Bord na Móna

Corlea Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2023

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0504-01:

> "*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 Corlea 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 Corlea Bog.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0504-01, 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, 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 Corlea 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 Corlea 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 Corlea Bog, such as amenity, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Table of Contents

NON-TECHNICAL SUMMARY

- Bord na Móna is planning to finalise the rehabilitation of Corlea Bog.
- Industrial peat harvesting is now finished at Corlea Bog.
- 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 developing habitats and vegetation back onto the bare peat, and minimising impacts to downstream. 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.
- 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 Reeds will thrive.
- Many Bord na Móna bogs can not be restored back to raised bog, as so much peat has been removed and the environmental conditions have been modified. However other natural habitats will develop such as shallow wetlands with Reedbeds and Birch woodland, and in time a naturalised peatland can be restored.
- The development of a range of habitats in Corlea Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- Corlea Bog was drained and developed for industrial peat production in the 1960s and much of the site was cutaway from 2010. Pioneer habitats have therefore already been developing at Corlea Bog. Some rehabilitation has already taken place in a phased basis over the years with several drain-blocking programmes. Corlea Bog formerly had a pumped drainage regime. This pump has now been turned off and decommissioned. A wetland has formed as a result in the main basin of the bog.
- Corlea is a notable site for its archaeological heritage. A togher or Iron Age Trackway was found in the bog at the site. This trackway is now preserved and a visitor centre has been developed called Corlea Trackway Centre, which is managed by the OPW.
- Longford County Council and Bord na Móna have developed a greenway or amenity walking/cycling track along the BnM industrial railway and on some high fields at Corlea Bog. This now forms a series of looped walks. The greenway also connects to Derrycolumb bog to the south-west. These greenways and amenity tracks form part of a wider proposal led by Longford County Council to develop a project called the Mid-Shannon Wilderness Park, which would develop amenity across BnM cutaway bogs.
- Measures proposed for Corlea Bog include some targeted drain blocking in areas that have not already been re-wetted and hydrological modelling and adjustment of outfalls to optimise summer wetland water levels to promote the development of wetland vegetation. Other measures include the use of fertiliser that will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Mona 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 boundary drains will be blocked. Water will still leave the site via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Corlea, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Peatland rehabilitation of these 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 Mountdillon bog group (Ref. P0504-01). 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. Corlea bog is part of the Mountdillon bog group (see Appendix II for details of the bog areas within the Mountdillon bog group). Corlea Bog is located in Co. Longford.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0504-01:

> "*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 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 European Union's Recovery and Resilience Facility as part of 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 at peat surface ± 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.

Corlea Bog is proposed to be part of this Scheme (PCAS) and this rehabilitation plan outlines the approach to be taken.

1.1 Constraints and Limitations

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

Industrial peat extraction at Corlea Bog permanently finally ceased in 2018 (having commenced bog development in 1960's). Currently the cutaway area largely comprises newly formed wetlands with pioneer cutaway habitats, in addition to marginal[1] habitats. There is still a portion of the site with bare peat present. Raised bog remnants occur within the bog. These parcels of high bog have never been subject to commercial peat extraction but have been subject to domestic turf cutting.

[1] 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.

An area of remnant raised bog, surrounded by cutaway peatland now dominated by heather (dry heath type vegetation) also occurs within the east of the site around the Corlea Trackway Visitor Centre[2]. This area was handed over by Bord na Móna to the OPW in the 1990s and is now managed by the OPW. This area is constrained from the rehabilitation plan.

It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly accelerate environmental stabilisation. Nevertheless, it will still take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

Parts of Corlea Bog (within and outside the east of the areas owned and under the control of Bord na Móna) are possibly being used by domestic turf cutters (indications of turf cutting were noted during site visit in October 2022) for intensive private sod peat production. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Corlea Bog that are outside of the control of Bord na Móna. Nevertheless, Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or archaeological features. There are archaeological features present at Corlea Bog, which may similarly constrain PCAS activities.

There are known rights of way around the margins of Corlea Bog. Where a public right of way or similar burden exists on Bord na Móna property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

A portion in the north of Corlea Bog is currently leased to Kenagh Community Co-op Society Ltd.

Bord na Móna are currently developing a renewable energy project called Derryadd Wind Farm (see Location | Derryadd Wind Farm). This proposed windfarm project is located within the adjacent Bord na Móna bogs of Derryadd, Derryarogue and Lough Bannow to the north of Corlea. The proposed Derryadd Wind Farm **does not** overlap with Corlea Bog and does not constrain PCAS rehabilitation at Corlea.

Longford County Council and Bord na Móna have developed a greenway or amenity walking/cycling track along the BnM industrial railway and on some high fields at Corlea Bog. They now form a series of looped walks. These amenity tracks are constrained from the rehabilitation plan.

[2] Corlea Trackway Visitor Centre website: https://heritageireland.ie/places-to-visit/corlea-trackway-visitor-centre/

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-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BNM drainage surveys;
- Bog topography and LiDAR data;
- Previous research studies on site;
- Hydrological modelling; and
- The development of a Methodology Paper outlining the Scheme (PCAS)[3]. 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 Corlea Bog 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-practice guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.

[3] https://www.bnmpcas.ie/supporting-material/

- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom (2019). Conserving Bogs – Management Handbook.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

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

- Mountdillon Integrated Pollution Control Licence;
- Mountdillon 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 2022.
- 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, Corlea Bog was surveyed in July of 2012. Additional ecological walk-over surveys and visits have taken place at Corlea Bog between 2012-2022 (visited during winter 2016/17). In addition, ecological surveys of the bog were undertaken in September 2022 to further inform the preparation of this Rehabilitation Plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and 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. A site visit was used to categorise any changes in habitat extent at Corlea in September 2022.

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

3. SITE DESCRIPTION

Corlea Bog is located in Co. Longford, 7.5 km north-west of Ballymahon. Corlea is part of the Mount Dillon bog group with Lough Bannow Bog located immediately to the north and Derrycolumb to the west of this site. A minor road separates Corlea Bog from Lough Bannow Bog to the north. The main Ballymahon-Lanesborough Road (R392) is situated along the western margin of the site. The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, and other bogs, many owned and managed by Bord na Móna.

Corlea Bog contains two main topographical basins separated by a gravel ridge that is now developing scrub and woodland. Both basins are former industrial peat extraction areas that are now developing as wetlands. Corlea formerly had a pumped drainage regime and a large wetland developed after the pump was turned off and decommissioned. Water levels are now largely controlled by a series of modified outfalls.

The ridge of higher ground in the centre of the site is a mineral ridge of gravel that is overlain with a thin layer of peat. Gravel is exposed in places along the ridge and further down both sides along the field drains. It is heavily vegetated by Soft Rush, which is in mosaic with Birch Scrub. Some of the older sections contain more mature scrub, while the younger sections have emerging young Birch coming through.

There have been several phases of previous rehabilitation at Corlea. The north-east basin at Corlea was re-wetted in 2016 in support of the lease to Keenagh Community Development CLG. There was some drain-blocking, removal of pipes and modification of outfall to support wetland development. A looped walk and car-park was constructed in 2017. The larger basin was re-wetted in 2018-2019. The pump was turned off and decommissioned and the levels at two outfalls were modified. There was some additional drain-blocking in 2020 in the drier areas.

Both wetland areas are now developing as a mosaic of cutaway habitats and standing water. The area of standing water in the main basin is relatively large with water depths of 0-3 m in places. Patches of Reeds, poor fen vegetation with Soft Rush, sedges and Bog Cotton, and wet scrub with Willows are developing. There are also some patches of emergent Birch in places and patches of pioneer dry calcareous grassland where the gravel is exposed.

Bord na Móna are currently developing a renewable energy project called Derryadd Wind Farm (see Location | Derryadd Wind Farm). This proposed wind farm project is located within the adjacent Bord na Móna bogs of Derryadd, Derryarogue and Lough Bannow to the north of Corlea. The proposed Derryadd Wind Farm **does not** overlap with Corlea Bog and does not constrain PCAS rehabilitation at Corlea.

See Drawing number BNM-DR-23_07_01 titled **Corlea Bog: Bog Site Location**, included in the accompanying Mapbook[4] , which illustrates the location of Corlea Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Corlea bog was formerly in industrial peat extraction from 1960's until 2018. The bog was formerly used for fuel peat production for Lough Ree Power station. Much of the site was cutaway at various stages prior to 2018 with industrial peat extraction reducing on a phased basis, and this meant that cutaway habitats have been developing across the site for some time.

[4] Cutaway Bog Decommissioning and Rehabilitation Plan – Corlea Bog Map Book

In 1984 an Iron Age trackway was found in the bog towards the east side of the site. This section of the site was handed over to the Office of Public Works by Bord na Móna. Part of the track way has been preserved in the bog and in 1994 a visitor centre on the site was developed.

3.1.2 Current land-use

Industrial peat production has now permanently ceased at Corlea Bog. Much of the site has already naturally re-vegetated with typical cutaway habitats consisting of a mixture of Birch scrub and woodland, and pioneering open habitats and wetlands have developed in the main basins with large areas of standing water. A small conifer plantation is located at the north-western margin of the site.

Part of site was leased to local community development group (Keenagh Community Development CLG) support the development of the first phase of the amenity walkway in association with Longford County Council.

A BnM railway formerly was located along the north-western boundary of the former production bog. This bog railway is now decommissioned. The bed of this industrial railway has now been developed by Longford County Council and Bord na Móna as a greenway (Flynn, Furney Environmental Consultants, 2021[5]). This has been extended along high fields and the eastern headland to form a looped walk. A second looped walk was created around the north-east basin that also links to the Corlea Trackway Centre. A small car-park was also built and the northern margin to facilitate greenway users. It is envisaged that further links will be developed in the future to the north into Lough Bannow Bog as part of the proposed Derryadd Windfarm (see Location | Derryadd Wind Farm).

Some wetland and rehabilitation management was undertaken between 2016-2020.

Corlea Bog is now managed by Bord na Móna along with other key stakeholders for its amenity and biodiversity value.

Site infrastructure and structures are mapped in the accompanying Mapbook.

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

[5] Flynn, Furney Environmental Consultants, 2021, Ecological Impact Assessment, *Mid-Shannon Wilderness Park Greenway: Ecological Impact Assessment Report,* Document No: MSWP-RP-EN-0005-P02

supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly. These job numbers have now declined with the cessation of peat extraction.

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

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

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the 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

GSI data indicates that Corlea Bog is underlain primarily by Visean Limestone, with a small section to the north underlain by the Lucan Formation. The Visean limestone unit is classified as a regionally important aquifer as it is karstified (conduit). The Lucan formation is classified as locally important aquifer which is moderately productive in local zones only. Geological Survey of Ireland (GSI) mapping does not identify any karst features in close proximity to the bog. No data exists concerning depth to bedrock, however, there is a small area of bedrock close to the ground surface to the south-east of the bog.

Quaternary Sediment maps show Corlea underlain by peat, yet surrounded by inorganic deposits, including till derived from limestone which occurs to the west, south-west and north-east of the bog and till derived from sandstone which occurs to the south-east of the bog.

Published bedrock and Quaternary geological maps only present the shallowest deposits encountered and fail to present in information on the buried peat substrate. Coring carried out by RPS in 2022 and existing coring records from Bord na Mona, provided further insight into the deposits underlying the site, particularly when combined with GPR data concerning the elevation of the substrate underlying the peat.

Combining the two datasets reveals the majority of the bog to be underlain by lacustrine clay (below c. 54mOD), with an elevated ridge of limestone till trending in a SE-NW direction through the north-west of the bog separating the two main lobes. In addition, there is a small pocket of limestone till extending into the main lobe of the bog a the south-east. This material has been interpreted as limestone till based on the presence of clayey material encountered during coring and the presence of comparable features present in the surrounding area. The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs and are more likely to be areas where groundwater contributions occur. Combining elevation data with the results of coring has permitted an indicative sub-peat substrate map.

