Bord na Móna

Mostrim Bog

Cutaway Bog Decommissioning and Rehabilitation Plan

2023

This document seeks to address the requirements of Condition 10.2 of IPC Licence 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 Mostrim 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 Mostrim 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.*

Note: Bord na Móna has an outstanding obligation to undertake rehabilitation activities at Mostrim Bog, which will be reflected in the overall cost budget for the site.

While this document outlines the enhanced rehabilitation measures planned for Mostrim 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 Mostrim 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 Mostrim Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Mostrim Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

Table of Contents

NON-TECHNICAL SUMMARY

- Industrial peat harvesting is now finished at Mostrim Bog.
- Bord na Móna is planning to rehabilitate Mostrim Bog, located in Co. Longford & Co. Westmeath.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the Government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies. Mostrim 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 will thrive.
- Like some of the other bogs in the Mostrim group the majority of the site was ditched originally in the 1980s and the Bog has been re-ditched (drained) more recently. Part of the bog (14%) was managed for the production of commercial sod-peat up until 2018. The northern section of the bog contains a relatively large un-ditched area.
- A large portion of Mostrim with remaining deeper residual peat has the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.
- Many Bord na Móna bogs cannot be restored back to raised bog in the short-term, as so much peat has been removed and the environmental conditions have been modified. However other peatland habitats with Heather, Bog Cotton, Rushes, Purple Moor-grass, Bog-mosses and scattered trees will develop, and in time a naturalised peatland can be restored.
- As the majority of Mostrim was drained but never fully developed for industrial peat extraction, Mostrim has excellent potential for raised bog restoration. Hydrological modelling indicates that 44 ha of Annex I habitat '*Degraded Raised Bog Capable of Regeneration (7120)'* occurs on the bog. This has the potential to become Annex I *'Active Raised Bog (7110)'* following the implementation of rehabilitation measures and rewetting of the deep peat.
- The development of a range of habitats in Mostrim 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 peatland and wetland habitats.
- Measures proposed for Mostrim Bog include drain blocking and additional measures required to raise water levels to the surface of the peat (cell bunding for example). Conifer removal and stump flipping will also be implemented.
- Bord na Móna plan to carry out this work in 2023.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities

will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.

- This 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 be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon (Mostrim) Bog Group (Ref. P0504-01) (see Appendix II for details of the bog areas within this Group). 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. Mostrim Bog is located in Co. Longford.

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

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

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

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

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

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

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

It is expected that the Scheme (PCAS) will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards

carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

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

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

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

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. It is anticipated that the combination of active 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.

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.

Mostrim 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 **Mostrim Bog**.

Industrial peat extraction at Mostrim Bog permanently ceased in 2018 (having commenced in the 1980s).

Rehabilitation in parts of the bog may be constrained due to property issues or archaeological features.

Several public roads and access tracks traverse the site or are located in adjoining areas. Rights of way will remain unaffected by PCAS rehabilitation.
There is some turf cutting trespass and private turf cutting (turbary) ongoing around the site.

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 2011 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[1] outlining the Scheme (PCAS). This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Mostrim Bog, in particular, optimising climate action benefits.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best 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.

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

- DAHG (2014). Review of Raised Bog Natural Heritage Area Network. Department of Arts, Heritage, and the Gaeltacht.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- 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 2022-2027
- Bord na Móna Annual Report 2021 & 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, Mostrim Bog was surveyed in 2012. Additional surveys have also taken place between 2014 and 2023. An ecotope bog condition survey was carried out in spring 2023 to measure the current ecological condition of the site. 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, ecotope survey results 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 (2019), 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).

An ecotope survey was carried out at Mostrim in March and April 2023. The main objective of the field survey was to identify and map the ecotopes of the intact high bog and to identify any areas of active raised bog. High bog vegetation was described and mapped based on raised bog ecotope vegetation community complexes developed by Kelly *et al*. (1995) and outlined in Fernandez *et al*. (2014) with some adaptations. Ecotope mapping methodology followed Fernandez *et al.* (2014). Data was recorded using ArcGIS Field Maps on GPS enabled tablets. Ecotope community complexes were identified and mapped along with ecotope boundaries. During the ecotope survey cutover habitats were classified in accordance with the classification outlined in Smith and

Crowley (2020), or where appropriate, the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). The results of the ecotope survey are set out in the accompanying ecotope survey report.

