Bord na Móna

Tirrur-Derrymore Bogs

Cutaway Bog Decommissioning and Rehabilitation Plan

2023

This document seeks to address the requirements of Condition 10.2 of IPC License 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 Tirrur-Derrymore Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

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

Industrial peat production has now fully ceased at Tirrur-Derrymore 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 Minster. 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 Tirrur-Derrymore 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 Tirrur-Derrymore 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 Tirrur-Derrymore 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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Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Tirrur-Derrymore Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Tirrur-Derrymore Bogs, located in east Co. Galway, just over 2km east of Mountbellew Bridge and 6km south-west of Ballygar.
- Tirrur-Derrymore Bogs comprise of a cluster of six raised bog sub-sites, which are themselves part of the Derryfadda Bog Group within the overall area covered by the IPC license for the Blackwater Bog group.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means the establishment habitats and vegetation back onto bare peat, and minimising impacts to downstream waterbodies. The bog was drained in the past to allow peat production. 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.
- Although some of the bog sub-sites were ditched and drained in the 1980's in anticipation of industrial peat production they were never commercially harvested for peat. Tirrur-Derrymore will not now be used for industrial peat extraction. All the Tirrur-Derrymore bog sites are located entirely within Co. Galway, and extend to 449.6ha.
- Parts of the periphery of the bogs within the Tirrur-Derrymore bogs are harvested for domestic turf by private individuals with turbary rights.
- Rehabilitation is being carried out as Bord na Móna have an obligation for rehabilitation via an IPC License issued by the Environmental protection Agency.
- The key objective is to **restore** Tirrur-Derrymore raised bog and to encourage Annex I active raised bog development (peat-forming habitat), where possible.
- In general soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and *Sphagnum* moss will thrive.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Tirrur-Derrymore Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. Many wetland and peatland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland restoration is an opportunity to improve formerly degraded sites.
- Tirrur-Derrymore Bog was ditched, drained and developed for industrial peat production in the 1980s. The majority of the bog was drained in anticipation for peat extraction, but it was never developed fully.
- Measures proposed for Tirrur-Derrymore Bog include internal drain blocking and other measures required to raise water levels to the surface of the peat.
- Bord na Móna plan to carry out this work in 2023.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No external boundary drains will be blocked. Water will still leave the site via the existing outlets.

- This is a peatland rehabilitation plan. This plan does not consider future after-use or development.
- Peatland rehabilitation of the Bord na Móna bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater (Derryfadda subgroup) bog group (Ref. P0502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The Tirrur-Derrymore Bogs (also referred to as Tirrur-Derrymore Bog) are part of the Blackwater (Derryfadda subgroup) bog group (see Appendix II for details of the bog areas within the Blackwater (Derryfadda subgroup) bog group). The Tirrur-Derrymore Bogs are located in Co. Galway.

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 have now announced the complete cessation of industrial peat production across its estate (January 2021).

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

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

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

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <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.

The Tirrur-Derrymore Bogs are proposed to be part of this Scheme (PCAS), which commenced in 2021 and this rehabilitation plan outlines the approach to be taken.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License 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.*"

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

This document covers the area of the **Tirrur-Derrymore Bogs**. The Tirrur-Derrymore Bogs comprise drained raised bog (PB1) that has never been harvested for industrial peat extraction despite the high bog having been ditched in the early 1980's (Cloonabricka, Eskermurry, Island bogs and Cloonfaris Bogs were drained - Castlegar Bog has not been drained by Bord na Móna but at some time in the past drainage has been installed). However, much of the periphery of the bogs within the Tirrur-Derrymore bogs have been harvested for domestic turf.

This rehabilitation plan takes account of the **current land-uses** of **Tirrur-Derrymore** Bog. Three sections of Tirrur-Derrymore bog have been leased to NPWS to relocate local turf cutters from nearby SACs. This supports conservation objectives at adjacent SACs and the National Raised Bog Special Area of Conservation Management Plan 2017-2022. These areas are not part of the planned rehabilitation.

Rehabilitation outcomes of particular sites are constrained by the environmental characteristics and bog condition. For example, there is potential for raised bog restoration at some sites like Tirrur-Derrymore where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained and degraded). At other sites, the majority of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).

Another 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.

Rehabilitation may also be constrained due to other property issues or as rights of way.

2. METHODOLOGY

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

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits (covering the period 2012 to 2022 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 [1]outlining 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 Tirrur-Derrymore 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.

[1] Supporting Material - BNM Peatlands Climate Action Scheme (bnmpcas.ie)

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

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

- 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 2020.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, the Tirrur-Derrymore Bogs were surveyed in February of 2010. Additional ecological walk-over surveys and visits have taken place at the Tirrur-Derrymore Bogs between 2012-2022. 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-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was 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. Site visits were used to categorise any changes in habitat extent at the Tirrur-Derrymore Bogs in September 2021.

A detailed ecological survey report for the Tirrur-Derrymore Bogs is contained in Appendix II.

3. SITE DESCRIPTION

The Tirrur-Derrymore Bogs are located in east Co. Galway, just over 2km east of Mountbellew Bridge and 6km south-west of Ballygar. The surrounding landscape is a mosaic primarily consist of low-lying agricultural land (pasture) interspersed with other raised bogs. Some of these other raised bogs are largely intact, although most have been utilised for domestic turf cutting with some other areas planted with commercial conifer crops and, to the east, lies several other raised bogs that have also been managed by Bord na Móna for peat production within the Derryfadda Bog Group. The Shiven River, a tributary of the River Suck, flows through the centre of the sites. No railway link was ever established to these bogs. However, there is a corridor with a track that links Tirrur-Derrymore Bogs to Gowla Bog to the east. There are no Bord na Móna buildings or infrastructure located at this site.

The Tirrur-Derrymore Bogs comprise a cluster of six separate bog subsites (Castlegar, Cloonfaris, Island Bog West, Island Bog East, Eskermurry and Cloonabricka). In addition, the Bord na Móna property is connected to Gowla Bog and the larger Derryfadda complex by a narrow strip of land linking the sites. These linkages cross farmland and were acquired originally to provide access between the various bogs.

See Drawing number BNM-DR-24_10_01 titled **Tirrur Derrymore Bog: Bog Site Location**, included in the accompanying Mapbook[2] , which illustrates the location of the Tirrur-Derrymore Bogs in context to the surrounding area. Sub-site names are also indicated.

3.1 Status and Situation

3.1.1 Site history

The six bog sub-sites that comprise Tirrur-Derrymore Bogs are a mix of ownership patterns between Bord na Móna and private (domestic) turf-cutting, and some have been used as part of the SAC turf-cutting compensation scheme (see detailed in Table 3.1 below).Note Island Bog although split into East and West is generally referred to as a single bog.

Table 3.1 Tirrur Derrymore Sub-site, Respective Area, Notes, Restoration Potential on the Tirrur-Derrymore Bogs

Sub-site	Area (ha)	Note	Restoration potential
Castlegar	35.6		Low
Cloonfaris (Kilasolan)	119.5	Includes NPWS leased turf-cutting compensation plots	High
Island Bog (West)	64.6	Includes NPWS leased turf-cutting compensation plots	Moderate
Island Bog (East)	22.4	Includes NPWS leased turf-cutting compensation plots	Low
Eskermurry	55.0	Includes NPWS leased turf-cutting compensation plots	High

[2] Tirrur and Derrymore Bogs Rehab Plan GIS Map Book 2023

Sub-site	Area (ha)	Note	Restoration potential
Cloonabricka	137.2		High

3.1.2 Current land-use

The entire bog is not within the ownership of Bord na Móna and domestic turf cutting is having a significant impact on the bog, both within and outside the BnM boundary. Islands Bog, Kilasolan Bog and Cloonabricka Bog are being used as part of the SAC turf-cutting compensation scheme. Twenty-three turf-cutters from neighbouring SACs have been relocated to these sites by NPWS in consultation with BnM. These areas are under the management of the NPWS who lease the area from BnM to facilitate relocation of private turf cutters. These areas are constrained from the rehabilitation plan, along with in some instance's contiguous buffers which are required to mitigate hydrological impacts on the leased areas.

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 Tirrur-Derrymore Bog, jobs would have included those around activities to prepare the bog for fuel 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 Tirrur-Derrymore Bogs is limestone and calcareous shale bedrock[3]. The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'.

3.2.2 *Peat type and depths*

The only peat removal from Tirrur-Derrymore Bogs has occurred as part of the private, domestic turf cutting, with no peat being removed from the majority of the Bord na Móna-owned area. As a result, peat depths range substantially, from between 0m (at the edges of the site and where turf cutting is taking place) to 6-8 m (high bog). Acidic peat is present in the upper level across the surface of the high bog and this is indicated by the type of vegetation that colonises this area. This tends to be Heather-dominated, where it is dry, while wetter areas contain Bog Cotton and occasional patches of *Sphagnum*-rich vegetation.

