present but domestic turf cutting is still carried out along the margins of all the bogs. Tonlemone Bog is almost entirely cutover bog. Active sod peat cutting is much less extensive around Ballydangan Bog. • Cattle and horses had access to areas of high bog in Cranberry Lough Bog and on Ballydangan Bog. • Parts of Ballydangan Bog and Northern Ballydangan Bog have been burned within the past five years. • Some shooting has taken place at various locations around the bog.
<p>Future issues for biodiversity management</p> <p>Potential issues for biodiversity management once production has ceased include:</p> <ul style="list-style-type: none"> • Ballydangan Bog, Northern Ballydangan Bog and Cranberry Lough Bog although somewhat degraded due to drainage in the past, still have features of significant ecological value and are worthy of conservation. These bogs, while ditched contain relatively large areas where the drains are in-filling naturally and some are probably partially blocked already. Birch and conifers have not colonised these high bogs to any great extent. The total area of <i>active</i> raised bog on these sites is likely to be greater than 10 ha, which is comparable to some of the raised bog cSACs found in Roscommon. In addition to this, the presence of a relatively large rich fen habitat in association with the raised bog habitat at Ballydangan and the transitional mire habitat at Doo Lough (and acid/alkaline transitions) are additional significant features of conservation value.
<p>Potential management options for Biodiversity</p> <p>There are several potential management options for this site.</p> <ul style="list-style-type: none"> • Ballydangan Bog, Northern Ballydangan Bog and Cranberry Island Bog are worthy of conservation due to the presence of several features of significant ecological value including the presence of priority EU Annex I habitats listed in the Habitats Directive (active raised bog, alkaline fen, transition mire). • Some sections of the individual raised bogs are still quite wet and these areas have in-filling drains. However, some restoration work in the form of targeted drain-blocking is likely to have a positive impact on the overall conservation status of these bogs and maintain or increase the area of active raised bog that is already on the sites.

<p>References</p> <p>Curtis and McGough (1988). <i>The Irish Red Data Book. Vascular Plants</i>. The Stationary Office, Dublin.</p> <p>European Commission (1996). <i>Interpretation manual of European Union habitats</i>. Brussels. European Commission, DGXI.</p> <p>Fossitt, J. (2000). <i>A guide to habitats in Ireland</i>. Kilkenny. The Heritage Council.</p> <p>Scallan, D (2009). <i>Red Grouse Conservation Plan for Ballydangan Bog, County Roscommon for 2010-2015</i>. Roscommon Regional Game Council</p>
<p>HABITAT DESCRIPTIONS</p> <p>(See Habitats Description Document for detailed description of each vegetation community not described in this section.)</p>
<p>HABITAT DESCRIPTIONS</p>
<p>Raised bog (PB1)</p> <p><u>High bog (PB1)</u></p> <p>There are three main sections of high bog contained in Cloonboley1 – Ballydangan, Northern Ballydangan Bog and Cranberry Lough Bogs. These bogs contain marginal, sub-marginal and sub-central ecotypes as well as active and inactive flushes. These bogs have not been burnt for some time and <i>Cladonia</i> lichen cover is high (50-75% in some places). The bog contains a typical hummock-hollow structure and all of the typical species that form the raised bog flora were present. The majority of the high bog areas have been ditched with regular drains running parallel to each other through-out the site. In the drier sections Heather is more abundant along the edges of drains and has colonised some of the ridges of peat that were dug out of the drain. This has created a distinctive patterning over the surface of the bogs. There are several individual Birch and Scot’s Pine trees of various sizes (non-flush) scattered over the high bog but these are generally rare.</p> <p>The majority of the high bog recorded comprises mainly marginal and sub-marginal vegetation and is somewhat degraded. Heather is prominent in the driest areas and Carnation Sedge becomes more prominent in some of the other communities. Deer-grass is also prominent around some of the drier margins. <i>Sphagnum</i> cover was mainly represented by hummocks of <i>S. capillifolium</i> and <i>S. papillosum</i>, with some <i>S. tenellum</i> and <i>S. subnitens</i>. Occasional small hollows contain <i>S. cuspidatum</i>, which show signs of degradation. There are occasional large mounds covered in Heather in these ecotopes that are dominated by other mosses such as <i>Hypnum</i> spp., <i>Pleurozium schreberi</i> and <i>Hylocomium splendens</i>. The drains in these areas have generally not infilled and contain water or are bare. This section did contain some former pool complexes that have degraded and are now are infilled hollows or remnants of pools with some algal cover and more frequent White Beak-Sedge.</p> <p>Purple Moor-grass and Bog Myrtle appear around the edges of some of the high bog and encroach into the high bog in some places, particularly along the drains.</p> <p>Several former central ecotope pool complexes are still present on the high bog but do show signs of degradation. However, they still have a high to very high <i>Sphagnum</i> cover and qualify as <i>active</i> raised bog. The majority of the <i>Sphagnum</i> cover is made up of lawns of <i>S. magellanicum</i> and <i>S. papillosum</i>. Pools are still present that are infilled with <i>S. cuspidatum</i>. Some pools have infilled to form <i>Sphagnum</i> lawns. Some sections have interconnecting pools and the bog is quaking in places. The drains within these areas have also infilled with <i>S. cuspidatum</i> and <i>S. magellanicum</i> and some are partially blocked. <i>Sphagnum magellanicum</i> forms some low hummocks in places. One of the main indicators of degradation is the lack of quality hummocks of <i>S. imbricatum</i> and <i>S. fuscum</i> within these wetter areas. Only a few hummocks of these species were recorded and they were generally degraded. Some pools within the area considered as active are also degraded and contain</p>