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

3. SITE DESCRIPTION

Mostrim bog is located 3km north-east of Edgeworthstown and overlaps the Longford and Westmeath county boundary (grid reference: N 30430 74492). The majority of the bog occurs within Co. Longford while the eastern section of the bog extends into Co. Westmeath. It is part of the Mountdillon Group (Mostrim sub-group) of bogs. The bog covers an area of 439 ha.

The bog is situated east of the N55 national road between Edgeworthstown and Granard. A regional road (R395) to the east divides a smaller eastern portion of the site from the main section. The site is 'dog-leg' in shape with the western side, north-south in orientation. This section is connected to an elongated section to the north, which is orientated northwest to southeast. The eastern side of this section is separated from the main section by the regional road. For ease of description the site is divided into three main sections according to the local topography.

Mostrim Bog is a raised bog. The majority of the site was developed for peat extraction and drained in the 1980s, with further development and drainage work in the 2000's. A small portion in the north of the site remains undrained and intact. These sections of bog still retain their raised bog characteristics, apart from the impacts of the drainage. A portion of the site was used for sod moss horticultural extraction. In this section vegetation was stripped away, there was more intensive drainage work, and sod moss was removed, creating wide trenches. Industrial peat extraction has now ceased at Mostrim. The bog has also been subject to restoration work in part.

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. Ardnagullian Bog SAC is located to the north of Mostrim bog is separated from it by a band of conifer forestry. Clonwhelan Bog lies approximately 500m south-west of Mostrim Bog.

See Drawing number BNM-DR-24-17-01 titled **Mostrim Bog: Bog Site Location**, included in the accompanying Mapbook[2] , which illustrates the location of Mostrim Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

The majority of Mostrim was drained in the 1980's but never fully developed for industrial peat extraction. Industrial peat production (sod moss) began in the SW part of Mostrim Bog in the 1980's. This expanded across the southern lobe with various sections being used to extract sod moss and other sections being developed (drained and vegetation removed) in advance of further sod moss extraction.

Bord na Móna leased part of the site to another industrial peat extraction company in the 2010-2020 period. Part of the site was subject to a small amount of bog development. This ceased after legal action due to infringements of the Wildlife Act related to the bog development and disturbance of vegetation.

In 2018, Bord na Móna made the decision to cease sod moss production at Mostrim Bog. The site was then added to the Bord na Móna Raised Bog Restoration Programme. Restoration of the site was initially carried out between 2019-2021.

[2] Cutaway Bog Decommissioning and Rehabilitation Plan – Mostrim Bog Map Book

3.1.2 Current land-use

Mostrim Bog is now a Biodiversity Area and is part of the Bord na Móna Raised Bog Restoration Programme. A large portion of the site is still dominated by degraded, drained, raised bog habitat.

There is still some private turbary ongoing around the margins of the site.

3.1.3. Socio-Economic conditions

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

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

In respect of Mostrim Bog, jobs would have included those to facilitate horticultural peat production and fuel peat production for Lough Ree Power.

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

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

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

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology[3] at Mostrim Bog comprises Ballysteen Formation (dark muddy limestone, shale) with a small pocket of Moathill Formation (limestone, calcareous sandstone, shale) to the south of the bog, south of a geological faultline. Quaternary Sediment maps show Mostrim is underlain by peat, yet surrounded by inorganic deposits, including till derived from carboniferous sandstones and cherts, alluvium, with eskers comprised of gravels of basic reaction to the south of the bog.

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

3.2.2 *Peat type and depths*

Commercial peat extraction has been undertaken at Mostrim Bog only in part and even in those areas, commercial peat extraction has been a short-term process with limited peat removal from the surface. Most of the site retains relatively deep peat reserves of *Sphagnum* peat with some smaller pockets of shallow residual peat depths around the margins where the peat has been cutaway due to turf-cutting (see mapbook drawing no. BNM-DR-24-17-04- Peat Depths). It is estimated that peat depths of 3-6 m occur across most of the bog.