3.3 Key Biodiversity Features of Interest

Overall, the Tirrur-Derrymore Bogs comprise drained raised bog (PB1) that has never been harvested for industrial peat extraction despite the high bog having been ditched in the early 1980's. The site supports the EU Habitats Directive Annex I habitat '*Degraded raised bogs still capable of natural regeneration*' (7120). Number codes refer to EU habitat classification system (European Commission, 2013). Hydrological analysis indicates that there is up to 33 ha of Annex I degraded raised bog habitat across the site with potential to develop as Annex I active raised bog (7110) in the future, when restoration measures are carried out.

The site currently supports a small area of the priority Annex I habitat type; '*active raised bog*' (7110) within The Islands subsection. More detailed descriptions are provided for the individual bog sub-sites below.

3.3.1 Current habitats

The most common habitats present include (Codes refer to Heritage Council habitat classification, Fossitt (2000)):

- Raised bog (PB1) including Annex I 'degraded raised bog', 'active raised bog', and supporting high bog habitat.
- Cutover Bog (PB4)
- Birch woodland (WN7) (Non-Annex) (on high bog and developed on cutover bog at edges)
- Oak Ash Hazel Woodland (WN2) towards the centre of the Eskermurry Bog
- Oak-Birch-Holly Woodland (WN1) located in the north east section of the Island Bog.
- Dry Heath (HH1) (on some mounds within high bog)
- Scrub (WS1) on old cutover bog
- Wet grassland (GS4) (reclaimed cutover bog and along access routes)
- Improved grassland (GA1) (access routes)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)
- Drainage ditches (FW4)
- Reed and large sedge swamps (FS1) along one section of the River Shiven
- Poor fen and flush (PF2) located on the Castlegar Bog

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

- Depositing Rivers (FW2)
- Conifer Plantation (WD4) located along the margins of the site with some sections falling within the BnM boundary

3.3.1.1 Castlegar Bog

Castlegar Bog is the most westerly bog in the Tirrur-Derrymore group of bogs. The edges of this bog mainly comprise of old domestic cutover bog while some recent signs of turf cutting are also evident, especially along the east, west and southern boundaries. The remaining areas are predominately Remnant Raised Bog (PB1) with a relatively long, narrow mineral island towards the centre of the site contained scrub (WS1) in two sections with an area of poor fen (PF2) between these sections.

3.3.1.2 Cloonfaris (Kilasolan) Bog

A bog track dissects the bog into two sections, east and west. Tall leggy Heather dominates the vegetation of the bog. The western section is primarily degraded raised bog with a section of old cutover bog to the north of the site. A small section of the site adjoins the River Shiven and it also contains a small area of wet grassland (GS4) along the river.
The eastern section is very similar to the western half in that it is primarily composed of degraded raised bog. A relatively large section of both old and new cutover bog is located along its eastern boundary, while an area of wet grassland (GS4) and a section of the River Shiven are located to the north.

3.3.1.3 Island Bogs

A bog road dissects these two sections of bog into east and west sections. These bogs were drained in the early 1980's but since then some of the drains have been infilling and are ceasing to have a drainage function. There has been little to no regeneration of the high bog.
The eastern section is mainly composed of high bog with cutover bog along the edges in most places. Active turf cutting was evident along the southern and eastern boundaries in particular with older sections of cutover bog to the north. Some of the older sections of cutover bog had begun to develop *Sphagnum* cover and may be capable of regeneration in the future. Occasional Birch and Pine trees were scattered around the high bog. A section of Oak-Birch-Holly Woodland (WN1) is located in the north east of the site. The western section of this bog is bounded on all sides by cutover bog both old and new cutover. A small section of wet grassland and the River Shiven are located within this site. The raised bog section itself, although drained has begun to regenerate to a small extent with many of the drains becoming in-filled with *Sphagnum*. This is occurring in the wettest section that is located to the north of the site.

3.3.1.4 Eskermurry Bog

Eskermurry bog is located along the eastern side of the River Shiven and is contained within two main sections, a northern and southern section. The bog is bounded to the east by a public road and to the northern and southern boundaries by forestry and some wet grassland. The majority of the site is high bog with the western side comprising a large area of cutover bog with Wet Grassland and Reed and Tall Sedge Swamps FS1 along the River Shiven. Towards the centre of the site, where the north and south sections meet, is an area where an access route crosses the site. This is the most diverse section of the site as a variety of habitats are found here including Cutover Bog (PB4), Oak Ash Hazel Woodland (WN2) and Bog Woodland (WN7). The Oak Ash Hazel Woodland is located on a mineral ridge and comprises *Quercus robur, Corylus avellana, Ilex aquifolium, Fraxinus excelsior, Betula*

pubescens, Crataegus monogyna and *Taxus baccata*. The Bog Woodland (WN7) was mostly made up of *Betula pubescens*.

Another mineral ridge was located towards the centre of the northern section of the site. Here a Bog Woodland (WN7) was located and was made up *of Quercus robur, Corylus avellana, Ilex aquifolium, Fraxinus excelsior, Betula pubescens, Crataegus monogyna* and *Picea sitchensis*. The ground flora consisted of *Vaccinium myrtillus, Hedera helix* and *Rubus fruticosus*.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the raised bog, these areas have not been individually mapped on the habitat map as they are relatively small within the larger site.

Fallow deer were widespread on these bogs.

3.3.1.5 Cloonabricka Bog

Cloonabricka Bog is the largest section of bog in Tirrur-Derrymore and is almost U-shaped as it curves around a section of farmland that is situated on a mineral island to the west of the site. The bog is bounded on its west and southern boundaries by public roads and to the east and north by both farmland and conifer plantations. Almost all of the bog boundary has been used to extract turf in the past and is now classed as cutover bog. There is a particularly large area to the west with active turf cutting impinging on the high bog at a gradual pace. The high bog itself has been drained and is quite dry even though some of the drains are beginning to become infilled and lose their drainage functionality. The high bog is dominated by *Calluna vulgaris* with *Cladonia*, *Rhynchospora alba*, *Eriophorum angustifolium* and *Sphagnum spp*. with occasional trees such as *Betula pubescens*, *Salix cinerea* and *Pinus contorta* scattered throughout the bog. *Huperzia selago* was also found on the high bog (photo taken). The high bog appears to have been burned within the past ten years.

A mineral ridge is located close to the centre of the site and comprised a small area of Bog Woodland (WN7). The woodland was dominated by *Betula pubescens* with *Salix cinerea*, *Sorbus aucuparia* and *Taxus baccata*. The latter consisting of the fastigiated variety commonly found in graveyards. The ground flora consisted of *Pteridium aquilinum*, *Vaccinium myrtillus*, *Hedera helix* and *Rubus fruticosus*. Deer activity was evident in this section to the point that no regeneration of tree species was taking place.

Sections of forestry (Coillte owned) border the northern section of the bog and a drainage ditch has been recently cleaned out between them running in a north – south direction through the entire northern section of the bog.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the high bog.

 *View of Scrub habitat on mineral ridge in centre of Castlegar Bog (Feb 2010)*	 *View of degraded raised bog habitats at Cloonfaris Bog (March 2018)*
 *View of degraded raised bog habitats at Island Bog (West) showing surrounding cutover habitats (March 2018)*	

Table 1: Photos of Habitats at Tirrur-Derrymore Bogs

See Drawing number BNM-DR-24-10-17 titled **Tirrur Derrymore Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at these Bogs.

3.3.2 Species of conservation interest

Otter spraints have been recorded along the banks of the Shiven River. The use of the high bog area by birds such as Snipe, Grouse and Woodcock has been noted. A Badger Sett located within the woodland in the north east section of the Islands Bog. Further points of interest include:

- Red Grouse droppings have been found on Cloonabricka Bog
- Numerous signs of Badger around the site
- Otter spraint on the banks of the River Shiven

3.3.3 Invasive species

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 is expected to be limited, these are, where necessary, to be treated in line with best practice during PCAS activities.

3.4 Statutory Nature Conservation Designations

The Tirrur-Derrymore Bogs have no overlapping designated sites.

Carrownagappul Bog SAC (Site Code: 001242) lies approximately 2.5 km to the north-west of the Tirrur-Derrymore Bogs. The site is a Special Area of Conservation (SAC) under the E.U. Habitats Directive, and its listed qualifying interests are Active raised bogs* (7110), Degraded raised bogs still capable of natural regeneration (7120) and Depressions on peat substrates of the *Rhynchosporion* (7150). Carrownagappul Bog is also designated as a pNHA.