Data used in compilation of the sub-peat map suggest that peat rests directly on glacial till in those areas where the substrate rises above c54mOD (as indicated by coring and GPR survey data). However, this only relates to a relatively small area of the bog, located to the northwest, separating the two lobes of bog. Most of the remainder of the bog is underlain by lacustrine clay. Studies completed at Clara Bog, Co. Offaly indicate that glacial till derived from limestone material has a higher hydraulic conductivity than the lower lying (and younger) lacustrine

deposits. Therefore, losses of water to depth in areas underlain by limestone till are likely to be significant, particularly since peat is very shallow across Corlea, with almost all of the bog having remaining peat depth of under 1m.

3.2.2 *Peat type and depths*

The majority of the site is cutaway and has shallow residual peat depths. These range from less than half a meter to greater than 2.6m Part of the site has exposed gravels where the peat has been completely cutaway. The south eastern side of the site has the greatest peat depths of > 2.6m.

3.3 Key Biodiversity Features of Interest

Much of the former industrial peat extraction area has already naturally re-vegetated with typical cutaway habitats consisting of a mixture of Birch scrub and woodland, and pioneering open habitats on drier ground. This higher ground is a mineral ridge of gravel that is overlain with a thin layer of peat. Gravel is exposed in places along the ridge and further down both sides along the field drains. It is heavily vegetated by Soft Rush, which is in mosaic with Birch and Willow scrub (WS1). Some of the older sections contain more mature scrub and Birch woodland (WN7), while the younger sections have emerging young Birch and Willow. Parts of this higher ground are still relatively wet even though it is quite elevated with steep slopes in places. A small section towards the northern end of the site has still relatively high peat and is re-vegetating with some pioneer Heather-dominated vegetation. There are also some patches of pioneer dry calcareous grassland where the gravel is exposed. There is a smaller ridge located at the southern end of the site with exposed gravel and some pioneer dry calcareous grassland. Small depressions in these exposed gravel areas act as small ponds and contain diverse aquatic communities with Pondweeds and other species. Bare peat is most prominent on the former headlands and some of the old high fields.

Wetlands have developed in the main basins with large areas of standing water and a mosaic of wetland vegetation with patches of developing Reedbeds (Common Reed and Reedmace) and poor fen (pioneering *Juncus effusus* and *Carex rostrata*). These wetlands attract breeding and wintering water-birds. The wetlands are fringed with bare peat and colonising vegetation.

During a field visit in February 2023, Round-leaved Wintergreen (*Pyrola rotundifolia subspecies rotundifolia*) was recorded at the site. This was the first record for the species in County Longford and is therefore of particular note. No rehabilitation works are proposed for the area in which this species was recorded i.e. the establishing scrub and woodland within the centre of the site.

A number of immature but established Sessile Oak were also recorded within the scrub and establishing woodland, dominated by Downy Birch, in 2023. This is in an elevated ridge on shallow peat soils and marl. This are also supported a good diversity of bryophytes, including Rhytidiadelphus loreus, *Thuidium tamariscinum, Hylocomium splendens* and *Fissidens dubius/adianthoides*; suggests a more diverse woodland may establish here in time.

Habitats of biodiversity interest are also found in the margins of the site. A section of raised bog containing the Corlea trackway was preserved and is in relatively good condition.

The hydrology of the Corlea Trackway area (OPW) is being maintained using a membrane to prevent significant water loss from the bog remnant. The high bog has a typical species assemblage and can be considered sub-marginal ecotope in quality. There are a series of depressions with some pool development in one section and there is also some development of lawns and hummocks of *Sphagnum magellanicum* and *S. papillosum*

associated with these depressions. Pitcher Plant was recorded in this section and seems to be spreading. A boardwalk was built on the surface of the bog over the trackway. Several artificial ponds have also been created to help maintain the hydrology of the bog remnant. These ponds generally contain open water with some *Sphagnum* growth around the margins. The most easterly and lowest pond contained emergent Bog Cotton and Bottle Sedge-dominated vegetation with a mat of *Sphagnum cuspidatum*. This section also contains regenerating peatland habitats with scrub (WS1), old cutover bog (PB4) and disturbed high bog (PB1) dominated by Heather, and Purple-Moorgrass-dominated grassland (gMol) prominent.

There is a small conifer plantation with Lodgepole Pine located in the north-west corner of the site. This plantation is a private plantation. The remaining western, southern and south-eastern boundaries are lined with scrub (WS1) or disturbed high bog remnants (PB1).

3.3.1 Current habitats

The most common habitats present at Corlea include (in order of dominance):

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog).
- Pioneer poor fen dominated by Soft Rush (pJeff) (frequently in mosaic with either bare peat or with Birch scrub)
- Emergent and open Birch scrub (eBir, oBir)
- Purple Moorgrass-dominated vegetation (gMol)
- Pioneer dry calcareous grassland (gCal) (in mosaic with pJeff)
- Pioneer Heather-dominated vegetation (dHeath) associated with drier disturbed areas around the Corlea Trackway Visitor Centre (in mosaic with Birch and Gorse scrub and Purple Moorgrass-dominated vegetation)
- Riparian zones (Rip)
- Access zones (railway along the west side)

See Drawing number BNM-DR-24-05-17 titled **Corlea Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Corlea Bog.

Table 1: Photos of Habitats at Corlea Bog (2016-2020).

Drone view of the central elevated ridge (centre and right) and western basin (left) (2023).

Southern margin – drier cutaway (2020).

Round-leaved wintergreen (Pyrola rotundifolia subspecies rotundifolia) recorded in February 2023

Bare peat along the headlands with the new track at the north-east basin.

Example of establishing scrub and woodland dominated by Birch within the centre of the site.

Common lizard on Trackway – Corlea Bioblitz 2016.

Pitcher Plant – Corlea Trackway Centre, outside the PCAS extent.

3.3.2 Species of conservation interest

Surveys undertaken in February 2023 records the amber listed species Little Grebe (*Tachybaptus ruficollis*), Great-crested Grebe (*Podiceps cristatus*), Linnet (*Carduelis cannabina*), Black-headed Gull (*Larus ridibundus*) and Lesser black-backed Gull (*Larus fuscus*). Little Egret (*Egretta garzetta*) was also of particular note in 2023.

During surveys walkover surveys of the site in October of 2021, other species recorded included Red-listed[6] Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), Snipe (*Gallinago gallinago*), Swift (*Apus apus*), Curlew (*Numenius arquata*) and the amber listed species Little Grebe (*Tachybaptus ruficollis*), Great-crested Grebe (*Podiceps cristatus*), Linnet (*Carduelis cannabina*), Teal (*Anas crecca*), Whooper Swan (*Cygnus cygnus*), Swallow (*Hirundo rustica*), Black-headed Gull (*Larus ridibundus*), Teal (*Anas crecca*), Cormorant (*Phalacrocorax carbo*), Lesser black-backed Gull (*Larus fuscus*) Sand Martin (*Riparia riparia*) and Skylark (*Alauda arvensis*). Little Egret (*Egretta garzetta*) was also of particular note in 2023.

Previous surveys by Bord na Móna ecologists have recorded Chiffchaff (*Phylloscopus collybita*), Swift (*Apus apus*), Goldfinch (*Carduelis carduelis*) (Flock > 30 individuals), Kestrel (*Falco tinnunculus*), Whitethroat (*Sylvia*

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

communis), Willow Warbler (*Phylloscopus trochilus*), Grasshopper Warbler (*Locustella naevia*) and Grey Heron (*Ardea cinerea*).

A review of the Ornithology Chapter for the proposed Derryadd Wind Farm Ecological Impact Assessment Report (EIAR)[4] was also undertaken. The below paragraphs provide a summary of the bird species of conservation concern recorded during surveys at Corlea and the other bogs to inform Derryadd Wind Farm planning permission. Corlea was included in the surveys for the proposed windfarm project as it was an adjacent site. A full list of bird species recorded within and adjacent to the bog is provided in the EIAR. Two Red Listed (BoCCI) species, Snipe and Kestrel, were recorded within the boundary of Corlea during dedicated bird surveys for the proposed development. Three Amber List species (BoCCI), Lesser Black-backed gull and Mallard, were also recorded. A number of additional Green listed target species recorded included Peregrine Falcon, Buzzard and Grey Heron were recorded over this study area. In addition, Whooper Swan have also been recorded flying over the site during dedicated winter bird vantage point surveys (2021/2022).

Surveys in the wider study area, outside the boundary of Corlea bog also recorded additional Red Listed (BoCCI) species including Curlew, Golden Plover, Redshank, Herring Gull, Grey wagtail, Lapwing and Wigeon. The results of the breeding bird surveys (2015, 2016 and 2017) undertaken in the wider windfarm study area also recorded several additional Red List species (BoCCI), including; Woodcock, Curlew, Golden Plover, Lapwing and Quail. A number of species recorded during the winter months in the windfarm study area are listed on Annex I of the EU Birds Directive, namely; Golden Plover, Greenland White-fronted goose, Hen Harrier, Kingfisher, Merlin and Peregrine Falcon. Golden Plover, Hen Harrier, Merlin and Peregrine Falcon were also recorded during breeding season surveys along with Common Tern and Little Egret.

It should be noted that much of the wildfowl, wader and gull observations recorded as part of the ornithological study were associated with the River Shannon and associated wet grasslands further to the north of the area.

Bord na Móna ecologists have recorded Green Veined White (*Pieris napi*), Small Tortoiseshell (*Aglais urticae*), Silver washed Fritillary (*Argynnis paphia*), Large Heath (*Coenonympha tullia*), Small Copper (*Lycaena phlaeas*) and Meadow Brown (*Maniola jurtina*) butterflies at Corlea previously. Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*), Red Fox (*Vulpes vulpes*), Badger (*Meles meles*) and Pine Marten (*Martes martes*) were also noted during surveys previously by Bord na Móna ecologists.

A Heritage Week event called Corlea Biodiversity Awareness Day and Bioblitz was held in August 2016. 201 different species records were made as part of this Bioblitz event at Corlea.

3.3.3 Invasive species

Pitcher Plant (*Sarracenia purpurea*), is found in the Corlea Trackway area (OPW), having been planted there as a plant of amenity interest. It has spread and formed a large dense area. The invasive species *Rhododendron ponticum* occurs in the eastern part of the bog. In addition, there are no works proposed in the area in which Pitcher plant has been recorded. There are no other NBDC or BNM records for high impact invasive species recorded from the bog.

[4] Tobin, 2019, Derryadd Wind Farm Environmental Impact Assessment Report (EIAR), Volume II, EIAR Main Report.

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

There are no European Sites (SAC's or SPA's) within close proximity (i.e. within a 5 km radius at minimum) to Corlea Bog. The closest EU Designated Sites to Corlea Bog are:

- Fortwilliam Turlough SAC (Site code: 000448), located approximately 7 km west of Corlea Bog.
- Lough Ree SAC (Site code: 000440), located approximately 8 km south-west of Corlea Bog.
- Lough Ree SPA (Site code: 004064), located approximately 8 km south-west of Corlea Bog.
- Mount Jessop Bog SAC (Site code: 002202), located approximately 8 km north-east of Corlea Bog.
- Glen Lough SPA (Site code: 004045), located approximately 17 km north-east of Corlea Bog.

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 10 km of Corlea Bog including; Forthill Bog NHA (Site code: 001448) located approximately 4 km south-west of Corlea Bog and Mount Jessop Bog NHA (site code: 001450), located 8 km north-east of Corlea Bog.

See map book drawing no: BNM-DR-24-05-23: Proximity Designated Sites in the accompanying mapbook.

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 located in proximity to Corlea Bog.

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

3.5 Hydrology and Hydrogeology

Corlea forms part of the Upper Shannon Catchment (Catchment ID : 26E) as defined by the EPA under the Water Framework Directive (WFD) and is primarily situated within the Bilberry_SC_010 sub-catchment. It is surrounded by flat agricultural land and additional bog land areas. The Bog is located between Lough Ree to the west and Derryhaunbeg to the east. The bog contains several drainage pathways and discharge locations, with the majority of the bog discharging along the eastern boundary into the Ledwithstown river (IE_SH_26L840850).