3.3 Key Biodiversity Features of Interest

For ease of description, Mostrim Bog is divided into three main sections (west, north and east) according to the local topography.

There is a small un-drained section at the northern end of the site that contains the best quality raised bog on the site with a former pools complex and some relic 'active' raised bog. This raised bog area has also supported breeding Curlew from (2020 were the last confirmed records).

A hydrological model developed by NPWS/RPS for estimating potential degraded raised bog capable of restoration was used to predict the extent of potential Annex I active raised bog (7110) that could develop after restoration (Mackin et al. 2017, NPWS 2017). This model predicts that 44 ha has the potential to become Annex I active raised bog. This area can be classified as the Annex I habitat, **degraded raised bog capable of regeneration** (7120). The remaining high bog is considered as supporting raised bog habitat (PB1) or cutover bog (PB4).

Marginal habitats are dominated by woody vegetation communities including heather, scrub, immature woodland and mature Birch dominated woodland. Commercial conifer forestry on high bog, cutover bog and marginal land occurs around the northern boundaries and is managed by Coillte. Unwanted feral conifer trees are spreading onto the bog from adjoining plantations.

3.3.1 Current habitats

Western section

About 50% of the western section was managed for production of commercial sod moss. Cutting of sod-moss ceased March 2018, while drying of the sod-moss blocks (splitting and walling) continued until Summer 2020. The former sod moss production area is mainly concentrated along the western and southern margins. The vegetation within this production area has been stripped away in places and the ground cover is dominated by bare peat. Sod-moss was cut from along the edges of the drains creating a regular topography with wide shallow trenches. The trenches are generally 2-3 m wide and 1 m deep. There is some Heather growing along the edges of these trenches. The majority of sod moss has been removed. In general, this area is a mosaic of bare peat and re-establishing cutover vegetation with Heather, Common Bog Cotton and Rushes all appearing.

Areas that were not used for sod moss extraction are drained with deep regular drains and still retain typical features of raised bog. Some of these sections may have been stripped of vegetation in the past but have regenerated with Heather-dominated vegetation.

Northern section

The northern section contains a relatively intact (undrained) section of raised bog (PB1) with limited drainage features concentrated around the margins. This area supports the priority EU Annex I listed habitat 'active raised bog (7110)'. This area comprises the best quality raised bog habitat onsite and is characterised by an extensive pool-hummock-hollow complex. Much of this area comprises active raised bog supporting sub-central ecotope community complexes. Areas comprising sub-central ecotope often forms mosaics with sub-marginal ecotope communities. Ground conditions are soft to very soft underfoot. *Sphagnum* cover was relatively high in this area. The un-ditched section of high bog extends to the north to a conifer plantation, some of which was planted on high bog. Some of the bog around this plantation is quite wet and has a relatively high *Sphagnum* cover.

The bog micro-topography comprises pools, hollows, hummocks, lawns and flats. There are several *Sphagnum* dominated hollows and lawns recorded in this area comprising *Sphagnum cuspidatum*, *S. papillosum*, S*. magellanicum* and several hummocks comprising *Sphagnum austinii*, *S. fuscum* and *S. capillifolium*. The liverwort, *Odontoschisma sphagni* was also present in amongst *Sphagnum* hummocks. Other species present included *Drosera rotundifolia, Aulacomnium palustre, Eriophorum vaginatum, E. angustifolium, Rhynchospora alba, Calluna vulgaris* (occasional) and *Andromeda polifolia*. There are noticeable changes along the boundary of the unditched section whereby blocked drains have resulted in significant changes in bog vegetation such as an increase in *Sphagnum* cover and *Eriophorum vaginatum* and a decrease in *Calluna vulgaris*. Water levels within drainage features have risen significantly and drainage systems are now deemed to be 'reduced' or 'non-functional' in localised areas.