Curraghlehanagh Bog SAC (Site Code: 002350) lies approximately 4.7 km to the north-west of the Tirrur-Derrymore Bogs. Its listed qualifying interests are Active raised bogs* (7110), Degraded raised bogs still capable of natural regeneration (7120) and Depressions on peat substrates of the *Rhynchosporion* (7150).

The River Suck Callows SPA (Site Code 004097) is located approximately 5 km to the east of the Tirrur-Derrymore Bogs. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Whooper Swan, Greenland Whitefronted Goose, Wigeon, Golden Plover and Lapwing.

Castle Ffrench East Bog (NHA) (Site Code 001244) and Castle Ffrench West Bog (NHA) (Site Code 000280) are located approximately 2 km to the south east of the Tirrur-Derrymore Bogs. Castle Ffrench East Bog NHA is a site of considerable conservation significance comprising a relatively intact raised bog, a rare habitat in the EU and one that is becoming increasingly scarce and under threat in Ireland. This site supports a range of raised bog habitats including pool systems, flushes, swallow holes and is showing signs of active regeneration.

Castle Ffrench West Bog NHA is also a site of conservation significance. The site supports raised bog, including a pool system and a wooded flush. This bog although small and damaged by extensive cutover and burning, is unusual in having such a relatively large area of wet quaking habitat. The presence of the wooded flush adds to the conservation value of the site.

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 the Tirrur-Derrymore Bogs (i.e. within 3km). The closest Ramsar Sites to the Tirrur-Derrymore Bogs is Mongan bog (Ramsar site no 416).

3.5 Hydrology and Hydrogeology

The Tirrur-Derrymore Bogs form part of the Upper Shannon Catchment (Catchment ID : 26D) as defined by the EPA under the Water Framework Directive (WFD) and is situated within the Castlegar_SC_010 Sub-Catchment. The Shiven River, a tributary of the River Suck, flows through the centre of the overall site. The Tirrur-Derrymore Bogs have gravity-based drainage systems.

GSI data indicates that Visean Limestones (undifferentiated) underlie the Tirrur-Derrymore Bogs. This unit is classified as a Regionally Important Aquifer - Karstified (conduit). A south-west to north-east trending fault line is located to the north west of the bogs. No data exists concerning depth to bedrock, whilst no mapped bedrock outcrop could be identified in close proximity to the bogs. Mapped karst features within the surrounding area show two features to the west and one feature to south east of the bogs (St. Brigid's well, turlough and spring).

Quaternary Sediment maps show Tirrur-Derrymore underlain by peat, yet surrounded by inorganic deposits, including Till derived from limestones to the north, south, east and west and pockets in between the bogs. GSI Groundwater mapping indicates that there is generally low vulnerability in the surrounding area with some higher vulnerability areas to the south-east. While Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to surface-water and watercourses

Tirrur/Derrymore bog has three treated surface water outlets from currently active turf cutting sections of Tirrur-Derrymore bog that have been leased to NPWS to relocate local turf cutters from nearby SACs. Other than these, peat extraction never commenced at the balance of these bogs catchments, which discharge to the River Shiven (IE_SH_26S030200 SHIVEN (SOUTH)_030 and the IE_SH_26S030300 SHIVEN (SOUTH)_040), which flows though the bog complex.

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-24-10-02 titled **Tirrur-Derrymore Bog: Structures and Sampling**, along with Drawing number BNM-DR-24-10-WQ01 titled **Tirrur-Derrymore Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Tirrur-Derrymore.

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 Shiven River, in the second cycle of the river basin management plan is indicated as remaining so in the third cycle, currently under preparation.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 4.27mg/l and COD 100mg/l.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. These bogs are already largely vegetated. 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 NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at the Tirrur-Derrymore Bogs has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water.

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 on a monthly basis.

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

As Tirrur/Derrymore bog, excluding the three sections leased to NPWS under the turf cutting relocating scheme, which are not part of this plan, did not have any active peat extraction, there is no silt control infrastructure. However, several sampling outlets are being included in the monitoring programme to try and capture the main bog catchments to be rehabilitated.

This new sampling programme just commenced this June 2023 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

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

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

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

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.

3.7 Fugitive Emissions to air

The bog was never utilised for industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

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 (taking in 0.1 to 1.1 t of carbon as CO2-C /ha/yr) into a cutaway ecosystem which is a 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 longterm 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. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

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

out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO_2 and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

It is expected that Tirrur-Derrymore Bog can become a reduced carbon source/part carbon sink following rehabilitation. The potential of any bog to develop as a reduced carbon source/carbon sink in the longer-term depends on land-use, the success of the rehabilitation measures, the extent of optimal re-wetting and hydrological conditions, 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. Tirrur-Derrymore has potential for **raised bog restoration** and is expected to have the same trajectory as Moyarwood Bog, developing **active raised bog** and becoming a **carbon sink in part** soon after drains are blocked.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The majority of the site comprises raised bog and is deemed to be of international importance due to the presence of active raised bog (7110), a priority Annex I habitat of the EU Habitats Directive. The site also supports the nationally important habitat 'degraded raised bog still capable of natural regeneration (7120)'. A number of semi-natural habitats including bog woodland and cutover bog occur on the peripheral margins of the high bog mass and are deemed to be of high local importance. Other habitats of similar value include Oak-Birch-Holly Woodland (WN1) and Oak-Ash-Hazel Woodland (WN2). Turf cutting is active at some locations along the high bog and comprises areas of bare peat deemed to be of low local importance.

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 Tirrur-Derrymore Bog. The draft plans and final versions of the rehab plans will be available on the Bord an Mona website (www.pcasinfo.ie).

There has been ongoing consultation about rehabilitation and other general issues over the years about Tirrur-Derrymore 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).
- Consultation with NPWS regarding re-location of turfcutters from adjacent SACs.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins the Tirrur-Derrymore Bogs 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 the Tirrur-Derrymore Bogs.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here

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 the Tirrur-Derrymore Bogs, contact details and the PCAS website address was delivered to each house within a 1Km radius of the bogs.

4.2 Issues raised by Consultees

To date, a number of issues have been raised by consultees during the consultation process for both the current and previous drafts of the rehabilitation plan for Tirrur-Derrymore Bog – these are summarised below.

4.2.1 Assessments of rehabilitation

During the initial commencement of PCAS, a number of consultees including: the Irish Farmers Association (IFA), the Irish Creamery Milk Suppliers Association (ICMSA) and Trinity College Dublin have raised concerns regarding the duration and scope of consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

Queries on pre-rehabilitation assessments were raised by NPWS and the National Museum of Ireland relating to the finalisation of several bog rehab plans in 2021 in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.2 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by the Irish Peatland Conservation Council (IPCC) and Butterfly Conservation Ireland (BCI) relating to the finalisation of several bog rehab plans in 2021 and 2022 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 Monitoring

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised by the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Uisce Éireann (formerly Irish Water) reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

4.2.4 Flooding and drainage

The Irish Farmers Association (IFA), The Department of Agriculture Food and the Marine, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehabilitation plans in 2021 and 2022, arising from the proposed re-wetting in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices. The Office of Public Works (OPW) raised concerns and queried potential for impacts on Arterial Drainage Maintenance and future drainage maintenance on the OPW Boyne scheme channels, namely C1/32/7/3 and C1/32/23.

4.2.5 Future management

In submissions made on earlier PCAS plans the Irish Farmers Association (IFA) expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

4.2.6 Other issues

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. Consultation has been carried out with NPWS throughout the provision of this rehabilitation plan.

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021, 2022 and in 2023 and also applicable for Tirrur-Derrymore Bog included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit. The National Museum of Ireland also requested that due diligence be taken during works to protect any archaeologically significant findings or areas. They also reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken.

For a complete summary of submissions received and replies, see Appendix XI.

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Consultation

BnM are carrying out consultation as part of the process of developing the rehabilitation plan for Tirrur-Derrymore Bog. This is ongoing with a dedicated Community Liaison Officer communicating with affected and interested parties. A website has been developed to make information available. This will be continually updated. Some PCAS Bogs have been used as demonstration sites so that interested stakeholders can come to visit and observe the measures on the ground.

4.3.2 Assessments of rehabilitation

Appropriate Assessment screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Tirrur-Derrymore Bog. If required, a Natura Impact Statement shall be completed and submitted to the Minister in accordance with 42(9) and 42(10) of the Habitats Regulation, noting that Bord na Móna is prescribed as a 'public authority' under this legislation. In relation to the SEA Directive and EIAR Directive, this has been considered and the legal advice to date is that the scheme does not come under these Directives.

An Archaeological Impact Assessment (AIA) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in-situ and BNM are taking steps to identify and avoid all known archaeology. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing stray finds that may arise during rehabilitation works.