Corlea Bog formerly had a pumped drainage system. This pump has now been decommissioned. Corlea Bog is located in the Upper River Shannon catchment. Corlea Bog discharges to the south west via adjacent land drains to the Bilberry stream and to the east to the Ledwithstown_26 stream which flows south and converges with the Bilberry stream and flows towards Lough Ree.

Regional hydrological data suggest that Corlea receives average precipitation of 903mm/yr (1981-2010), with an estimated annual effective precipitation rate of 498.6mm/yr based on GSI data. The GSI also estimate a recharge rate of 19.9mm/year. This is considered to be an underestimate for the areas of the bog underlain by limestone till, where a more likely estimate would be 60mm/year. In contrast, the low-lying basin is expected to receive groundwater inputs, estimated to be up to 50mm/year. Therefore, the available precipitation that may become runoff (assuming no change in storage) is estimated to range from 438.6mm/yr – 548.6mm, which equates to an

annual runoff rate of c. 4,386m^3/ha – 5,486m^3/ha. This highlights that the low-lying topographic basins will retain adequate water throughout the year, with the level of outfalls being the main control on water levels. However, the small sections of the bog that are elevated, steeply sloping and underlain by limestone till will be extremely difficult to rewet.

GSI data indicates that Corlea Bog is underlain by Tournaisian sandstone, mudstone, limestone bedrock which is classified as a regionally important aquifer (karstified conduit). Geological Survey of Ireland (GSI) mapping identifies no karst features (enclosed depressions) within close proximity to the bog. No data exists concerning depth to bedrock, however, the closest bedrock outcrop occurs 0.3km to the north-west of the central western margin of the bog.

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

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

The bog is located in an area mapped by GSI as of low - moderate groundwater vulnerability (GSI Mapviewer). Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The surrounding areas is generally ranges between low to moderate; however, a number of high and extreme vulnerability areas can be identified in the surrounding area. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. 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. These data indicate there is generally low risk of any groundwater contamination occurring at this site.

3.6 Emissions to surface-water and watercourses

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

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

Corlea bog has 1 treated surface water outlet from a previously active peat extraction catchments, which discharges to the (Ledwith/Bilberry River) IE_SH_26L840850 LEDWITHSTOWN_010.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-24-05-02 titled **Corlea Bog: Structures and Sampling**, along with Drawing number BNM-DR-24-05-WQ01 titled **Corlea Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Corlea.

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

The main emission limit value (ELV) associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 1.42mg/l and COD 100mg/l.

From an analysis of any results over number of years of the IPC licence environmental monitoring of some of the discharges from this bog, these indicate that results were under the Emission Limit Value for Suspended Solids and Ammonia and broadly under the trigger level for COD.

Ammonia averaged 0.098mg/l and ranged from 0.04 to 0.21 mg/l with Suspended Solids ranging from 2 to 5 mg/l and averaging 3.6 mg/l.

Table 3.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Corlea	SW-77A	Q2 22	7.7	4	248	0.04	0.05	65	271
Corlea	SW-77A	Q4 19	7.6	2	374	0.046	0.05	47	156
Corlea	SW-77A	Q2 17	7.6	5	208	0.21	0.05	57	210

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. This site is already vegetated in some areas. 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 Corlea has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream water bodies.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

The licence obligation of quarterly sampling regime on a selected number of discharges to be sampled over a 3 year cycle will 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. Suitable outlets representing the majority of the bog catchment are being assessed for monthly water quality sampling.

This new sampling programme commenced in November 2020 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.

Initial monthly results are included in appendix XIII for Corlea bog. These results cover the period from November 2020 to November 2022 and are from the one remaining surface water outlet from the sections of bog to be rehabilitated in 2023. Peat extraction ceased in this bog in 2020 and as expected some of the key water quality parameters that can impact water quality from peat extraction activities, remain on a relatively static trajectory, with suspended solids indicating a very slight upward trend, but well below any limits. During this period ammonia did not indicate any significant increase or decrease in trend during the 24 months of sampling, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly ammonia concentrations from both bogs from November 202 to November 2022 had a range of 0.005 to 1.17 mg/l with an average of 0.182 mg/l.

Results for suspended solids for the same period indicate a range of 2 to 8mg/l with an average of 2.57 mg/l.

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 this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 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.

This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

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 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 & 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.

Water will still discharge from designated emission points when rehabilitation at Corlea Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream watercourses.

3.7 Fugitive Emissions to Air

The bog is no longer in 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.

It is expected that Derryarogue Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop regenerating wet deep peat vegetation on deep peat areas, and wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current Ecological Rating

(Following NRA (2009) Evaluation Criteria)

The majority of the site can be rated as having a **medium local ecological value (D)** as it contains a relatively large area of developing semi-natural habitats that are still immature and in a pioneer phase.

4. CONSULTATION

4.1 Consultation to Date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by Bord na Móna over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Mountdillon bog group, including Corlea 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.
- The Corlea Archaeological Settlement and Biodiversity Project (2013) prepared by Donall Mac An Bheatha and Sean Savage,
- Longford Wetland Wilderness (general proposal led by Longford County Council and other stakeholders. This has had several iterations. See Lough Ree and Mid Shannon, Spirit Level 2017. A feasibility study for Longford County Council).
- Feehan, J. (2004) A Long-Lived Wilderness; the future of the north midlands peatland network UCD/NWWPC.
- Lauder, A. & O'Toole L. (2017). Concept development for a landscape-scale Wetland Wilderness Park in the Mid Shannon Region. A report funded by the Heritage Council's Heritage Grant Scheme.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017). Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc.).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Community development (Keenagh Community Development CLG).
- Corlea Bog Bioblitz (National Heritage Week event organising by Bord na Móna and held at Corlea Bog in August 2016).
- Greenway development at Corlea (Longford County Council).
- Previous consultation around the discovery of the Corlea trackway, handing a portion of the site over to the OPW for management and the development of the Corlea Trackway Centre is not listed here.

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

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

4.2 Issues raised by Consultees

N/A.

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**.
- Optimising hydrological conditions for the development of reed swamp and fen and wetland vegetation on shallow more alkaline peat and other subsoils, or embryonic *Sphagnum*-rich vegetation communities on deep residual peat, where present.
- Integrating peatland rehabilitation with other infrastructure on site (greenway).
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting any future amenity land-use planning. Integrating rehabilitation measures with any planned amenity infrastructure on site. It is not proposed to carry out any rehabilitation actions to change or negatively affect any amenity infrastructure.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- It will take some time for stable naturally functioning habitats to fully develop at Corlea Bog. This will happen over a longer time-frame 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. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop embryonic *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as 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). Reducing pressures due to former peat extraction activities at Corlea will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources., including peatlands in general (private and Bord na Móna).
- Bord na Móna have also carried out rehabilitation measures in some adjacent bogs (e.g. Derrycolumb) in 2021-2022 and are planning rehabilitation for other bogs (Derryadd East) in 2023. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the River Shannon from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) will be carried out under the PCAS scheme.
- In relation to the proposed Mid-Shannon Wilderness Park Greenway, it is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any amenity infrastructure or existing land-uses. It is intended that the greenway will utilise the former railway infrastructure that bisects the site. This land use will not have a significant effect on rehabilitation planning, which will be focused on the former peat production areas.

6. SCOPE OF REHABILITATION

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

- The area of Corlea Bog.
- EPA IPC Licence - Ref. P0504-01. 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. Corlea bog is part of the Mountdillon 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 Corlea Bog, in particular, optimising **climate action benefits**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Corlea Bog mean that wetland creation and re-wetting shallow residual peat is the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Corlea Bog as **environmental stabilisation**, **optimising residual peat re-wetting, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Integrating rehabilitation measures with future potential amenity projects i.e. the Mid-Shannon Wilderness Park Greenway. It is not proposed to change any conditions around the area proposed for this project.
- Rehabilitation of Corlea Bog 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.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key Constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites like Corlea, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). The environmental conditions of Corlea Bog are significantly influenced by its topography (two main basins) and the former pumped drainage regime, meaning that once the pump was decommissioned, wetlands have already developed.
- **Corlea Trackway Visitor Centre.** Rehabilitation will be integrated with this infrastructure and with this land-use. This does not significantly impact on any proposed rehabilitation.

- **Amenity.** Longford County Council and Bord na Móna have developed a greenway or amenity walking/cycling track along the BnM industrial railway and on some high fields at Corlea Bog. This now forms a series of looped walks.
- **Renewable Energy.** The proposed Derryadd Wind Farm will be developed by Bord na Móna on cutaway peatlands on Derryadd, Derryarogue and Lough Bannow bogs in south Co. Longford and to the north of Corlea Bog. There is **no footprint overlap** with Corlea Bog. Bord na Móna intends to submit a planning application in early 2023 for the proposed development. There will be no expected overlap between PCAS rehabilitation in 2023 at Corlea Bog and potential construction of Derryadd Wind Farm (potential starting date in 2024).
- **Current/future land-use.** The key land-uses for the site are amenity. As described above, a greenway has already been developed as part of the Mid-Shannon Wilderness Park to utilise the former railway corridor through the site. Any proposed enhancement measures (ie. targeted drain-blocking) will be positively aligned with current land-uses and will look to facilitate amenity, where possible.
- **Local roads.** Marginal drains will not be blocked adjacent to the local road at the northern end of the site.
- **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.** The small remnant raised bog area to the northeast of the northern part of the site. This area was never developed by BnM and has turbary rights.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures will be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) will be carried out to mitigate against any impact on found archaeology at Corlea Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. There is no mapped public right of way at Corlea bog.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- The longer-term development of stable naturally functioning habitats to fully develop at Corlea Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Corlea Bog.
- Corlea Trackway Visitor Centre. This area is excluded from the scope of the rehabilitation plan.
- 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 critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this 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 key emissions (e.g. potential suspended solids run-off).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures.

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.
- 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. This will be measured by the EPA Water Framework Directive monitoring programme.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from Corlea bog in Mountdillon over the past 3 years. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends. As the monthly monitoring program at Corlea Bog continues in 2023 and during the rehabilitation works planned for 2023, with data from the 2022 monitoring program, further trending will be produced to verify any ongoing trends.