The eastern side of the northern lobe is raised bog that was drained in the past. This section largely comprised raised bog of sub-marginal, marginal and Facebank ecotope quality. *Sphagnum* cover is present but is less extensive. There are two areas of poor fen and flush (PF2) that are dominated by Purple Moorgrass. Numerous colonising feral Pine are scattered over the high bog. This section has been restored and the drains have been blocked (2019-2021). Water-levels are being maintained close to the peat surface and in some sections, there is pooling of surface water, indicating the drain-blocking has been quite effective. There has been a limited ecological response to this re-wetting so far, but in some sections there is die-back of Heather and Common Bog Cotton is more extensive, which is a typical early indicator of bog re-wetting.

Marginal habitats included cutover bog (PB4), Birch woodland (WN7) and scrub (WS1). Most of the cutover areas in this section were old and had developed habitats such as Gorse and Birch scrub and wet grassland dominated by Purple Moor-grass. There is some active turf-cutting around the southern margins of this section.

Eastern section

This section is cut off from the main site by a regional road (R395). The Longford-Westmeath county boundary occurs along the eastern side of this section. The majority of the high bog in this section was drained in the past but was not utilised for sod moss production. Only a few small areas around the margins left un-ditched (it should be noted that not all this peatland is within the Bord na Móna property boundary). This part of the bog was relatively dry and comprises raised bog (PB1) of marginal and facebank ecotope quality. The vegetation is dominated by *Calluna vulgaris* in association with *Narthecium ossifragum*. This section has been restored and the drains have been blocked (2019-2021). Water levels are now being maintained close to the peat surface.

This section is also surrounded by scrub (WS1) and Birch woodland (WN7) that have developed on old cutover bog (PB4). There is some active turf cutting along the southern margin of this area.

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

Figure 3.1. Sod moss drying prior to removal at the southern end of the bog (2020).

Figure 3.1. Sod moss trench and colonisation of ridges (2020).

Figure 3.3. Northern section. Annex I Active raised bog.

Figure 3.4. Northern section. Undrained raised bog.

Figure 3.5. Northern-eastern section (2020). Drain-blocking and bog restoration

Figure 3.6. Northern-eastern section (2020). Drain-blocking and bog restoration

Figure 3.7. Northern section (2020). Conifer forestry.

Figure 3.8. Northern section (2022). Conifer forestry.

Figure 3.9. North-east section (2022). Feral conifer colonisiation.

3.3.2 Species of conservation interest

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

Multiple mammal species have been recorded on or in close proximity to the bog including Irish Hare (*Lepus timidus subsp. hibernicus*), Pine Marten (*Martes martes*) and Eastern Grey Squirrel (*Sciurus carolinensis*). Common Frog (*Rana temporaria*) has also been recorded on the bog.

Bird species of conservation interest recorded at Mostrim Bog include Snipe (*Gallinago gallinago*), European Golden Plover (*Pluvialis apricaria*), Meadow Pipit (*Anthus pratensis*) and Woodcock (*Scolopax rusticola*). Breeding Curlew (*Numenius arquata*) have previously been recorded on the bog, using the intact raised bog remnant, for several years. All of these species are currently Red listed on the most recent BOCCI list (Gilbert et al. 2021).

Breeding Curlew have been recorded on the site, using the intact raised bog remnant, for several years (2016 to 2018, absent in 2019, present in 2020- no further sightings to 2023). Targeted breeding bird surveys have been undertaken by the Bord na Móna Ecology Team and BirdWatch Ireland in line with best practice methodologies (Brown & Shepherd, 1993 & Bibby et al. 2000).

Signs of Red Grouse were also noted on the site in 2017 but the recent breeding status of this species has not been confirmed. There have been no recent records of this bog species.

3.3.3 Invasive species

The invasive species *Rhododendron ponticum* has previously been recorded from forestry in along the north-eastern margins of Mostrim Bog. There are no other NBDC or BNM records for high impact invasive species recorded from the bog.

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 a number of European Sites and Nationally Designated Sites in close proximity (i.e. within a 5km radius at minimum) to Mostrim Bog.