Implementation of rehabilitation measures including machine access across the bog will be carried out in conjunction with BnM Ecology Department. Seasonal and other restrictions will be put in place to mitigate against any impacts on biodiversity.

4.3.3 Restoration scope

As part of PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After-use of the bog is outside the scope of PCAS. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future.

As part of PCAS, one of the objectives for the rehabilitation of bogs is to promote the development of a naturally functioning peatland system. BnM would envisage benefits to biodiversity on these bogs as a result of rehabilitation. The most intensive peatland re-wetting will be applied to bare peat areas. Where there are diverse habitats already present, less intensive, targeted drain-blocking will be applied. While the overall objective is to

make the bog wetter and increase the footprint of wet peatland habitats, there will still be a mosaic of habitats present, including a transition from wet to drier areas of peat, in areas that cannot be re-wetted.

The local environmental conditions of Tirrur-Derrymore Bog means that deep peat measures along with some additional works measures are the most suitable rehabilitation approach for this site to optimise benefits for climate. The bog was completely ditched and drained in the 1980's, but the vegetated surface was never removed and no industrial peat harvesting ever took place. Tirrur-Derrymore Bog is predominantly a deep peat bog which was ditched but never brought into peat production. The only peat removal from Tirrur-Derrymore Bogs has occurred as part of the private, domestic turf cutting, with no peat being removed from the majority of the Bord na Móna-owned area. The absence of production has meant that the site has retained many of its natural raised bog features, although there has also been significant degradation and the high bog is relatively dry with relatively deep field drains. The majority of area proposed for rehabilitation is expected to develop as deep peat habitat. A key expected habitat is raised bog habitat on deeper residual peat. Degraded raised bog within the site will improve in overall habitat condition. Tirrur-Derrymore Bog has a gravity based drainage system.

4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. It is proposed to monitor the improvement of some biodiversity ecosystem services. The appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

4.3.5 Flooding, drainage or other impacts on adjacent land.

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided, and alterations made to the rehabilitation plan. In general, drains around the margins of the bog will not be blocked.

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts. No issues were identified. There is no potential for direct impacts on arterial drainage downstream.

The rehabilitation measures proposed at Tirrur-Derrymore Bog will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. It is intended that these measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by Bord na Móna. Based on evidence from other bogs, rehabilitation measures will reduce the run-off from the bog by returning the peatlands towards its natural water retention function.

4.3.6 Amenity

Creating amenity developments such as walking tracks is not part of the direct scope of PCAS. However, PCAS will enable and support any future amenity development.

4.3.7 Water quality

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.

4.3.8 Future management

Bord na Móna will continue to manage their land bank into the future. As peat production has now ceased on Bord na Móna lands and rehabilitation measures will be carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the Bord na Móna internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by Bord na Móna.

Bord na Móna considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, PCAS activities, should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same.

4.3.9 Other issues

Other issues, including after-use and management issues outside the boundary of Tirrur-Derrymore Bog, are acknowledged but are specifically outside the scope of this rehabilitation plan.

Security: It is the intention of Bord na Móna to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

4.3.10 Concluding statement

- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Marginal drains will not be blocked to avoid impacts on adjacent lands, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- Turbary rights, if present, will remain unaffected.
- Bord na Móna intend to continue management of this site into the future and issues such as security and trespass will be addressed on an ongoing basis in association with other stakeholders.
- Bord na Móna intends to maintain a “No Shooting” policy at this site.

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in including drain-blocking to encourage **raised bog restoration** and the development of further **active raised bog** habitat.
- Integrating rehabilitation measures with current land-use (e.g. turf-cutting).
- 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:

- Current land-uses. Part of the site is leased to NPWS for turf-cutting. This supports conservation objectives at Carrownagappul Bog SAC (About Carrownagappul Bog - The Living Bog (raisedbogs.ie)) and the National Raised Bog Special Area of Conservation Management Plan 2017-2022. Turf-cutters were relocated from protected bog sites like Carrownagappul to Islands Bog, Eskermurray Bog and Clonfaris Bog. It is not proposed to carry out any rehabilitation actions to change or negatively affect this land-use. It is expected that turf-cutting will continue in these areas for the foreseeable future.
- It will take some time for stable naturally functioning habitats to fully develop across the entirety of the Tirrur-Derrymore Bogs. 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.
- Tirrur-Derrymore Bog has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). However, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats and therefore potentially active raised bog (about 33 ha based on hydrological modelling) in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the overall bog sub-sections.

- Rehabilitating former industrial peat production bog 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 contributary sources of impacts (private peat extraction and Bord na Móna).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Derryfadda Bog was partially rehabilitated in 2022 and Castlegar Bog was rehabilitated in 2021). There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the Shannon from rehabilitation to more than one bog in the same catchment.

6. SCOPE OF REHABILITATION

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

- The area of Tirrur-Derrymore bogs.
- EPA IPC Licence - Ref. P0502-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Tirrur-Derrymore bogs 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 Tirrur-Derrymore bogs, 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 Tirrur-Derrymore bogs mean that deep peat measures are the most suitable rehabilitation approach for this site. Tirrur-Derrymore bogs have 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 Tirrur-Derrymore Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible,** and integrating rehabilitation with the existing land-uses. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of active raised bog.**
- Rehabilitation of Tirrur-Derrymore bogs will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- Current land-uses. It is not proposed to rehabilitate the area leased to NPWS and used by private turf-cutters.

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 Tirrur-Derrymore, 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 Tirrur-Derrymore Bog, some areas were drained but never harvested. The variation in drainage regime across these land use types will create unique hydrological conditions that create differing rehabilitation requirements.
- **Current land-use.** Several sections of Tirrur-Derrymore Bog are currently leased to NPWS and harvested by private turf cutters, relocated to this bog from nearby SACs. These areas are constrained from the rehabilitation and no measures will be carried out that will impact on these areas. These areas are constrained from the rehabilitation plan, along with in some instance's contiguous buffers which are required to mitigate hydrological impacts on the leased areas.

- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Turbary.** There are a number of areas along the boundaries of the Tirrur-Derrymore bogs being used for turf-cutting (turbary).
- **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 unknown archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted.
- **Public Rights of Way**. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and **a monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards stabilisation and raised bog restoration. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Tirrur-Derrymore bogs.
- 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
- 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 run off of suspended solids 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 yrs., post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