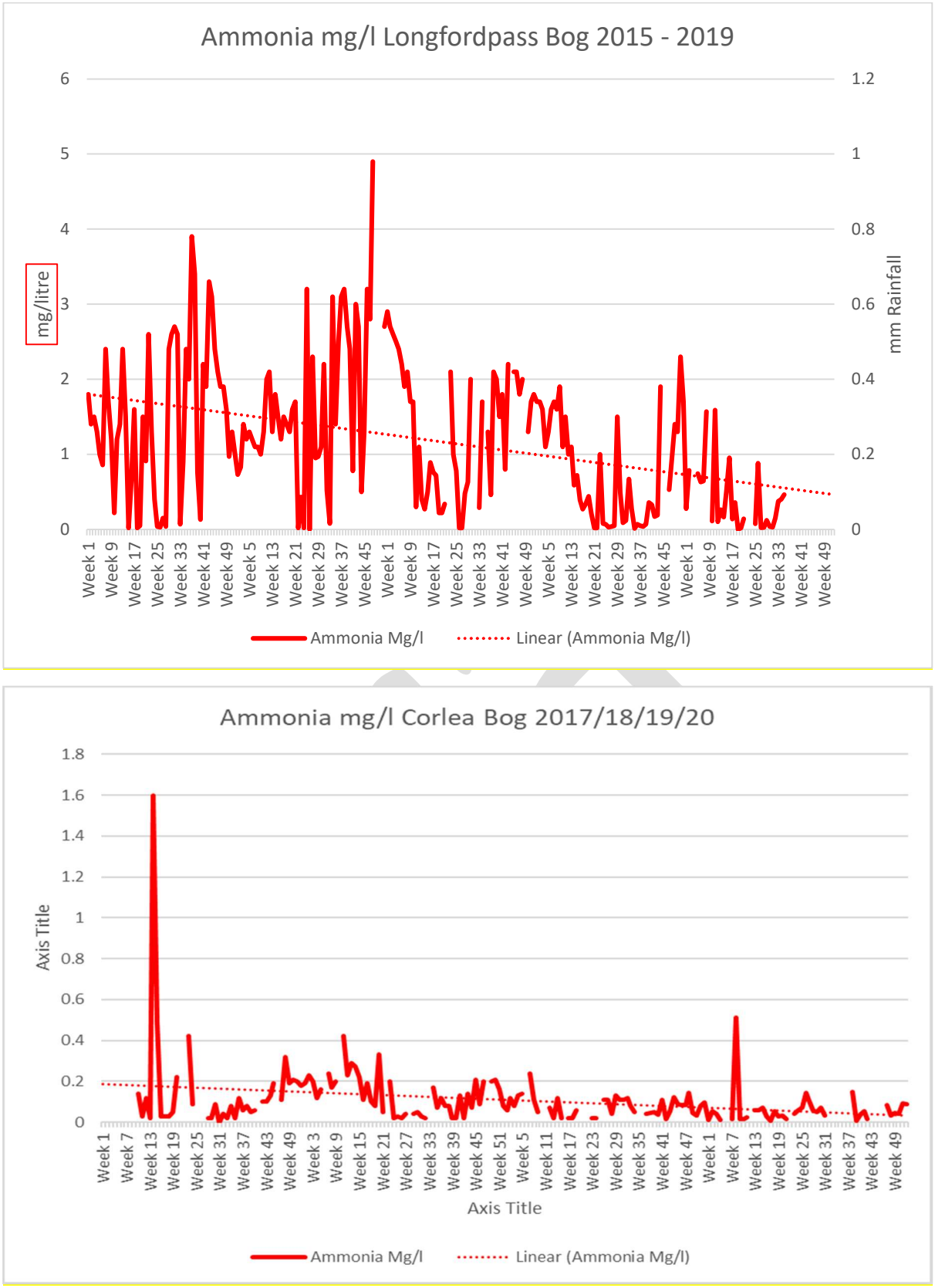


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including wetland habitats, fen, Reed swamp, wet woodland, Birch woodland, scrub and Heather-dominated habitats where conditions are suitable. Some of these habitats have already in part established as pioneer vegetation/wetlands. It will take some time for stable naturally functioning habitats to fully develop at Corlea 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)	Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

Criteria type	Criteria	Target	Measured by	Expected Timeframe
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions. Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2023-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a bog condition assessment and appropriate carbon emission factors.	2023-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2023-2025

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 practice 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.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. However, Bord na Móna experience has demonstrated the effectiveness of these type of measures for re-wetting bog (Renou-Wilson et al. 2018).
- 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 depression analysis/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 (see mapbook drawings BNM-DR-24-05-03 LiDAR Map and BNM-DR-24-05-09 Depression Analysis Map) indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in the enhanced rehab measures drawing (see mapbook drawing ref. no. BNM-DR-24-05-05: Enhanced Rehab Measures) (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 areas out of peat extraction at Corlea bog will include**:**

- Targeted drain-blocking using an excavator in areas that have not deemed to be re-wetted sufficiently, or were not completed by the previous phases.
- Initial hydrological modelling indicates that a large part of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage. The water-levels in the main wetland could be lowered by a small amount to encourage the development of wetland vegetation.
- Re-alignment of any piped drainage;
- Management of water levels in these areas with overflow pipes;
- Targeted fertiliser applications to accelerate vegetation establishment on areas of **bare peat** on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Silt ponds and silt control measures will be retained and maintained during the rehabilitation phase. 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).

An indication of the areas for these various measures is shown in Table 8.1 and in mapbook ref. no. BNM-DR-25-05-05: Enhanced Rehab Measures.

Table 8.1 Enhanced rehabilitation measures and target area at Corlea Bog. Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.

Type	Code	Description	Area (Ha)
Dry Cutaway	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	22.69
Marginal land	MLT1	No work required	6.38
Additional Work	AW1	No intervention	14.31
Additional Works	AW2	Targeted drain blocking to optimise hydrological conditions/rewet the residual peat.	27.5
Wetland	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	64.59
Wetland	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	4.9
Other	Silt ponds	Silt-ponds	0.03
Other	Constraint	Constrained Areas – No intervention	23.7
Total			164.1

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 detailed site drawings outlining how the various rehabilitation methodologies will be applied to Corlea Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map book ref. no. BNM-DR-24-05-05: Enhanced Rehab Measures for an indicative view of the application of different rehabilitation methodologies);
- Carry out a hydrology and drainage management assessment of the proposed enhanced rehabilitation measures;
- Carry out a review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where needed;
- A review of issues that may constrain rehabilitation such as amenity, forestry, other land-uses, known rights of way, archaeology, turbary, and existing land agreements will be carried out and incorporated into the rehabilitation plan, where needed;

- An ecological appraisal of the potential impacts of the planned rehabilitation such as the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or larval webs of Marsh Fritillary butterfly, etc will be carried out;
- Review silt control measures and establish suitable silt control, where needed;
- Ensure all activities comply with the environmental protection requirements of the IPC Licence;
- An Appropriate Assessment of the Rehabilitation Plan will be carried out. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site;
- Track delivery of mitigation measures (AA) 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 a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix IV).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.
- 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.
- **2023**: Short-term practical actions.
- **2023-2025**: 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, 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 twice 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.
- **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.
- This new sampling programme commenced in November 2020 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 this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 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.
- This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

- 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 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 & 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.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this 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 appropriate assessment process and planning procedures.

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

- Vegetation and habitat monitoring will be carried out using a condition assessment. This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated

peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme and after consultation with stakeholders.

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

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

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

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

10. REFERENCES

Atherton, I, Bosanquet, SDS & Lawley, M (2010). Mosses and liverworts of Britain and Ireland - a field guide. British Bryological Society.

Anderson, R., Farrell, C., Graf, M., Muller, F., Calvar, E., Frankard, P., Caporn, S., Anderson, P. (2017). An overview of the progress and challenges of peatland restoration in Western Europe. Restoration Ecology, Issue 2 Pages 271-282.

Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.

Bord na Móna 2014. Blocking Drains in Irish raised bogs. The Bord na Móna Raised Bog Restoration Project. Cris, R. Buckmaster, S. Bain, C. Reed, M. (Eds) (2014) Global Peatland Restoration demonstrating SUCCESS. IUCN UK National Committee Peatland Programme, Edinburgh. http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/IUCNGlobalSuccessApril2014.pdf

Bord na Móna. 2016. Bord na Móna Biodiversity Action Plan 2016-2021. Brosna Press, Ferbane. http://www.bordnamona.ie/wp-content/uploads/2016/04/Biodiversity-Action-Plan-2016-2021.pdf.

Bord na Móna (2022). Bord na Móna Annual Report 2022. Publications - Newsroom | Bord na Móna (bordnamona.ie)

Bord na Móna (2022). *Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022 Version 19.* Bord na Móna. Available online at : https://www.bnmpcas.ie/supporting-material/

Bonn, A., Allott, T., Evans, M., Joosten, H. & Stoneman, R. (2017) Peatland restoration and ecosystem Services-science, policy and practice. Cambridge University Press.

Carroll, J., Anderson, P., Caporn, S., Eades, P., O'Reilly C. & Bonn, A. 2009. Sphagnum in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16. Moors for the Future Partnership.

Clark, D. and Rieley, J. 2010. Strategy for responsible peatland management. International Peat Society, Finland.

Clark, D. (2010). Brown Gold. A history of Bord na Móna and the Irish peat industry. Gill Books.

Cross, J.R. (2006). The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

Department of Communications, Climate Action and Environment 2019. National Climate Action Plan 2019. https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/Climate-Action-Plan.aspx

Department of Housing, Planning, Community and Local Government 2017. Public consultation on the River Basin Management Plan for Ireland. Department of Housing, Planning, Community and Local Government. https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_river_basin_management_plan_1.pdf

Department of Arts, Heritage and the Gaeltaght 2015. National Peatland Strategy. Department of Arts, Heritage and the Gaeltacht.

http://www.npws.ie/sites/default/files/general/Final%20National%20Peatlands%20Strategy.pdf

Eades, P., Bardsley, L., Giles, N. & Crofts, A. (2003). The Wetland Restoration Manual. The Wildlife Trusts, Newark.

Environment Agency (2013). The Knotweed code of practice. Managing Japanese Knotweed on development sites. Environment Agency, Bristol, UK. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536762/LIT_2695.pdf

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

EPA (2019). http://gis.epa.ie/Envision. EPA Envision Map Viewer. (Last Viewed: 31/12/2019).

EPA (2020). Guidance on the process of preparing and implementing a bog rehabilitation plan. http://www.epa.ie/pubs/reports/enforcement/guidanceontheprocessofpreparingandimplementingabogrehabilitationplan.html.

Farrell, C. A. and Doyle, G. J. 2003. Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland. Wetlands Ecology and Management, 11, 21-35.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey (2013). Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.

Foss, P.J. & O' Connell, C.A. (1984). Further observations of *Sarracenia purpurea* L. in County Kildare (H19). Irish Nat. Journ. 21:264-266

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

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., Hallett, ,J.G., Eisenberg, C., Guariguata, M.R., Liu, J., Hua,F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K. & Dixon, K.W. (2019). International Principles and Standards for the practice of Ecological Restoration. Restoration Ecology 27(S1): S1–S46.

Grand-Clement, E., Anderson, K., Smith D., Angus, M., Luscombe D.J., Gatis, N., Bray L.S., Brazier R.E. (2015). New approaches to the restoration of shallow marginal peatlands Journal of Environmental Management 161.

Günther, A., Barthelmes, A., Huth, V., Joosten, H.,Jurasinski, G., Koebsch, F. & Couwenberg, J. (2020). Prompt rewetting of drained peatlands reduces climate warming despite methane emissions. Nature Communications volume 11, Article number: 1644.

Hinde, S., Rosenburgh, A., Wright, N., Buckler, M. and Caporn, S. 2010. Sphagnum re-introduction project: A report on research into the re-introduction of Sphagnum mosses to degraded moorland. Moors for the Future Research Report 18. Moors For The Future Partnership.

Holden, J., Walker, J., Evans, M.G., Worrall, F., Bonn, A., 2008. In: DEFRA (Ed.), A Compendium of Peat Restoration and Management Projects.

Joosten, H. and Clarke, D. 2002. Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making. I.M.C.G. – I.P.S., Jyväskylä, Finland.

Lindsay, R., 2010. Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change (Report to RSPB Scotland, Edinburgh).

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

McBride, A., Diack, I., Droy, N., Hamill, B., Jones, P., Schutten, J., Skinner, A. and Street, M. 2011. The Fen Management Handbook, (2011), Scottish Natural Heritage, Perth.

Minayeva, T. et al. (2017). Towards ecosystem-based restoration of peatland biodiversity. Mires and Peat, Volume 19 (2017), Article 01, 1–36, http://www.mires-and-peat.net

McDonagh, E. (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service. https://www.npws.ie/sites/default/files/publications/pdf/McDonagh_1996_Drain_Blocking_Raised_Bogs.pdf.

NPWS. (2014). Review of the raised bog Natural Heritage Area network. Department of Arts, Heritage and the Gaeltacht.

NPWS. (2017a). National Raised bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/files/FOR%20UPLOAD%20Plan(WEB_English)_05_02_18%20(1).pdf

NPWS. (2017b). Actions for biodiversity 2017-2021. Ireland's 3rd national biodiversity plan. Department of Arts, Heritage and the Gaeltacht. https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill. https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

NRA (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority.https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf.

Pschenyckyj, C., Riondata, E., Wilson, D., Flood, K., O'Driscoll, C., Renou-Wilson, F. (2021). Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity, Report produced for An Fóram Uisce, Online, Available at: https://thewaterforum.ie/app/uploads/2021/04/Peatlands_Full_Report_Final_March2021b.pdf, Accessed 17.08.2021

Quinty, F. and L. Rochefort, 2003. Peatland Restoration Guide, second edition. Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy. Québec, Québec.