algae mats. White Beak-sedge is also prominent around some of the degraded pools and the pools with more healthy *Sphagnum* cover.

Small areas were noted on Ballydangan, Northern Ballydangan Bog and Cranberry Lough Bogs where there seems to have been some secondary re-wetting and development of *active* raised bog. The development of the drains may have caused subsidence in this area or may have diverted water into a natural hollow that led to the re-wetting and subsequent development of *Sphagnum* cover and *active* raised bog.

Main flush (PF1) (elements of PF2) Ballydangan Bog

This large flush occurs in the centre of Ballydangan Bog. This flush is characterised by either dense cover of Purple Moor-grass or sparse cover through Heather-dominated vegetation. Bog Myrtle, and scattered Birch and Willow-dominated scrub are also characteristic. The scrub is not dense and mainly occurs in a central line along the middle of the flush. There are also some standing-dead trees. Species such as Bramble, Broad-Buckler Fern and Bracken are associated with the shrub cover. Heather within the flush is much more robust compared to the surrounding high bog. Other species present include Hare's-tail Bog Cotton, Cross-leaved Heath, Soft Rush, Devil's Bit, Milkwort, Cranberry, Greater Tussock Sedge and Yorkshire Fog. There are large hummocks of bryophytes present including *Polytrichum* spp. *Aulacomnium palustre*, and *Hylocomium splendens*. *Sphagnum* is present with *S. capillifolium* most prominent. Drains were cut across the flush but many of these have infilled to some extent. Water was flowing from the southern end of the flush (or associated drains) and off the bog.

Of major importance are the noted presence Saw Sedge *Cladium mariscus* and Black Bog Rush *Schoenus nigricans*, both these species are indicators of spring-fed minerotrophic fen and flush and it is quite unusual to find these species associated with a mainly Poor flush on a raised bog. The appearance of these species may be an indication of an unusual hydrological feature that is associated with this raised bog. The underlying geology of this area is limestone so it would not be unusual for spring-fed nutrient enrichment to occur in this area.

Dry Heath (HH1)

This habitat occurs on several of the mounds and ridges that are present on the site. It is characterised by dense tall heather cover that overlies relatively hard thin peat. Some of the mounds also have some bracken cover and other species present include Purple Moor-grass, Bramble, Bilberry, Common Reed, Board-Buckler Fern, Gorse, Birch and Willow.

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

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

APPENDIX V. BIOSECURITY

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

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

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

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

In addition to the above, best practice measures around the prevention and spread of Crayfish plague⁸ will be adhered with throughout all rehabilitation measures and activities.

⁸ <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 Blackwater (Derryfadda subgroup) bog group (Ref. PO-502-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Blackwater (Derryfadda subgroup) 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) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

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

other ecosystem services, will also be delivered. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.*

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

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

3 National and EU Climate and Biodiversity Policy

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

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

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

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

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

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

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

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

International research and scientific understanding of peatlands is now reflected in key Irish national policy and strategy documents such as the National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017 - 2022 (Department of Arts, Heritage and the Gaeltacht 2017), The National Peatland Strategy (Department of Arts, Heritage and the Gaeltacht 2015), The National Biodiversity Action Plan (National Parks and Wildlife Service 2017), the River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018), the Draft River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) and the Biodiversity – Climate Change Sectoral Action Plan (Department of Arts, Heritage and the Gaeltacht 2019). Each of the national plans, which are also complemented with the recently published EU Green Deal communication on Biodiversity Strategy for 2030 (COM 2020) have overlapping objectives and actions that focus on the restoration of peatlands damaged by turf-cutting, drainage and other impacts, as well as the re-wetting of Bord na Móna industrial peat extraction bogs.