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

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

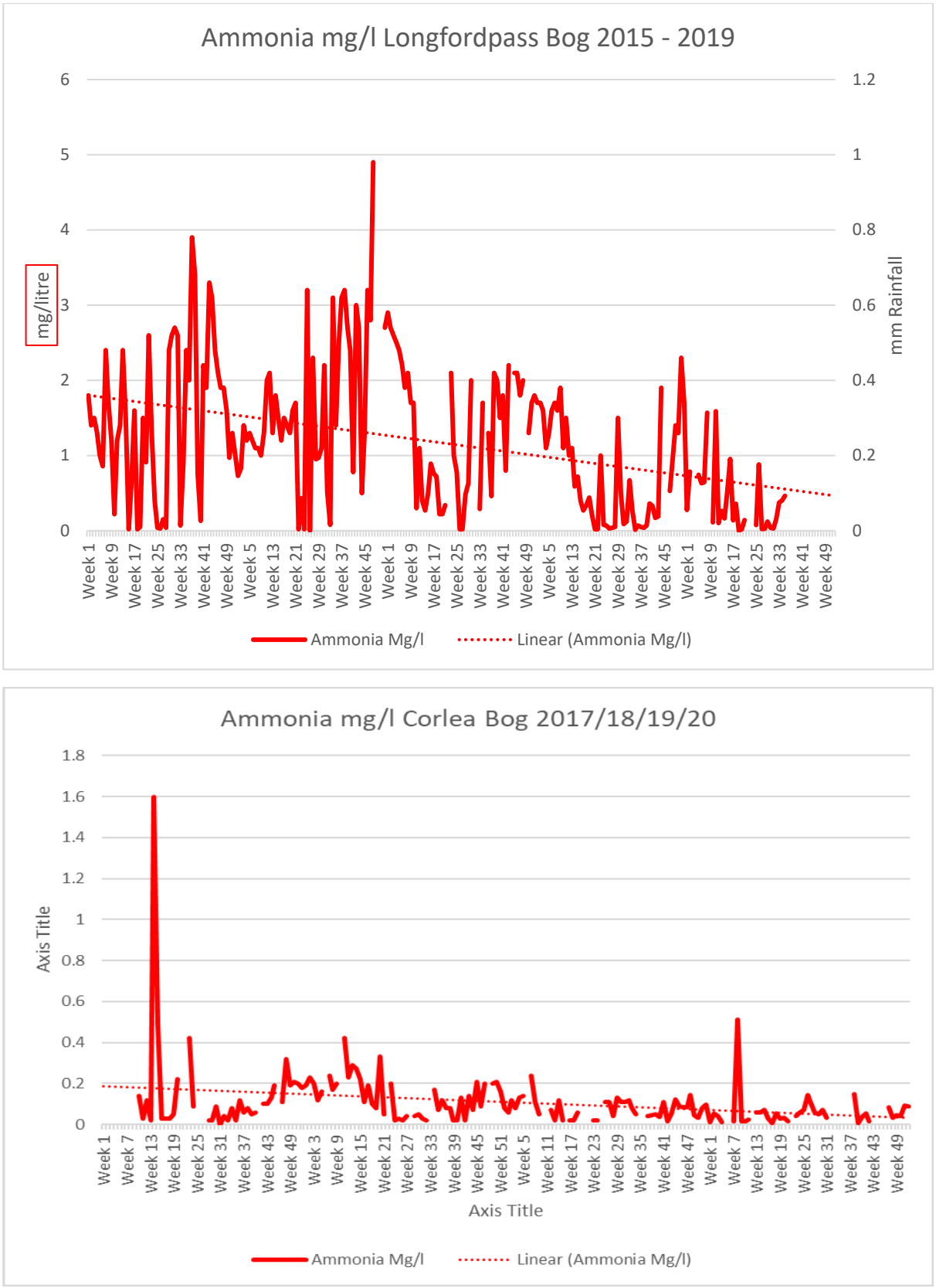

Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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/part carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards raised bog restoration and the development of active raised bog, supporting raised bog and embryonic *Sphagnum*-rich peat-forming habitats, where possible. These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Tirrur-Derrymore Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected 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.	2023-2025
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2023-2025
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.	2022-2025
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	2022-2025

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 when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence. It is expected that additional costs of enhanced rehabilitation will be supported by Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. Bord na Móna have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of Bord na Móna experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, Bord na Móna will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.**
- 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.

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-24-10-22 titled **Tirrur Derrymore Bog: Aerial Imagery 2020**

BNM-DR-24-10-04 titled **Tirrur Derrymore Bog: PeatDepths**

BNM-DR-24-10-03 titled **Tirrur Derrymore Bog: LiDAR Map**

BNM-DR-24-10-09 titled **Tirrur Derrymore Bog: 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-24-10-05 **Tirrur Derrymore Bog: Rehabilitation Measures** in the accompanying Mapbook (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for Tirrur-Derrymore bogs will include (see Table 8.1):

- Re-wetting some deep peat areas of the bog through field drain blocking using an excavator to create peat barriers (up to seven every 100 m along each field drain);
- Re-alignment of any piped drainage;
- Regular drain blocking (3/100) on cutover bog, along with the management of outfalls and management of water levels;
- Re-wetting the deep peat in the cutover areas and some shallow peat areas of the bog using contour bunding and drain blocking. This enhanced measure seeks to create large flat areas of shallow (< 10 cm) water conditions on former cutover bog;
- As Tirrur/Derrymore bog, excluding the three sections leased to NPWS under the turf cutting relocating scheme, which are not part of this plan, did not have any active peat extraction, there is no silt control infrastructure. Silt control measures may be added if none exist currently. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Table 8-1 Types of and areas for enhanced rehabilitation measures at Tirrur-Derrymore bogs.

Type		Enhanced Rehabilitation Measure	Extent* (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m), modifying outfalls and managing overflows	215.86
Deep Peat	DPT4c	Contour bunding and drain blocking	22.56
Marginal land	MLT1	No work required	16.62
Additional Work	AW1	Targeted Drain Blocking	4.63
Additional Work	AW2	Targeted Drain Blocking	2.34
Other	Constraint	Other Constraints	184.31
Total			**446.32**

**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 Tirrur-Derrymore bogs. 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. There is some known turbary on this bog.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) 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 implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include 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.
- Silt ponds (if added) will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme.

8.3 Long-term (>3 years)

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

8.4 Timeframe

- 2022-2023: Short-term planning actions.
- 2022: Short-term practical actions.
- 2022-2025: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2025: Decommission silt-ponds, if necessary.

8.5 Budget and costing

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

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

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

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been be 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, the condition of the silt ponds (if added), assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, 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 silt ponds (if added) 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 License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

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

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

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TIRRUR-DERRYMORE DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Blackwater (Derryfadda subgroup) bog group (Ref. P0502-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Tirrur- Derrymore Bog is located in Co. Galway.

This addendum outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Tirrur- Derrymore.

Appropriate Assessment Reporting Findings

An Appropriate Assessment Screening Report[4] was commissioned by Bord na Móna to inform whether the proposed PCAS activities at Tirrur- Derrymore Bog had the potential to result in Likely Significant Effects on European Sites.

The concluding statement of this report reads as follows:

> *'In accordance with Article 6(3) of the Habitats Directive, Regulations 42 of the Habitats Regulations, the relevant case law, established best practice and the Precautionary Principle; this AA Screening Report has examined the details of the Project and the relevant European sites and has concluded, on the basis of objective information, that the Project, either individually or in combination with other plans or projects, is not likely to give rise to impacts that would constitute likely significant effects in view of the Conservation Objectives of those sites.*
>
> *In light of this conclusion, it is the considered opinion of ROD, as the author of this AA Screening Report, that the competent authority, Bord na Móna, may find in completing its AA Screening in respect of the Tirrur-Derrymore Bogs Decommissioning and Rehabilitation Plan, that the Project, either individually or in combination with other plans and projects, is not likely to have a significant effect on any European site, in view of best scientific knowledge and the Conservation Objectives of the sites concerned. Therefore, it is the recommendation of the author of this AA Screening Report that the competent authority may determine that AA is not required in respect of the Project.'*

Therefore following screening, Appropriate Assessment is not required for the project as it is not directly connected with or necessary to the management of any European Site(s) and as it can be concluded, on the basis of objective information, that the project, individually or in combination with other plans or projects is not likely to have a significant effect on any European Site(s).

[4] Roughan & O'Donovan Consulting Engineers (2023). Article 6 (3) Appropriate Assessment Screening Report. Tirrur-Derrymore Bog, Co. Galway, Decommissioning and Rehabilitation Plan 2023

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 Tirrur-Derrymore bogs.
- EPA IPC Licence - Ref. P0502-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Tirrur-Derrymore bogs are part of the Blackwater (Derryfadda subgroup) bog group.
- The current condition of Tirrur-Derrymore bogs.
- 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 Tirrur-Derrymore bogs will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Tirrur-Derrymore bogs is environmental stabilisation of the site via wetland creation. 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 development of vegetation cover via natural colonisation and reducing the area of bare exposed peat.

- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- 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 drier sections of the former industrial production area using a dozer to create 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.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Timeframe:

- 2023. 1st phase of rehabilitation. Field drain blocking.
- 2024-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2024-2026. Decommission silt-ponds, if necessary.

Table AP-1. Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep Peat	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	215.86
Additional Works	AW1/AW2	Targeted drain blocking	6.97
Marginal land	MLT1	No work required	206.87

Type	Code	Description	Area (Ha)
Constraint	Constraint	Other Constraints	184.31
Total			**446.32**

See Drawing number BNM-DR-24-10-20 titled **Tirrur Derrymore Bog: 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, the condition of the silt-ponds, assess the condition of the rehabilitation work, asses 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.
- This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment and planning procedures.

Validation and IPC Licence surrender

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

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

APPENDIX II. BOG GROUP CONTEXT

The 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 bare milled peat production areas to 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 bog had been rehabilitated in previous years.

A number (6) of bogs were initially drained but have never been used for industrial peat production (three former development bogs (Kellysgrove, Tirrur-Derrymore and Newtown-Loughgore), Clonboley, 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 Clonboley bog cluster as having high ecological value within the recent assessment of raised bog SACs, NHAs and non-designated sites (NPWS 2014[5]).

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 License 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	2109	Finalised 2018

[5] 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	Finalised 2018
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
Tirrur-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	Updated 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	Finalised 2018
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 2nd phase of rehabilitation planned for 2023	N/A	To be finalised 2023
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	Finalised 2014
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	Finalised 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
Ballaghhurt	597	Cutaway Bog Industrial peat production commenced at Ballaghhurt Bog in 1981. The majority of the site is cutaway with some residual deeper peat	Ballaghhurt 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	To be 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. Coilte have developed a portion of the bog for forestry. Rehabilitation has been completed	2020	Finalised 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
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
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	To be 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

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
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
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
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
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
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	Draft 2017

See Drawing number BNM-DR-24-10-24 titled Blackwater (Derryfadda subgroup) Bog Group, included in the accompanying Mapbook which illustrates the location of Tirrur-Derrymore bogs and the Blackwater (Derryfadda subgroup) Bog Group in context to the surrounding area.