Regan, S., Swenson, M., O'Connor, M. & Gill, L. (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA RESEARCH PROGRAMME 2014–2020. Report No.342. (2014-NC-MS-2). EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin. www.epa.ie.

Renou-Wilson F., Bolger T., Bullock C., Convery F., Curry J. P., Ward S., Wilson D. & Müller C. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Renou-Wilson, F., Wilson, D., Rigney, D., Byrne, K., Farrell, C. and Müller C. (2018). Network Monitoring Rewetted and Restored Peatlands/Organic Soils for Climate and Biodiversity Benefits (NEROS). Report No. 238. Report prepared for the Environmental Protection Agency. Johnstown Castle, Co. Wexford.

Schouten, M.G.C. 2002. Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland; Dublin.

Smith, G., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Stace, C. A. (1997). New Flora of the British Isles. Cambridge: Cambridge University Press.

Thom, T., Hanlon, A., Lindsay, R., Richards, J., Stoneman R. & Brooks, S. (2019). Conserving Bogs – Management Handbook. https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving%20Bogs%20the%20management%20handbook.pdf

Wilson, D., Renou-Wilson, F., Farrell, C., Bullock, C. and Muller, C. (2012). Carbon Restore – the potential of restored Irish peatlands for carbon uptake and storage; CCRP Report. EPA Wexford.

Wilson, D., Dixon, S.D., Artz, R.R., Smith, T.E.L., Evans, C.D., Owen, H.J.F., Archer, E., & Renou-Wilson, F. (2015). Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the UK. Biogeosciences Discuss., 12, 7491–7535.

Wheeler, B. D., & Shaw, S. C. (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction. London: HMSO.

Wittram, B. W., Roberts, G., Buckler, M., King, L., & Walker, J. S. (2015). A Practitioners Guide to Sphagnum Reintroduction. Edale: Moors for the Future Partnership.

APPENDIX I: 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 Corlea Bog (BNM-DR-24-05-22: Aerial Imagery 2020).
- EPA IPC Licence - Ref. P0504-01. 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. Corlea bog is part of the Mountdillon bog group.
- The current condition of Corlea Bog. This site had pumped drainage, the pump has now been decommissioned and wetlands are developing.
- Completed rehabilitation. There have already been several phases of rehabilitation at Corlea bog and the site is largely stabilised
- 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 Corlea Bog will be left unblocked as blocking boundary drains could affect adjacent land.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Corlea Bog 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 residual peat in the former area of industrial peat production 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 indicators

- 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 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). This will be demonstrated by water quality monitoring results.

Rehabilitation measures: (see Mapbook drawing no. BNM-DR-23-17-20: Standard Rehab Measures)

- Targeted drain blocking, where required;
- Adjustment of main water level, where needed.
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- 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.
- 2023. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- 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)
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	22.69
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	69.49
Marginal Land	MLT1	No work required	6.38
Additional Works	AW1	No work required	41.82
Other	Silt Pond	Silt ponds	0.03
Other	Constraint	Rights of Ways and constrained areas/buffers/Archaeology	23.7
Total			**164.1**

See Drawing number BNM-DR-23-07-20 titled **Corlea 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 twice 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 Mount Dillon Bog Group IPC Licensed area is made up of two sub-groups (Lough Ree (the Mount Dillon Energy Peat Group) and Mostrim) and have been in industrial peat production for several decades. There are 28 defined sites covering a total area of 11,322 ha. Of the 28 sites, 23 mainly straddle the River Shannon within counties Roscommon and Longford, with five sites partially in County Westmeath to the east. 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 Lanesborough (LRP) or for horticultural peat products.

Industrial peat extraction in the Mount Dillon Bog Group ceased in 2019. It is planned to supply remaining milled peat stocks to Lanesborough (LRP) during 2020. Both power stations ceased using peat by the end of 2020. All remaining horticultural peat stocks were also removed during 2020. Intensive decommissioning and rehabilitation for the Mount Dillon Bog Group started in 2020/2021.

One bog site, Cloonmore, was never used for industrial peat production and several bogs in the Mostrim group have been drained but never fully developed and still retain typical high bog characteristics. These include Clonwhelan, Glenlough and a section of Mostrim. These sites have been zoned for biodiversity and a high bog drain blocking will be used to re-wet the high bog and encourage restoration of the raised bog habitat. Several sites (Glenlough, Mostrim, Clonwhelan and Clynan) were assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

The rehabilitation plan for the Mount Dillon Bog Group encompasses all areas involved in industrial peat production including industrial production areas and associated facilities. It also includes rehabilitation measures for those bogs that were initially drained but not fully developed.

A breakdown of the component bog areas for the Mount Dillon Bog Group IPC License Ref. PO-504-01-01 is outlined in Table Ap-2.

Industrial peat production history varies across the Mount Dillon bog group, so there is a wide range of peat depths at present. Bogs close to Lanesborough tend to have shallower peat depths or have been cutaway, while some bogs on the periphery of the group tend to have deeper peat reserves. Several sites such as Mount Dillion and Garryduff have been mostly cutaway to the fen peat layers or in some cases to expose the underlying gravel/sub-soil. Several bogs in the Mostrim group have only been partially developed or have had no industrial peat production, and have relatively deep peat depths.

Table Ap-2: Mount Dillon Bog Group names, area and indicative status (Mount Dillon Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Begnagh	265	Cutover Bog Industrial peat production commenced at Begnagh Bog in 1977 and ceased in 2020. Deep peat reserves remain on much of the former production area. Begnagh is considered a deep peat cutover bog.	Begnagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Some areas of cutaway on site are developing pioneer cutaway vegetation communities.	2020	Finalised 2022 Rehab started in 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Clooneeny	358	Cutover Bog Industrial peat production commenced at Clooneeny Bog in 1985 and ceased in 2020. Deep peat reserves remain on much of the former production area. Clooneeny is considered a deep peat cutover bog.	Clooneeny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power Most of the former production area on site is bare peat. Some areas of cutaway on site are developing pioneer cutaway vegetation communities.	2020	Finalised 2022 Rehab started in 2022
Cloonmore	102	N/A	Never developed for industrial peat production; scattered plots.	N/A	N/A
Cloonshannagh	494	Cutover Bog Industrial peat production commenced at Cloonshannagh Bog in 1985 and ceased in 2020. Deep peat reserves remain across the former production area. Cloonshannagh is considered a deep peat cutover bog.	Cloonshannagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power Restoration work has been carried out on a 38ha section of high bog within Cloonshannagh Bog. Some of the former production area on site is developing pioneer cutaway vegetation communities, the remainder of the site is bare peat.	2020	Draft 2017
Cloonshannagh Rail Link	28	Cloonshannagh rail link is a link between sites.	N/A	N/A	N/A
Derraghan	289	Cutover Bog Industrial peat production commenced at Derraghan Bog in the 1940's and ceased in 2020. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derraghan is considered a shallow peat cutover bog.	Derraghan Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derraghan has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2020	Plan Finalised 2021 Rehab commenced 2022
Derryadd	653	Cutover Bog Industrial peat production commenced at Derryadd Bog in 1960 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd is considered a shallow peat cutover bog.	Much of the former production area at Derryadd has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities Derryadd Bog will form part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020.	2020	Draft 2017
Derryadd2	328	Cutover Bog Industrial peat production commenced at Derryadd 2 Bog in 1960 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd 2 is considered a shallow peat cutover bog.	Much of the former production area at Derryadd 2 has been out of peat production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities	2020	Rehab Plan Draft 2022 To be Finalised in 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryarogue	895	Cutover Bog Industrial peat production commenced at Derryarogue Bog in 1941 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryarogue is considered a shallow peat cutover bog.	Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland, cutaway and scrub vegetation communities. Derryarogue Bog will form part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020. An amenity walkway through part of Derryarogue is proposed for the Derryadd Windfarm project	2020	Rehab Plan Draft 2022 To be Finalised in 2023
Derrycashel	388	Cutover Bog Industrial peat production commenced at Derrycashel Bog in 1951 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Most of the former production area has shallow peat reserves. Some pockets of deep peat remain. Derrycashel is considered a shallow peat cutover bog.	Derrycashel Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derryarogue has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities. Some wetland and rehabilitation management was undertaken (c.60ha) between 2014-2015.	2018	Finalised 2021 Rehab started in 2021
Derrycolumb	454	Cutover Bog Industrial peat production commenced at Derrycolumb Bog in the 1980's and ceased in 2019. Most of the former production area still has deep peat reserves. Derrycolumb is considered a deep peat cutover bog.	Derrycolumb Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power Much of the former production area at Derrycolumb has been out of production for some time. These areas have already extensively colonised with pioneer wetland and scrub vegetation communities.	2018	Finalised 2021 Rehab started in 2021
Derrymoylin	356	Cutover Bog Industrial peat production commenced at Derrymoylin Bog in 1985 and ceased in 2020. Long-term peat extraction has reduced peat reserves on this bog. Derrymoylin is considered a shallow peat cutover bog.	Derrymoylin Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Most of the former production area on site is bare peat.	2020	Draft 2021
Derryshannoge	452	Cutover Bog Industrial peat production commenced at Derryshannoge Bog in 1985 and ceased in 2020. Deep peat reserves remain across most of the site. Derryshannoge is considered a deep peat cutover bog.	Derryshannoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Derryshannoge has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Rehab Plan Draft 2022 To be Finalised in 2023
Edera	281	Cutover Bog Development for industrial peat production commenced at Edera Bog in 1990's. Active extraction from Edera began in 2003 and ceased in 2018. Edera is considered a deep peat cutover bog.	Edera Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. The majority of Edera Bog former production area is bare peat.	2020	Finalised 2021 Rehab started in 2021
Erenagh	93	Cutover Bog	Erenagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power.	2020	Draft 2017

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Development for industrial peat production commenced at Erenagh Bog in 1970's. Erenagh is considered a deep peat cutover bog.	Much of the former production area at Erenagh has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.		
Granaghan	212	Cutover Bog Development for industrial peat production commenced at Granaghan Bog in 1980's. Long-term peat extraction has reduced peat reserves on this bog but deep peat reserves remain on site. Granaghan is considered a deep peat cutover bog.	Granaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. The majority of Granaghan Bog former production area is bare peat.	2020	Rehab Plan Draft 2022 To be Finalised in 2023
Killashee	110	Cutover Bog Development for industrial peat production commenced at Killashee Bog in 1985. Killashee is considered a deep peat cutover bog.	Killashee Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. The majority of Killashee Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2020	Rehab Plan Draft 2022 To be Finalised in 2023
Knappoge	313	Cutaway Bog Peat Production at Knappoge bog commenced in 1963, and finished in 2018. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Knappoge is considered a shallow peat cutaway bog.	Knappoge Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. The majority of Knappoge Bog former production area is bare peat. Some areas have colonised with pioneer cutaway and scrub vegetation communities.	2018	Finalised 2021 Rehab started in 2022
Lough Bannow	739	Cutaway Bog Peat Production at Lough Bannow bog commenced in the 1960'S, and finished in 2020. Peat depths on the former production area are generally shallow. There are some pockets of deeper peat. Lough Bannow is considered a shallow peat cutaway bog.	Much of the former production area at Lough Bannow has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities. A small (35ha) conifer plantation was established in 1980's. Lough Bannow will form part of the footprint of Derryadd Windfarm for which planning permissions were granted in 2020.	2020	Draft 2017
Moher	483	Cutover Bog Peat Production at Moher bog commenced in the 1960'S, and finished in 2020. Peat depths on the former production area remain relatively deep. Moher is considered a deep peat cutover bog.	Moher Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Moher has been out of production for some time. These areas have already extensively colonised with pioneer cutaway and scrub vegetation communities.	2020	Draft 2021
Mount Dillon	592	Cutaway Bog Peat Production at Mount Dillon bog commenced in the 1940'S, and finished in 2020. Peat depths on the former production largely shallow and the peat is considered cutaway. Some deep peat remains on the west of the site. Mount	Mount Dillon Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. Much of the former production area at Mount Dillon has been out of production for some time. These areas have already extensively colonised with pioneer cutaway, wetland and scrub vegetation communities.	2020	Draft 2017

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		Dillon is considered a shallow peat cutaway bog.			