Ardagullion Bog SAC (site code: 002341) lies immediately adjacent to Mostrim along the eastern boundary. This EU site is designated for Active raised bogs [7110], Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150]. This SAC is also designated as a pNHA. Ardagullion Bog was also included in the recent Living Bog LIFE Project.

Garriskil Bog SAC (site code: 000679) lies approximately 5.3 km south-east of Mostrim Bog. The qualifying interests of this SAC Active raised bogs [7110], Degraded raised bogs still capable of natural regeneration [7120] and Depressions on peat substrates of the *Rhynchosporion* [7150]. This SAC is also designated as Garriskil Bog SPA (004102) designated for Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]. Garriskil Bog is also listed as a pNHA.

Glen Lough SPA (Site code: 004045) lies approximately 6 km south of Mostrim Bog. This SPA is designated for Whooper Swan (*Cygnus cygnus*). Glen Lough is also designed as a pNHA (site code: 001687) and as a Ramsar Site (site no. 849).

Lough Garr NHA (site code: 001812) is located approximately 5.5 km south of Mostrim.

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.

The closest Ramsar site to Mostrim is Glen Lough (site no. 849), approximately 6 km south of Mostrim Bog.

3.5 Hydrology and Hydrogeology

Mostrim Bog lies in the Shannon (Upper) catchment (Catchment ID: 26F/26C), as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog falls into the Inny [Shannon]_SC_050 (catchment id: 26F_8), while the northern bog margins fall into the Camlin_SC_010 (catchment id: 26C). The eastern extent of

the bog falls into the Inny [Shannon]_SC_020 (catchment id: 26F_7) and the Inny [Shannon]_SC_030 (catchment id: 26F).

There are no mapped EPA watercourses within the bog boundary. However, there are several drains around the margins of the bog that drain the bog.

Mostrim Bog has a gravity drainage regime. Hydrological modelling (BNM-DR-24-17-09 titled **Mostrim Bog: Depression analysis**) indicates that parts of the bog are in topographical basins with significant potential for re-wetting, with the assumption that all drains would be blocked.

GSI data indicates that Mostrim Bog is primarily underlain by Ballysteen Formation (dark muddy limestone, shale) with a small pocket of Moathill Formation (limestone, calcareous sandstone, shale) to the south of the bog, south of a geological faultline, which are classified as locally important aquifers - Bedrock which is Moderately Productive only in Local Zones.

Geological Survey of Ireland (GSI) mapping indicates that there are no karst features in proximity to the bog. No data exists concerning depth to bedrock.

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 entirety of the bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). Groundwater vulnerability for the area surrounding Mostrim Bog is generally of high/moderate vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to surface-water and watercourses

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.

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.

Mostrim bog has 7 treated surface water outlets from previously active sod peat extraction catchments, which discharge to Riffery River (IE_SH_26R030100 RIFFEY_010), the Coolnagun Stream (IE_SH_26C080860 Coolnagun Stream_010) and the Camlin (IE_SH_26C010050 CAMLIN_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-24-17-02 titled **Mostrim Bog: Structures and Sampling**, along with Drawing number BNM-DR-24-17-WQ01 titled **Mostrim Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Mostrim Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders. Peat extraction was identified as pressure in the second cycle of the river basin management plan and is 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 the results in 2018, under 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, broadly under the trigger level for Ammonia and under the trigger level for COD. Ammonia averaged 0.95 mg/l and ranged from 0.52 to 2.2 mg/l with Suspended Solids averaging 5mg/l.

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Mostrim	SW-120	Q2 18	Lab error	5	92	0.57	0.05	56	301
Mostrim	SW-121	Q2 18	Lab error	5	73	0.52	0.05	59	171
Mostrim	SW-115	Q2-18	Lab error	5	72	0.69	0.05	61	181
Mostrim	SW-116	Q2-18	Lab error	5	130	2.2	0.05	79	301
Mostrim	SW-117	Q2-18	Lab error	5	72	0.95	0.05	65	222
Mostrim	SW118	Q2-18	Lab error	5	142	0.62	0.06	73	306
Mostrim	SW-119	Q2-18	Lab error	5	166	1.1	0.06	47	176

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 Mostrim 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 water bodies.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3 year cycle 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.