APPENDIX III. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	**Tirrur-Derrymore**	**Area (ha):**	547 ha
Works Name:	Derryfadda	**County:**	Galway
Recorder(s):	DF	**Survey Date(s):**	16/17/18 Feb 2010
Photos:	Photos taken – see L:\AI_Data\Boora\Ecology Team\Photos\ Tirrur-Derrymore		

Peat production programme and outlook

Cloonabricka, Eskermurry, Island bogs and Cloonfaris Bogs have all had drains installed (ditched) during the period 1981-84, so that commercial peat harvesting could take place. To date however no commercial peat harvesting has taken place. Large areas of the aforementioned bogs have been heavily subjected to domestic sod peat cutting over a long period of time.

Castlegar Bog has not been drained by Bord na Móna but drainage has been installed in the past. These drains are not as intensive as the drains on the other bogs in the Tirrur-Derrymore group of bogs. Castlegar Bog is also heavily subjected to domestic turf cutting.

Bord na Móna has not had any part in any turf cutting on any of the aforementioned bogs (pers. comm Paul Quinn).

Key biodiversity features of interest

- Otter spraints along the banks of the Shiven River.
- The use of the high bog area by birds such as Snipe, Grouse and Woodcock.
- A Badger Sett located within the woodland in the north east section of the Islands Bog.

Habitats present (in order of dominance)

The most common habitats present on the industrial cutaway include (Codes refer to Heritage Council habitat classification, Fossitt 2000):

- Raised bog (PB1) including ‘degraded raised bog’ and ‘active raised bog’
- Cutover Bog (PB4)
- Bog woodland (WN7) (on high bog and developed on cutover bog at edges) (only the area of bog woodland on the high bog qualifies as the Annex I habitat - Bog woodland (91D0))
- Oak Ash Hazel Woodland (WN2) towards the centre of the Eskermurry Bog
- Oak-Birch-Holly Woodland (WN1) located in the north east section of the Island Bog.
- Dry Heath (HH1) (on some mounds within high bog)

- Scrub (WS1) on old cutover bog
- Wet grassland (GS4) (reclaimed cutover bog and along access routes)
- Improved grassland (GA1) (access routes)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces along access routes)
- Drainage ditches (FW4)
- Reed and large sedge swamps (FS1) along one section of the River Shiven
- Poor fen and flush (PF2) located on the Castlegar Bog
- Depositing Rivers (FW2)
- Conifer Plantation (WD4) located along the margins of the site with some sections falling within the BnM boundary

Description of site

Tirrur-Derrymore comprises a series of individual bogs that are located approximately 5km east of the town of Mountbellew in East Galway along the Mountbellew – Ballyforan road. The River Shiven flows through the site and breaks the cluster into three areas. These bogs are have all been subjected to domestic turf cutting and this practice continues to the present day with evidence of active turf cutting taking place on all bogs. Most of the bogs have had drainage systems installed (ditching) with the objective of commencing industrial peat harvesting. To date Bord na Móna has not carried out ant industrial peat harvesting on these bogs. The Tirrur-Derrymore property is connected to Gowla Bog and the larger Derryfadda complex by a narrow strip of land linking the sites that crosses farmland. This strip was acquired originally to provide access between the various bogs.

The various bogs are labelled as sub-sites according to the main town-lands.

Cloonabricka Bog is the largest section of bog in Tirrur-Derrymore and is almost U-shaped as it curves around a section of farmland that is situated on a mineral island to the west of the site. The bog is bounded on its west and southern boundaries by public roads and to the east and north by both farmland and conifer plantations. Almost all of the bog boundary has been used to extract turf in the past and is now classed as cutover bog. There is a particularly large area to the west with active turf cutting impinging on the high bog at a gradual pace. The high bog itself has been drained and is quite dry even though some of the drains are beginning to become infilled and lose their drainage functionality. The high bog is dominated by *Calluna vulgaris* with *Cladonia*, *Rhynchospora alba*, *Eriophorum angustifolium* and *Sphagnum* sp. with occasional trees such as *Betula pubescens*, *Salix cinerea* and *Pinus contorta* scattered throughout the bog. *Huperzia selago* was also found on the high bog (photo taken). The high bog appears to have been burned within the past ten years. Grouse droppings were observed on the high bog (probably at most a pair is present).

A mineral ridge is located close to the centre of the site and comprised a small area of Bog Woodland (WN7). The woodland was dominated by *Betula pubescens* with *Salix cinerea*, *Sorbus aucuparia* and *Taxus baccata*. The latter consisting of the fastigiated variety commonly found in graveyards. The ground flora consisted of *Pteridium aquilinum, Vaccinium myrtillus*, *Hedera helix* and *Rubus fruticosus*. Deer activity was evident in this section to the point that no regeneration of tree species was taking place.

Sections of forestry (Coillte owned) border the northern section of the bog and a drainage ditch has been recently cleaned out between them running in a north – south direction through the entire northern section of the bog.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the high bog.

Eskermurry bog is located along the eastern side of the River Shiven and is contained within two main sections, a northern and southern section. The bog is bounded to the east by a public road and to the northern and southern boundaries by forestry and some wet grassland. The majority of the site is high bog with the western side comprising a large area of cutover bog with Wet Grassland and Reed and Tall Sedge Swamps FS1 along the River Shiven. Towards the centre of the site, where the north and south sections meet, is an area where an access route crosses the site. This is the most diverse section of the site as a variety of habitats are found here including Cutover Bog (PB4), Oak Ash Hazel Woodland (WN2) and Bog Woodland (WN7). The Oak Ash Hazel Woodland is located on a mineral ridge and comprises *Quercus robur*, *Corylus avellana*, *Ilex aquifolium*, *Fraxinus excelsior*, *Betula pubescens*, *Crataegus monogyna* and *Taxus baccata*. The Bog Woodland (WN7) was mostly made up of *Betula pubescens*.

Another mineral ridge was located towards the centre of the northern section of the site. Here a Bog Woodland (WN7) was located and was made up of *Quercus robur*, *Corylus avellana*, *Ilex aquifolium*, *Fraxinus excelsior*, *Betula pubescens*, *Crataegus monogyna* and *Picea sitchensis.* The ground flora consisted of *Vaccinium myrtillus, Hedera helix* and *Rubus fruticosus.* Two woodcock were observed close to this woodland.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the raised bog, these areas have not been individually mapped on the habitat map as they are relatively small within the larger site.

Fallow deer were widespread on these bogs.

Island bogs comprise two sections of bog that are isolated from the rest of the bogs by the River Shiven. A bog road dissects these two sections of bog into east and west sections. These bogs were drained in the early 1980's but since then some of the drains have been infilling and are ceasing to have a drainage function. There was little to no regeneration of the high bog.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the raised bog, these areas have not been individually mapped on the habitat map (again, as they are relatively small within the larger bog area).

The eastern section is mainly composed of high bog with cutover bog along the edges in most places. Active turf cutting was evident along the southern and eastern boundaries in particular with older sections of cutover bog to the north. Some of the older sections of cutover bog had begun to develop *Sphagnum* cover and may be capable of regeneration in the future. Occasional Birch and Pine trees were scattered around the high bog.

A section of Oak-Birch-Holly Woodland (WN1) is located in the north east of the site. This woodland was made up of *Quercus robur*, *Ilex aquifolium*, *Fraxinus excelsior*, *Betula pubescens*, *Crataegus monogyna* and *Salix cinerea.* The ground flora was made up of *Vaccinium myrtillus, Luzula sylvatica, Hedera helix*, *Rubus fruticosus, Calluna vulgaris, Lonicera periclymenum, Pteridium aquilinum, Blechnum spicant* and *Dryopteris filix-mas.* This woodland was unfenced and unmanaged and had an extensive network of Badger setts. The area immediately surrounding the woodland was dominated by dense Bracken (HD1) and had been burned sometime in the past five years (approximately), the woodland appeared to have escaped this burning unscathed.

The western section of this bog is bounded on all sides by cutover bog both old and new cutover. A small section of wet grassland and the River Shiven are located within this site. The raised bog section itself, although drained has begun to regenerate to a small extent with many of the drains becoming infilled with *Sphagnum*. This is occurring in the wettest section that is located to the north of the site.

Castlegar Bog

Castlegar Bog is the most westerly bog in the Tirrur-derrymore group of bogs. The edges of this bog are mainly comprised of old domestic cutover bog while some recent signs of turf cutting are also evident, especially along the east, west and southern boundaries. The remaining areas are predominately Remnant Raised Bog (PB1) with a relatively long, narrow mineral island towards the centre.