See Drawing number BNM-DR-24-05-24 titled **Mount Dillon Bog Group**, included in the accompanying Mapbook which illustrates the location of Corlea Bog and the Mount Dillon 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.

Bog Name:	**Corlea**	**Area (ha):**	169ha
Works Name:	Mount Dillon	**County:**	Co. Longford
Recorder(s):	BnM Ecology	**Survey/monitoring Date(s):**	15/03/2011 Barry Raftery Conference field trip August 2014

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer poor fen dominated by Soft Rush (pJeff) (frequently in mosaic with either bare peat or with Birch scrub)
- Emergent and open Birch scrub (eBir, oBir)
- Purple Moorgrass-dominated vegetation (gMol)
- Pioneer dry calcareous grassland (gCal) (in mosaic with pJeff)
- Pioneer dry Heath (dHeath) associated with drier disturbed areas around the Corlea Trackway Visitor Centre (in mosaic with Birch and Gorse scrub and Purple Moorgrass-dominated vegetation).
- Riparian zones (Rip)
- Access zones (railway along the west side)

Other habitats found around the margins of the site include:

- Conifer Plantation (WD4) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II)
- Scrub (WS1)
- Birch woodland (WN7) (minor area around margins)
- Mixed broad-leaved woodland (WD1) (minor area along margin).
- Artificial pools (FL8) (around the visitor centre)
- Built land (BL3) (visitor centre)

Description of site

Corlea Bog is located in Co. Longford, 7.5 km north-west of Ballymahon. Corlea is part of the Mount Dillon bog group with Lough Bannow located immediately to the north of the site and Derrycolumb to the west of this site. In 1984 an Iron Age trackway was found in the bog towards the east side of the site. This section of the site was handed over to the Office of Public Works. Part of the trackway has been preserved in the bog and in 1994 a visitor centre on the site was developed. The trackway, visitor centre and associated habitats have now been fenced off from the production bog area.

A section of intact raised bog containing the trackway has been preserved and the hydrology of the site is being maintained using a membrane to prevent significant water loss from the bog. The high bog still shows signs of degradation and is spongy. It has a typical species assemblage and can be considered sub-marginal ecotope in quality. There are a series of depressions with some pool development in one section and there is also some development of lawns and hummocks of *S. magellanicum* and S. *papillosum* associated with these depressions (see photos). Pitcher Plant was recorded in this section and seems to be spreading. A boardwalk was built on the surface of the bog over the trackway. Several artificial ponds have also been created on the site to help maintain the hydrology of the site. These ponds generally contain open water with some *Sphagnum* growth around the margins. The most easterly and lowest pond contained emergent Bog Cotton and Bottle Sedge-dominated vegetation with a mat of *Sphagnum cuspidatum*. This section also contains regenerating peatland habitats with scrub (WS1), old cutover bog (PB4) and disturbed high bog (PB1) dominated by Heather, and Purple-Moorgrass-dominated grassland (gMol) prominent.

The rest of the site is taken up by the production bog. It can be divided up into two sections by a ridge of high land that is now out of production. This higher ground is a mineral ridge of gravel that is overlain with a thin layer of peat. Gravel is exposed in places along the ridge and further down both sides along the field drains. It is heavily vegetated by Soft Rush, which is in mosaic with Birch Scrub. Some of the older sections contain more mature scrub, while the younger sections have emerging young Birch coming through. This area was still quite wet at the time of the survey even though it was on relatively high ground.

The north-east section is relatively small and contains a low hollow with mainly bare peat. Soft Rush-dominated vegetation extends from the adjacent cutaway area down the edge of fields into the production section. There was some standing water in the hollow at the time of the survey and this area is likely to be flooded occasionally. There are some patches of disturbed high bog around the eastern margin. And the northern margin is marked by a minor road. A small section towards the northern end of the site has still relatively high peat and is revegetating with some pioneer dry heath (dHeath).

A BnM railway runs along the north-western boundary of the production bog. This part of the production bog also forms a basin. A pump is located along the west side of the site. The majority of the ground cover in the production area is bare peat. However, there is a significant amount of pioneer poor fen dominated by Soft Rush spreading over fields that have been out of production for several years. Birch is also spreading along the drains. There are also some patches of emergent Birch in places and patches of pioneer dry calcareous grassland where the gravel is exposed. There is a smaller ridge located at the southern end of the site with exposed gravel and some pioneer dry calcareous grassland (gCal).

There is a small conifer plantation with Lodgepole Pine located in the north-west corner of the site. This plantation is likely to have been a private plantation and has been established on land that probably was never in production. The remaining western, southern and south-eastern boundaries are lined with scrub (WS1) or disturbed high bog (PB1).

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

None

Lough Bawn pNHA (NPWS site code 001819) is located adjacent to the north end of the site.

The Royal Canal pNHA (NPWS site code 002103) is located 0.5 km to the east side of the site

Adjacent habitats and land-use

Adjacent habitats and land-uses are those typical of reclaimed or disturbed peatlands and include wet grassland (GS4), improved grassland (GA1), conifer plantation (WD4), bog woodland (WN7), raised bog (PB1) and cutover bog (PB4).

Watercourses (major water features on/off site)

- The Royal Canal (0.5 km to the east of the site)
- Corlea bog is in the catchment of two separate streams that flow to either side of the site and connect further south to form the Bilberry River. This river flows into Lough Ree.

Peat type and sub-soils

The main peat type left on the site is fen peat. There are several small areas where there is higher remnant bog with acidic peat that is being colonised by Heather. The main sub-soils are calcareous gravels.

Fauna biodiversity

Birds

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

- Mallard (2) (using artificial ponds)
- Snipe (1) (using artificial ponds)
- More common birds recorded in and around the site include Meadow Pipit, Skylark, Chaffinch and Rook.

Mammals

Signs of several mammals were recorded during the survey.

- Fox

Activities on the site

Activities on the site include:

- Corlea Trackway Visitor Centre

References

Cross, J.R. 2006. The Potential Natural Vegetation of Ireland. Biology and Environment: Proceeding of the Royal Irish Academy, Vol. 106B, No. 2, 65-116 (2006).

European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey 2013. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.

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

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

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 Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

Pitcher Plant is present at Corlea, avoidance measures will be put in place where necessary to avoid spreading this invasive species.

[7] 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 Mountdillon Bog Group (Ref. PO-504-01). 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 Mountdillon 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 Climate Policy

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

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

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

Bord na Móna is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. 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 Mona 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 proposed 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.

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.

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	Corlea Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Completed
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	Completed
7	Decommissioning or Removal of Septic Tanks	Where 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.

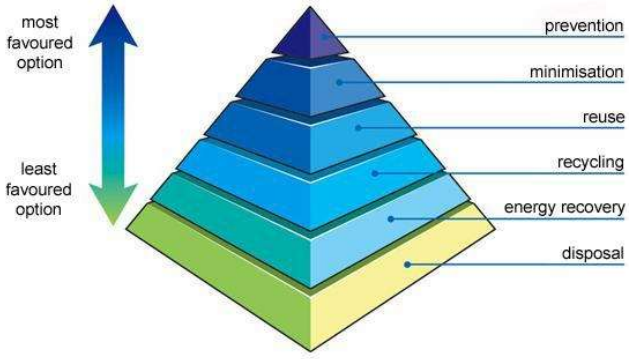
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 license. The removal of these are deemed as enhanced measures. These may enhance the future after-use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

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

APPENDIX VIII: GLOSSARY

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

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

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

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

Restoration: Ecological restoration 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 P0504-01, Mountdillon Group of Bogs in County Longford.

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 P0504-01 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	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

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

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPPC Licence requires the following:

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

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.

- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Mountdillon 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 Mountdillon IPPC Licence P0504-01.

APPENDIX X: MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, 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. Reproduced as follows:

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

APPENDIX XI: CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Table APX -2 Response summary from Consultees contacted

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

22

Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.

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 Corlea Bog, Co. Longford

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2020) *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 of lands at Corlea Bog, Co. Longford 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 Corlea Bog will include:

- Targeted drain-blocking using an excavator in areas that have not deemed to be re-wetted sufficiently, or were not completed by the previous phases.
- Initial hydrological modelling indicates that a large part of the site will develop a mosaic of wetland habitats with the potential for some deeper water. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some small sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage. The water-levels in the main wetland could be lowered by a small amount to encourage the development of wetland vegetation.
- Re-alignment of any piped drainage;
- Management of water levels in these areas with overflow pipes;
- Targeted fertiliser applications to accelerate vegetation establishment on areas of bare peat on headlands and high fields, and within certain areas of dry cutaway. Areas where vegetation has established do not need fertiliser application.
- Silt ponds and silt control measures will be retained and maintained during the rehabilitation phase. 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).

Corlea Bog is located c.2km west of the village of Keenagh, Co. Longford, and east of the R392 road. The overall rehabilitation area occupies the townlands of Cloonbreany, Corlea, Derryadd, Derryveagh and Mosstown on OS 6 inch sheet Longford No. 22.

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 Corlea Bog. The overall extent of the rehabilitation is indicated in Fig. 1. This area was examined using information from:

- The IAWU Peatland Survey

- The 1999 Bord na Móna Re-assessment Survey
- The 2013 Bord na Móna Re-assessment Survey
- The Record of Monuments and Places
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland
- Archaeological monitoring
- The Excavations database
- Previous assessments

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

Desktop assessment

Peatland Survey

The rehabilitation area of Corlea Bog was the subject of surveys carried out by Prof. Barry Raftery in 1985-1988 and a survey by the Irish Archaeological Wetland Unit (IAWU) in 1991 (Raftery 1996). 17 sightings of archaeological material were made during the 1985- 1991 surveys and there was one find (see Table 1). These archaeological sightings were notified to the Archaeological Survey of Ireland.

IAWU Cat._No.	IAWU Class	SMR No.	SMR Class	Townland	ITM Easting	ITM Northing	Depth BS m
LF-C 50	TOGH	LF022-057040-	Road - class 3 togher	Cloonbreany	609919	762651	-
LF-C 1	TOGH	LF022-058001-	Road - class 1 togher	Corlea, Cloonbreany	610209	762539	0
LF-C 2	TOGH	LF022-058002-	Road - class 2 togher	Cloonbreany	609990	762632	0.7
LF-C 3	TOGH	LF022-058003-	Road - class 2 togher	Cloonbreany	609884	762671	0.3
LF-C 4	TOGH	LF022-058004-	Road - class 2 togher	Cloonbreany	609892	762674	0.85
LF-C 5	TOGH	LF022-058005-	Road - class 2 togher	Cloonbreany	610015	762607	-
LF-C 51	TOGH	LF022-058007-	Road - class 3 togher	Cloonbreany	609919	762651	-
LF-C 52	TOGH	LF022-058008-	Road - class 3 togher	Cloonbreany	609939	762691	-
LF-C 53	TOGH	LF022-058009-	Road - class 3 togher	Cloonbreany	609919	762701	-
LF-C 54	TOGH	LF022-058010-	Road - class 2 togher	Cloonbreany	609982	762689	-
LF-C 55	TOGH	LF022-058011-	Road - class 3 togher	Cloonbreany	609979	762686	-
LF-C 56	TOGH	LF022-058012-	Road - class 3 togher	Cloonbreany	609999	762686	-
LF-C 57	TOGH	LF022-058013-	Road - class 3 togher	Cloonbreany	610074	762671	-
LF-C 58	TOGH	LF022-058014-	Road - class 3 togher	Cloonbreany	609969	762656	
LF-C 59	TOGH	LF022-058015-	Road - class 3 togher	Cloonbreany	609949	762666	-
LF-C 60	TOGH	LF022-058016-	Road - class 3 togher	Cloonbreany	609857	762635	-
LF-C 61	TOGH	LF022-058017-	Road - class 3 togher	Cloonbreany	609808	762621	-
LF-C 16	Find	-	-	Cloonbreany	610267	761761	-

Table 1. List of sightings recorded during the 1985 -1991 surveys.