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2023-2030

The National Biodiversity Action Plan 2023-2030 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 4th 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, development of an updated Biodiversity Action Plan, and rehabilitation of 33,000 hectares of its peatlands under the Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS).

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

7 National conservation designations

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

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

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

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

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies.

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

11 National Archaeology Code of Practice

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

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

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

12 Bord na Móna Biodiversity Action Plan 2016-2021

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

One example of a key CBD target is:

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

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

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

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

13 Bord na Móna commitments

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

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

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

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

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

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

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

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

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

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

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

APPENDIX VII. DECOMMISSIONING

1. Condition 10 Decommissioning

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

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

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

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence 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, stockpile covering, pumps, septic tanks and fuel tanks.

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

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

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

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

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

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

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

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

7.3.3 The ultimate destination of the waste.

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

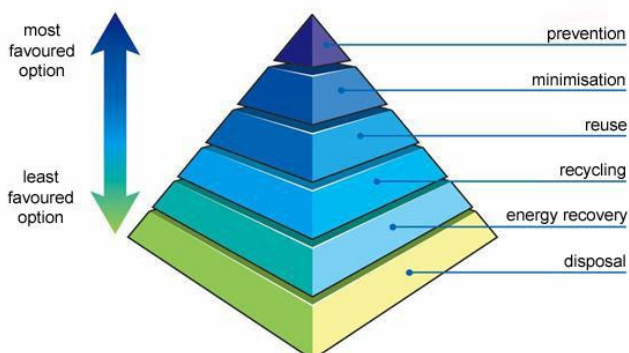
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

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

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

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can be 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 licence. The removal of these is deemed as enhanced measures. These may enhance the future after use 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	Cloonboley Decommissioning Plan
1	Removal of Railway Lines	Not Applicable
2	Decommissioning Bridges and Underpasses	Not Applicable
3	Decommissioning Railway Level Crossing	Not Applicable
4	Restricting Access (bogs and silt ponds)	Not Applicable
5	Removal of High Voltage Power Lines	Not Applicable

APPENDIX VIII. GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX IX. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:

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

Scope:

This plan covers IPPC Licence's Ref P0502-01, Blackwater (Derryfadda subgroup) Group of Bogs in County Galway.

1.0 Extractive Waste:

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

1.1 Silt Pond excavations and maintenance.

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

1.2 Power Station screenings:

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

1.3 Bog Timbers:

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

2.0 P0502-01 IPPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management

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

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

2.2 Condition 7.6 Waste Facility

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

2.3 Condition 7.7 Excavation Voids

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

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

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

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

3.0 Minimisation.

3.1 Silt pond excavation material and cleanings.

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

3.2 Power Station Screenings.

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

3.3 Bog Timbers.

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

4.0 Treatment

4.1 Silt pond excavation material and cleanings.

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

4.2 Power Station Screenings.

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

4.3 Bog Timbers

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

5.0 Recovery

5.1 Silt pond excavation material and cleanings.

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

5.2 Power Station Screenings.

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

5.3 Bog Timbers

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

6.0 Disposal

6.1 Silt pond excavation material and cleanings.

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

6.2 Power Station Screenings.

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

6.3 Bog Timbers

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

7.0 Extractive Waste Management Plan

5 (2a)(i)

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

5 (2a)(ii)

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

5 (2a)(iii)

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

5 (2a)(iv)

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

5 (2a)(v)

Peat mineral resources do not undergo any treatment.

5 (2b)

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

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

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

5 (3)

The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings. Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

Description of operations.

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

Closure plan. (Bog Rehabilitation Plan).

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

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

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

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

Review.

This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Blackwater IPPC Licence P0502-01.

APPENDIX X. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
 1. The land is waterlogged;
 2. The land is flooded, or it is likely to flood;
 3. The land is frozen, or covered with snow;
 4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
 5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, in line with advice on the implementation of the European Union (Good Agricultural Practice for Protected of Waters) (Amendment) Regulations 2022, latest statutory instrument below at link: <https://www.irishstatutebook.ie/eli/2022/si/113/made/en/pdf> will be adhered to at all times with regard to fertiliser application. Reproduced as follows:

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

APPENDIX XI. CONSULTATION SUMMARIES

[Consultation to follow]

Draft

APPENDIX XII. 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

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Code of Practice

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



Bord na Móna	Procedure: ENV017	Rev: 1
Title: Archaeological Findings	Approved: EM	Date:

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1			
2			

APPENDIX XIII. INITIAL WATER QUALITY DATA FROM CLOONBOLEY

To follow once available.

Draft