The Cutover sections around the edges are mainly comprised of old and new cutover with the older areas now supporting various vegetation types such as *Molinia* grassland, Scrub and Poor Fen. The more recent cutover areas still have large areas of bare peat. The raised bog is quite degraded and dry with no active bog present. Although this bog has never been ditched it is likely that activities on the bog and on the surrounding land, such as turf cutting and forestry, are having a degrading effect on the bog.

The slender section of mineral island in the centre of the site contained scrub (WS1) in two sections with an area of poor fen (PF2) between these sections. The Scrub comprised blackthorn, Ash, Hawthorn, Holly, Birch, Gorse, Willow, Ivy, Bramble and Heather.

A tributary of the Castlegar River flows through the eastern section of this site and is bounded on both sides by Wet Grassland (GS4).

Sections of high mounds containing Dry Heath (HH1) were located on parts of the raised bog, these relatively small areas have not been individually mapped on the habitat map.

Turf cutting machinery appears to cross the raised bog section in order to gain access to the western side of the bog as a track was clearly visible.

Cloonfaris Bogs

Cloonfaris bog has been ditched (drained) in the early 1980's. A bog track dissects the bog into east and west sections. Tall leggy heather dominates the vegetation of the bog. The western section is primarily degraded raised bog with a section of old cutover bog to the north of the site. A small section of the site adjoins the River Shiven and it also contains a small area of wet Grassland (GS4) along the river.

The eastern section is very similar to the western half in that it is primarily composed of degraded raised bog. A relatively large section of both old and new cutover bog is located along its eastern boundary, while an area of wet grassland (GS4) and a section of the River Shiven are located to the north. Otter spraints were found along the banks of the River Shiven within this section of the site.

Sections of high mounds containing Dry Heath (HH1) were located on parts of the raised bog, these relatively small areas have not been individually mapped on the habitat map.

The Moylough Gun Club has erected a sign close to the entrance to the site deeming the shooting rights of the bog belong to this club (uncertain as to what area the sign refers to as they currently do not have any hunting or shooting rights on the bog).

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

None

Adjacent habitats and land-use

The main surrounding land-use is agriculture, mainly grazing and production of fodder, many of the areas of grassland that border the site are best classified as wet grassland. Forestry is also another major land use and Coillte have a number of properties that border the site. The River Shiven along with its tributaries forms boundaries with the site in numerous locations. Domestic turf cutting is carried out on many of the surrounding bogs and is also carried out on the site.

Watercourses (major water features on/off site)

- River Shiven – this river forms the boundary of the site in several locations.
- A tributary of the Castlegar River (which in turn joins the River Shiven) flows along the eastern border of Castlegar bog.

Fauna biodiversity

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

- 4 Mallard, 6 Teal
- 1 Kestrel
- Pheasant (4)
- Grey Heron flying over the site at two locations
- 2 Woodcock
- Grouse droppings on Cloonabricka Bog
- 5 Reed Bunting
- 6 Snipe
- More common species such as Rook, Blackbird, Robin and Grey Crow

Mammals

- Numerous signs of Badger around the site and Badger sett in the woodland to the north east of Island Bog
- Numerous deer tracks throughout the site with 7 Fallow Deer counted on Cloonabricka Bog
- Evidence of Foxes using the site
- Evidence of Pine Marten using the site
- Otter spraint on the banks of the River Shiven

Fish

- Sticklebacks observed in the small stream in Castlegar Bog
- The River Shiven is listed as holding stocks of Brown Trout and Pike along with several species of coarse fish, according to the Shannon Regional Fisheries Board website.

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

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

APPENDIX V. BIOSECURITY

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

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

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

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

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[6] will be adhered with throughout all rehabilitation measures and activities.

[6] 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 license, 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), 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 principle actions.

The draft NWBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydromorphological condition of rivers.

The draft NWBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage 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 NWBMP 2022-2027.

6 National Biodiversity Action Plan 2016-2021

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

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

A new National Biodiversity Action Plan is currently being developed.

7 National conservation designations

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

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

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

of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

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

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

9 All-Ireland Pollinator Plan 2021-2025

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

10 Land-use planning policies

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

11 National Archaeology Code of 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 EUs headline target for progress by 2020 is to:

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

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

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 license under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

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

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

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

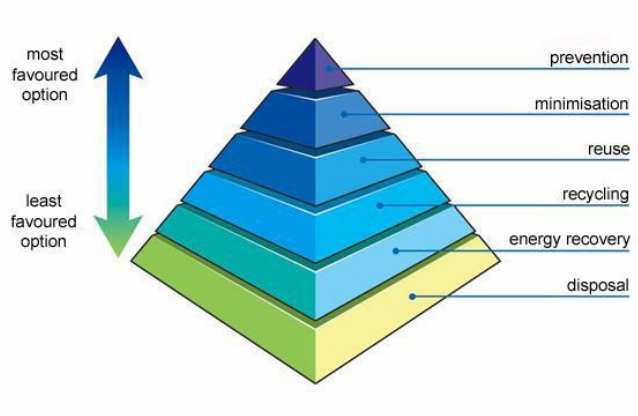
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 reused or recycled ahead of disposal.



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

2. Enhanced Decommissioning.

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

Item	Enhanced Decommissioning Type	Tirrur-Derrymore 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 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 stabilisiation: 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 Lisence. 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 stabilisiation.

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 to 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 in 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 ores 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 that 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 bogs 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 31' December2012. 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 out 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	**C**lassification	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 there 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.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

Water body / Feature	Buffer zone
Any water supply source providing 100m^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

Table APX -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Department of Agriculture, Food and the Marine	environmentalco-ordination@agriculture.gov.ie;	30/06/2023	Email		
Tirrur-Derrymore	Head of Ecological Assessment - NPWS	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Department of Housing, Local Government and Heritage NPWS	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Department of Housing, Local Government and Heritage NPWS	General Email Contact	30/06/2023	Email	30/06/2023	Email
Tirrur-Derrymore	National Museum of Ireland	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Dept of Agriculture Food & the Marine	Environmental_Co-ordination@agriculture.gov.ie;	30/06/2023	Email		
Tirrur-Derrymore	Department of Environment, Climate and Communications	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Dept of Rural and Community Development	info@drcd.gov.ie;	30/06/2023	Email		
Tirrur-Derrymore	Minister for Environment, Climate and Communications	General Email Contact				

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Eoghan.murphy@agriculture.gov.ie;	30/06/2023	Email		
Tirrur-Derrymore	Oireachtas	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	An Taisce	heritage@antaisce.org;	30/06/2023	Email		
Tirrur-Derrymore	Environmental Protection Agency	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Inland Fisheries Ireland	info@fisheriesireland.ie;	30/06/2023	Email		
Tirrur-Derrymore	Local Authority Waters Programme (West and Border Region)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Local Authority Waters Programme	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Local Authority Waters Programme (Midlands and Eastern Region)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	NWRA	info@nwra.ie;	30/06/2023	Email		
Tirrur-Derrymore	Teagasc	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	The Heritage Council	General Email Contact	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Waterways Ireland	info@waterwaysireland.org;	30/06/2023	Email		
Tirrur-Derrymore	An Forum Uisce (The Water Forum)	info@thewaterforum.ie;	30/06/2023	Email		
Tirrur-Derrymore	Coillte	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Water	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Water	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Office of Public Works	General Email Contact	30/06/2023	Email	26/07/2023	Email
Tirrur-Derrymore	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	An Taisce	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Ballinasloe Groups – Senator Galway	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Ballinasloe Walks	ballinasloewalksandtrails@gmail.com;	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Bat Conservation Ireland	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Birdwatch Ireland	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Butterfly Conservation Ireland	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Eastern and Midland Regional Assembly	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Fisheries Ireland	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Friends of the Irish Environment	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	ICMSA (Irish Creamery Milk Suppliers Association)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	ICSA (Irish Cattle and Sheep Farmers Association)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Environmental Network (Agriculture and Land Use Policy and Advocacy Officer)		30/06/2023	Email		
Tirrur-Derrymore	Irish Farmers Association	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Farmers Association (Senior Policy Exec)	General Email Contact	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Irish Farmers Association (Galway/Leitrim/Longford/Rosc/Sligo)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Farmers Association (Galway/Mayo)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Farmers Association (Meath)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Peatlands Conservation Council	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Raptor Study Group	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Rural Link (Community Wetlands Forum)	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Rural Link	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Irish Wildlife Trust	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	IWAI	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	National Association of Regional Game Councils	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	NPWS Rangers Mid Western	General Email Contact	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	NUIG Galway	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Galway Public Participation Network	administrator@galwaycountyppn galwaycountyppn	30/06/2023	Email		
Tirrur-Derrymore	ORNI	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Ranger Association Committee	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Sustainable Water Action Network (SWAN)	http://www.swanireland.ie;/	30/06/2023	Email		
Tirrur-Derrymore	Trinity College Dublin	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Turf Cutters and Contractors Association	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	UCD / Irish Rural Link	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	University College Dublin	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Waterways Ireland Org	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Woodlands of Ireland	info@woodlandsofireland woodlandsofireland	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	University of Galway	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Ballyforan Community Group	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Director of Services Galway County Council	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Director of Services Infrastructure & Operations	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Director of Services for Planning	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Galway Co Co general address	customerservices@galwaycoco.ie;	30/06/2023	Email		
Tirrur-Derrymore	Chief Executive Galway County Council	chiefexecutive@galwaycoco.ie;	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Tim Broderick	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Dermot Connolly	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Michael Connolly	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Declan Geraghty	30/06/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Peter Keaveney	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council -Ballinasloe area	Cllr Dr Evelyn Francis parsons	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	Galway County Council	General Email Contact	30/06/2023	Email		
Tirrur-Derrymore	TD/Galway	Michael Fitzmaurice TD	30/06/2023	Email		
Tirrur-Derrymore	TD/Galway	Denis Naughton TD	30/06/2023	Email		
Tirrur-Derrymore	TD/Galway	Claire Kerrane TD	30/06/2023	Email		
Tirrur-Derrymore	All Land- owners in vicinity of bog	Leaflet Drop	03/07/2023	Leaflet		