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Longford which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1996). This record was published by the Minister in 1996 and includes sites and monuments that were known in Corlea Bog before that date. This review established that there are 14 RMPs located in the proposed rehabilitation area (see Table 2 and Fig. 1). All the sightings were notified by the IAWU following the 1985 - 1991 surveys.

IAWU Cat._No.	IAWU Class	SMR No.	SMR Class	Townland	ITM Easting	ITM Northing
LF-C 1	TOGH	LF022-058001-	Togher	Corlea, Cloonbreany	610209	762539
LF-C 2	TOGH	LF022-058002-	Togher	Cloonbreany	609990	762632
LF-C 3	TOGH	LF022-058003-	Togher	Cloonbreany	609884	762671
LF-C 4	TOGH	LF022-058004-	Togher	Cloonbreany	609892	762674
LF-C 5	TOGH	LF022-058005-	Togher	Cloonbreany	610015	762607
LF-C 51	TOGH	LF022-058007-	Togher	Cloonbreany	609919	762651
LF-C 52	TOGH	LF022-058008-	Togher	Cloonbreany	609939	762691
LF-C 53	TOGH	LF022-058009-	Togher	Cloonbreany	609919	762701
LF-C 54	TOGH	LF022-058010-	Togher	Cloonbreany	609982	762689
LF-C 55	TOGH	LF022-058011-	Togher	Cloonbreany	609979	762686
LF-C 56	TOGH	LF022-058012-	Togher	Cloonbreany	609999	762686
LF-C 57	TOGH	LF022-058013-	Togher	Cloonbreany	610074	762671
LF-C 58	TOGH	LF022-058014-	Togher	Cloonbreany	609969	762656
LF-C 59	TOGH	LF022-058015-	Togher	Cloonbreany	609949	762666

Table 2. List of sites included in the Record of Monuments and Places in the rehabilitation area.

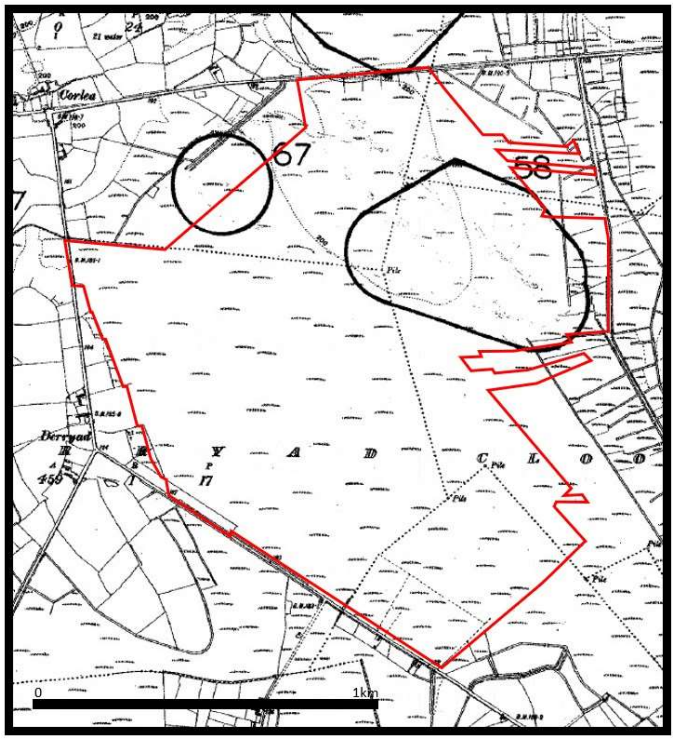


Fig. 1. Corlea Bog, Co. Longford, detail of the Record of Monuments and Places map sheet No. 22. The proposed rehabilitation area is outlined with the red line.

Archaeological Excavations

A review of Bord na Móna reports and the Excavations Bulletin at excavations.ie indicated that there have been 5 unlicensed archaeological investigation carried out in the rehabilitation area (see Table 3).

SMR No.	License No.	Cat No.	Cuttings	Classification	Reference
LF022-058001-	-	R LF-C 1	17	Road – class 1 togher	Raftery 1996, 7-55
LF022-058002-		R LF-C 2	5	Road - class 2 togher	Raftery 1996, 55-60
LF022-058003-		R LF-C 3	3	Road - class 2 togher	Raftery 1996, 60-64
LF022-058004-		R LF-C 4	1	Road - class 2 togher	Raftery 1996, 65
LF022-058007-		R LF-C 5	2	Road - class 2 togher	Raftery 1996, 65-71

Table 3. Excavations carried out in Corlea Bog.

National Monument

Corlea Bog has a National Monument No. 677 (see Table 4). The area of the National Monument also includes the Corlea Visitor Centre.

IAWU Cat._No.	IAWU Class	National Monument No.	SMR No.	SMR Class	Townland	ITM Easting	ITM Northing
LF-C 1	TOGH	677	LF022-058001-	Togher	Corlea, Cloonbreany	610209	762539

Table 4. The National Monument in Corlea Bog.

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 2nd of February 2023. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are 19 entries in the SMR in the proposed rehabilitation area (see Table 5 and Fig. 2). All the entries were reported by Barry Raftery, the IAWU and ADS following the 1987-88 Pilot Survey and 1999 Peatland Re-assessment Survey.

SMR No.	SMR Class	IAWU Cat._No.	1999 Cat._No.	Townland	ITM Easting	ITM Northing	depth BS m
LF022-057040-	Road - class 3 togher	LF-C 50		Cloonbreany	609919	762651	
LF022-058001-	Road - class 1 togher	LF-C 1		Corlea, Cloonbreany	610209	762539	0
LF022-058002-	Road - class 2 togher	LF-C 2		Cloonbreany	609990	762632	0.7
LF022-058003-	Road - class 2 togher	LF-C 3		Cloonbreany	609884	762671	0.3
LF022-058004-	Road - class 2 togher	LF-C 4		Cloonbreany	609892	762674	0.85
LF022-058005-	Road - class 2 togher	LF-C 5		Cloonbreany	610015	762607	
LF022-058007-	Road - class 3 togher	LF-C 51		Cloonbreany	609919	762651	
LF022-058008-	Road - class 3 togher	LF-C 52		Cloonbreany	609939	762691	
LF022-058009-	Road - class 3 togher	LF-C 53		Cloonbreany	609919	762701	
LF022-058010-	Road - class 2 togher	LF-C 54		Cloonbreany	609982	762689	
LF022-058011-	Road - class 3 togher	LF-C 55		Cloonbreany	609979	762686	
LF022-058012-	Road - class 3 togher	LF-C 56		Cloonbreany	609999	762686	
LF022-058013-	Road - class 3 togher	LF-C 57		Cloonbreany	610074	762671	
LF022-058014-	Road - class 3 togher	LF-C 58		Cloonbreany	609969	762656	
LF022-058015-	Road - class 3 togher	LF-C 59		Cloonbreany	609949	762666	
LF022-058016-	Road - class 3 togher	LF-C 60		Cloonbreany	609857	762635	
LF022-058017-	Road - class 3 togher	LF-C 61		Cloonbreany	609808	762621	
LF022-091----	Platform - peatland		ADS	Cloonbreany	609910	762669	

LF022-097----	Platform - peatland		ADS	Cloonbreany	609829	762683	

Table 5. Sightings in Corlea Bog listed in the SMR .

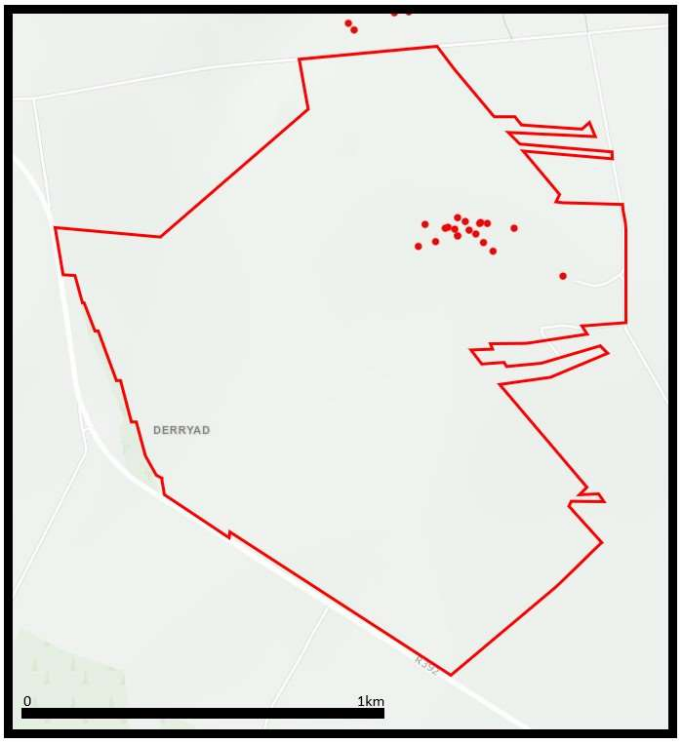


Fig. 2. Corlea Bog, Co. Longford, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

1999 Bord na Móna Re-assessment Survey

Corlea Bog (then called Lough Bannow 1) was the subject of the Bord na Móna 1999 Re-assessment Survey. Two sightings of archaeological material were identified (see Table 5). These archaeological sightings were notified to the Archaeological Survey of Ireland.

2013 Bord na Móna Re-assessment Survey

Corlea Bog (then called Lough Bannow 1) was the subject of the Bord na Móna 2013 Re-assessment Survey (Whitaker 2014, 159). There were no new archaeological sightings identified and the previously identified sightings were confirmed no longer be extant.

Previous assessments

Corlea Bog has been the subject of an Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-03. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all finds from the bog reported to the Museum by that date and these finds are included below in Table 4 (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological features to be uncovered during the course of any future development works in Corlea Bog.

Reported finds

As noted above the Environmental Impact Assessment Report caried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-03 contains a complete list of known finds from Corlea Bog reported to the National Museum of Ireland up to 2018 (see Table 6).

Townland	Museum No.	Description
Corlea	1996:227	Bog Butter

Table 6. List of archaeological finds from Corlea Bog reported to the National Museum of Ireland.

Impact assessment

Nineteen sightings of archaeological material were identified and recorded in Corlea Bog between in 1985 and 1999 and all were included in the SMR. The 2013 Re-assessment Survey confirmed that, apart from the National Monument LF022-058001-, none of the sightings were any longer extant. In March 2023 it was agreed with the National Monuments Service that a buffer zone would be left around the Corlea National Monument and the Corlea Visitor Centre. The buffer zone is indicated in Fig. 3 and a shapefile has been provided by the National Monuments Service to Bord na Móna. buffer zone indicated in Fig. 3

See Fig x

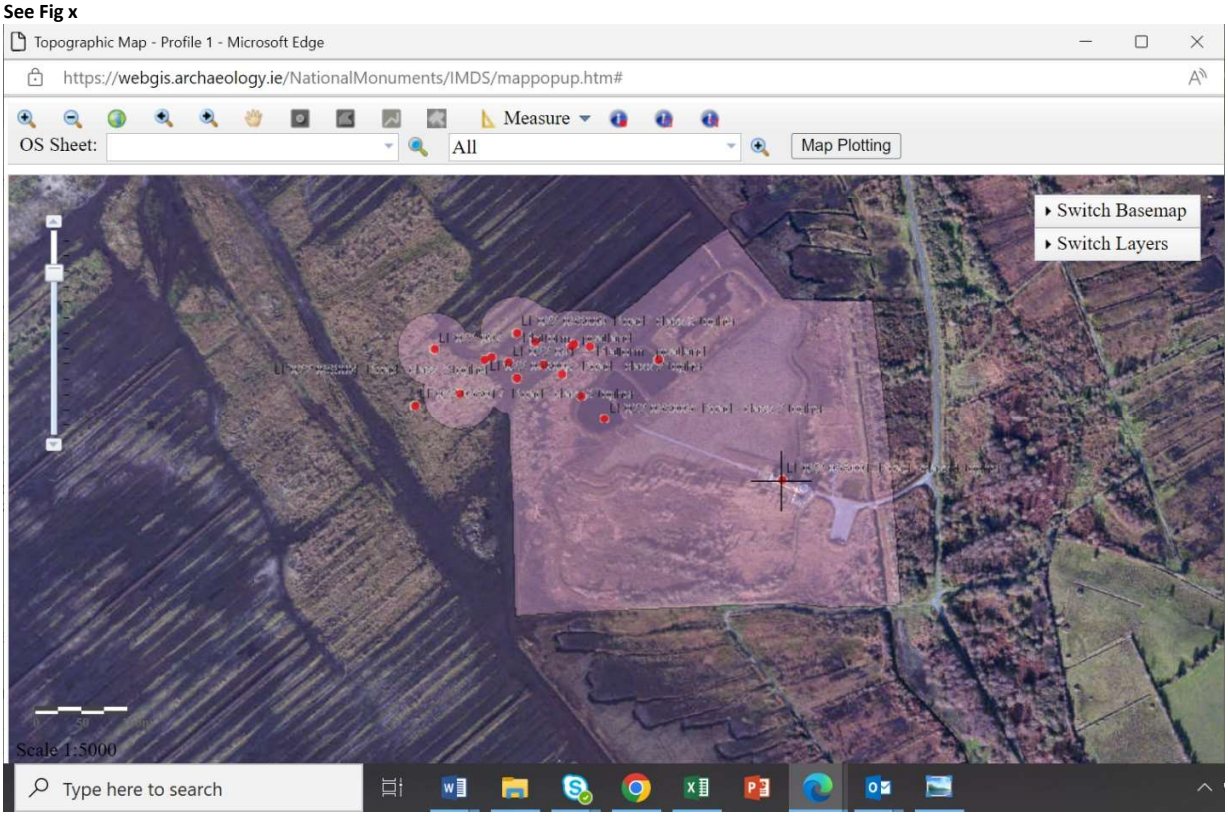


Fig 3. Full extent of the buffer zone agreed with National Monuments Service around the Corlea National Monument and the Corlea Visitor Centre (shaded area).

Conclusion

This is a desk-based archaeological assessment that includes a collation of existing written and graphic information to identify the archaeological potential of the proposed rehabilitation area. There are 19

known sightings of archaeological material in Corlea Bog. Apart from the National Monument LF022-058001-, none of the sightings are any longer extant. The area of the National Monument LF022-058001- will be enclosed within a buffer zone agreed with the National Monuments Service (see Fig 3). Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

References

DAHGI 1996. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Longford.

Raftery, B. 1996. Irish Archaeological Wetland Unit Transactions: Volume 3. Dept. of Archaeology, University College Dublin.

Whitaker, J. 2014. Re-assessment Peatland Survey 2013: Blackwater, Boora, Derrydreenagh, Mountdillon Group of Bogs County Offaly, Longford, Westmeath and Roscommon. Unpublished report for Bord na Móna.

Dr. Charles Mount
3 March 2023

APPENDIX XIII: INITIAL WATER QUALITY DATA FROM CORLEA

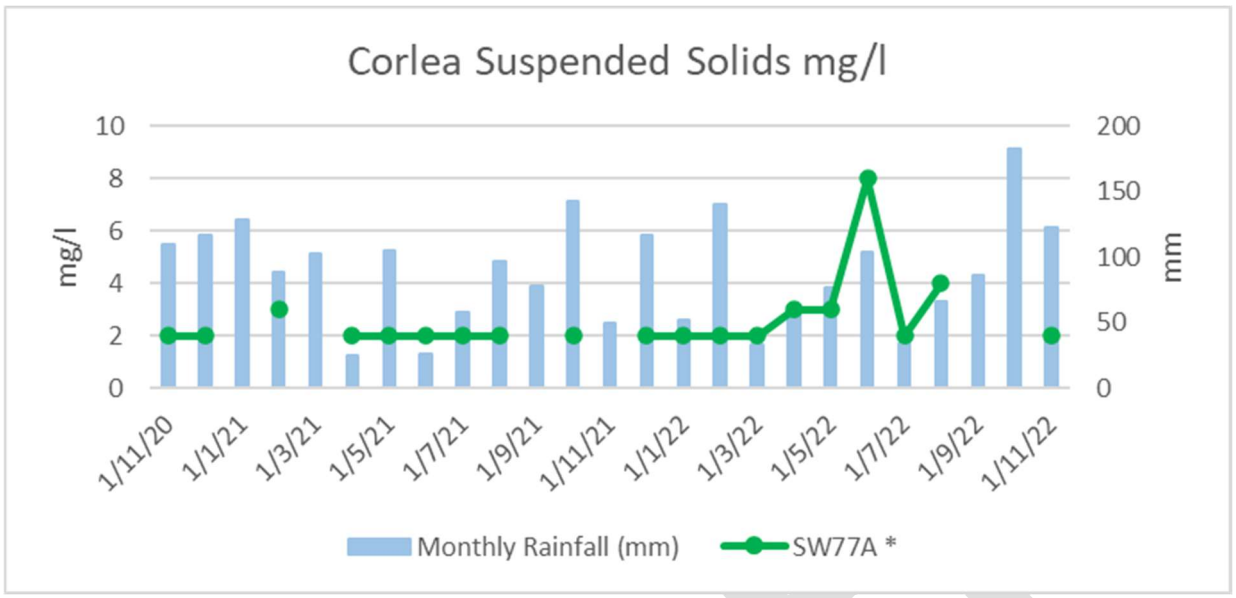


Plate 0-1 Corlea suspended solids sampling results

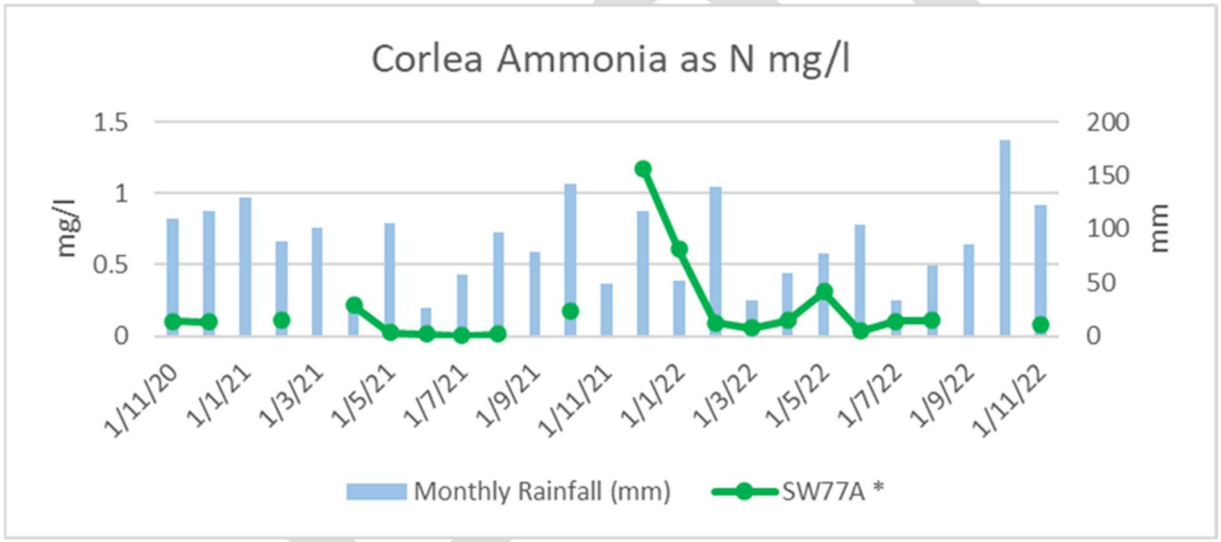


Plate 0-2 Corlea N sampling results

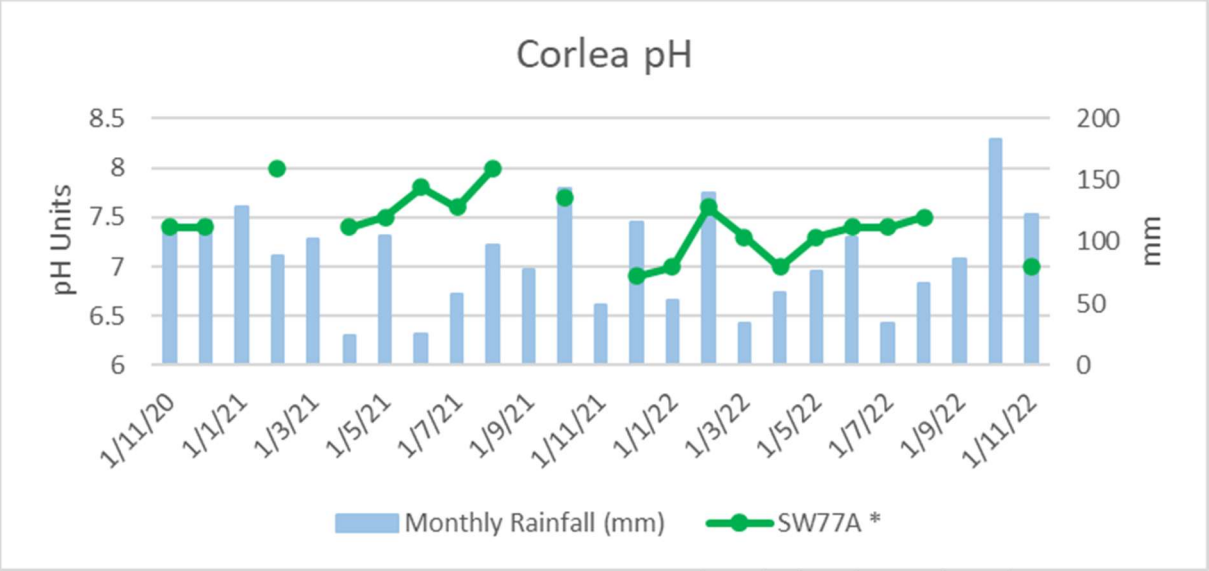


Plate 0-3 Corlea PH sampling results

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	2	2		3		2	2	2	2	2		2		2	2	2	2	3	3	8	2	4				2	
			Monthly Rainfall (mm	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1		

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	276	228	NF	164	NF	200	246	62.4	59.9	189	NF	156	NF	454	178	216	221	287	214	207	183	333	NF	NF	311		

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	78	60	NF	43	NF	61	74	23	16	68	NF	59	NF	86	41	56	74	62	43	64	59	95	NF	NF	80		

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	Ph	Ph	pH	pH	pH	pH	pH	pH	Ph	Ph	Ph	Ph	Ph	
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	7.4	7.4		8		7.4	7.5	7.8	7.6	8		7.7		6.9	7	7.6	7.3	7	7.3	7.4	7.4	7.5			7		
			Monthly Rainfall (mm	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1		

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/22	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	0.09	0.05	NF	0.05	NF	0.06	0.13	0.05	0.08	0.05	NF	0.05	NF	0.05	0.05	0.05	0.07	0.06	0.06	0.12	0.05	0.05	NF	NF	0.16		

PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	313	359	NF	173	NF	212	321	269	207	482	NF	337	NF	216	127	291	353	143	234	281	269	255	NF	NF	248		

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	0.105	0.1		0.116		0.217	0.025	0.013	0.005	0.016		0.177		1.17	0.611	0.093	0.059	0.112	0.311	0.035	0.104	0.109			0.086		
			Monthly Rainfall (mm	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1		

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	
Mountdillon	P0504-01	Corlea *	SW77A *	34.3	30.6	NF	15.8	NF	22.9	30	10.3	8.27	76.6	NF	22.3	NF	32.9	17.3	20.6	30.7	25	24.2	26.1	22.4	35.8	NF	NF	25		