Table APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Department of Housing, Local Government and Heritage	The Department of Housing, Local Government and Heritage responded via email on 30/06/2023 to acknowledge receipt of the rehabilitation consultation email.	No response required.
Office of Public Works (OPW)	OPW responded via e-mail on 26/07/2023 and advised that Tirrur-Derrymore Bog, does not overlap with any OPW Arterial Drainage Scheme. The OPW expressed support for the BnM bog rehabilitation and rewetting as a Nature Based Catchment Management measure in managing flood flows in the Shannon River Catchment and acknowledged the many other environmental co-benefits from developing this project.	No response required.

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

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			

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Tirrur-Derrymore Bog, Co. Galway

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.446 hectares at Tirrur-Derrymore Bog, Co. Galway on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Tirrur-Derrymore Bog will include:

- Re-wetting some deep peat areas of the bog through field drain blocking using an excavator to create peat barriers (up to seven every 100 m along each field drain);
- Re-alignment of any piped drainage;
- Regular drain blocking (3/100) on cutover bog, along with the management of outfalls and management of water levels;
- Re-wetting the deep peat in the cutover areas and some shallow peat areas of the bog using contour bunding and drain blocking. This enhanced measure seeks to create large flat areas of shallow (< 10 cm) water conditions on former cutover bog;
- Existing Silt ponds and silt control measures will be retained and maintained during the rehabilitation phase. Further control measures may be added if none exist currently. During the monitoring and verification phase silt ponds and silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. Silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Tirrur-Derrymore Bog is located c.1.7km east of Mountbellew Bridge and north of the L3210 road. The bog rehabilitation area occupies the townlands of Castlegar, Cloonabrioka, Corrabaun, Currafarry, Derrymore, Islands, Killosolan, Lisnaclassagh, and Ticooly, on OS 6-inch sheets Galway Nos. 46 and 47.

Methodology

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

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

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

Desktop assessment

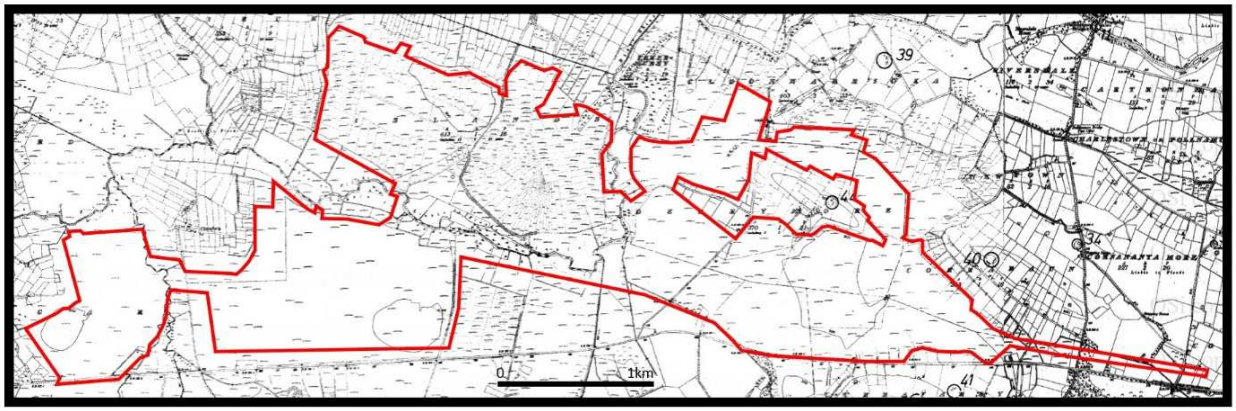


Fig. 1. Tirrur-Derrymore Bog, Co. Galway, detail of the Record of Monuments and Places map sheets Galway Nos. 46 and 47. The proposed rehabilitation area is outlined with the red line.

Peatland survey

Tirrur-Derrymore Bog has not been the subject of peatland archaeological survey.

Recorded Monuments

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

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 12th of June 2023. This review established that there is one SMR located in the proposed rehabilitation area (see Fig. 2). SMR GA046-092--- is a Redundant Record. The record relates to an archaeological find: bog butter that was found during turf-cutting operations in 1991. It is not an archaeological monument.

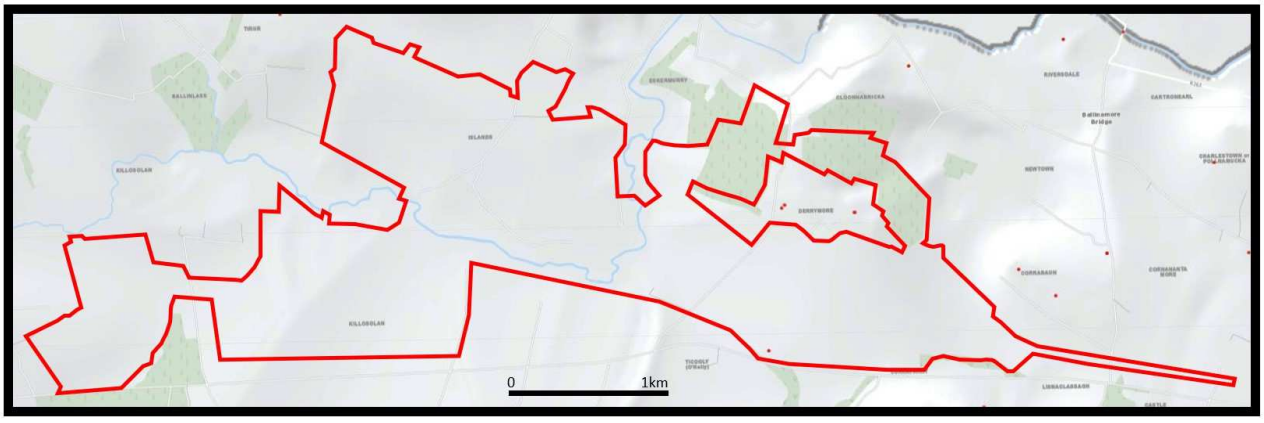


Fig. 2. Tirrur-Derrymore Bog, Co. Galway, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Archaeological Excavations

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

Previous assessments

Tirrur-Derrymore Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0502-01. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all archaeological objects from the bog reported to the Museum by that date and these are included below in Table 1 (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological heritage to be uncovered during the course of any future development works in Tirrur-Derrymore Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0502-01 contains a complete list of known archaeological objects from Tirrur-Derrymore Bog reported to the National Museum of Ireland up to 2018 (see Table 1).

Townland	Museum No./ catalogue No.	Description
Castlegar	2015C1:54	Stone axehead
Derrymore	2011:129, 130	Wooden vessel and bog butter

Table 1. List of archaeological finds from Tirrur-Derrymore Bog reported to the National Museum of Ireland.

Impact assessment

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

Recommendations

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

Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are no known sightings of archaeological monuments in the rehabilitation area. There are some archaeological objects known from the bog that have been removed to the National Museum. Should any previously unknown archaeological heritage be uncovered during the rehabilitation works, it should also be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

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

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

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

Dr. Charles Mount
13 June 2023

APPENDIX XIII. INITIAL WATER QUALITY DATA FROM TIRRUR-DERRYMORE

To follow once available. Commenced in June 2023.