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

Initial monthly results are included in Appendix XIV for Mostrim bog. These results cover the period from January 2023 to March 2023 and are from the surface water outlet from the sections of bog to be rehabilitated in 2023. Peat extraction ceased sod moss extraction from this bog in 2018 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 no significant trend for both SW119 and SW120. During this period ammonia displayed a slight downward trend for SW 119 and an upward trend for SW 120, with all other parameters fluctuated slightly, most likely influenced by normal weather patterns, including rainfall.

Monthly ammonia concentrations from the bog from January 2023 to March 2023 had a range of 0.064 to 2.2 mg/l with an average of 0.8 mg/l. Results for suspended solids for the same period indicate a range of 2 to 4 mg/l with an average of 2.4 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 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.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also 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 Mostrim Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key water catchments.

3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the former production area 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 into a carbon source (Waddington & McNeil, 2002; Alm *et al*., 2007; Wilson *et al*., 2007, Wilson *et al*., 2015). A natural peatland can take in 0.1 to 1.1 t of carbon as CO2-C /ha/yr while drainage and extraction can create large source of carbon dioxide releasing 1.3 to 2.2 t of carbon as CO2-C /ha/yr (based on Tier 1 Emission factors, Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

The EPA-funded CarbonRestore Project (Renou-Wilson et. al. 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the C-sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO_2 and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018). Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting at this site to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Mostrim Bog will become a reduced carbon source/part carbon sink following rehabilitation. Mostrim Bog has the potential to follow a similar trajectory to Moyarwood Bog, although the area used for sod moss extraction has a longer trajectory to become a stable naturally-functioning raised bog habitat. The potential of any raised bog 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 site is raised bog in poorer condition and has potential for raised bog restoration. Some areas of the bog are cutover bog and a range of different habitats is expected to develop in these areas. Birch woodland is expected to develop on drier, more elevated areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

The northern section contains a relatively intact (undrained) section of high bog with limited drainage features concentrated along the margins. This area supports the priority EU Annex I listed habitat 'active raised bogs (7110)' deemed to be of ***International Importance***.

The majority of Mostrim Bog can be rated as having a ***National Ecological Value (B***) as it is dominated by a relatively large area of degraded raised bog (ditched) with potential for restoration. Mostrim Bog is also listed in NPWS (2014) and was reviewed as part of the potential raised bog NHA network. The site is expected to be considered for NHA designation in the future.

Bare peat and other intensively managed areas are assessed as ***local importance (lower value)***. Marginal habitats including woodland, scrub and pioneer cutaway habitats may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be ***locally important (higher value)***.

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 Mostrim 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.
- 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.
- Site meeting in July 2019 with BnM staff, Birdwatch Ireland, NPWS and IPCC to discuss Wildlife Act infringement at Mostrim Bog in 2019 and BnM proposals for rehabilitation of Mostrim Bog.
- Meeting with NPWS in December 2019 to discuss BnM proposals for the rehabilitation of Mostrim Bog.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- 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.).

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

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

Further to the above, as a means of further notification for those based near to any proposed PCAS activities, a leaflet detailing PCAS plans for Mostrim Bog, contact details and the PCAS website address was delivered to each house within a 1Km radius of the bog.

4.2 Issues raised by Consultees

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

4.2.1 Consultation

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

4.2.2 Assessments of rehabilitation

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

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

4.2.3 Restoration scope

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

4.2.4 Monitoring

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

4.2.5 Flooding and drainage

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

queried potential for impacts on Arterial Drainage Maintenance and future drainage maintenance on the OPW maintained channels, in the case of Mostrim Bog channel C33/2/1 was highlighted as having a potential hydrological connection to the bog.

4.2.6 Future management

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

4.2.7 Other issues

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

Multiple landowners have contacted Bord na Móna expressing concern regarding the ability of said landowners to continue cutting turf and whether PCAS activities may exclude them from doing so.

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

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

4.3 Bord na Móna response to issues raised during consultation

4.3.1 Consultation

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

4.3.2 Assessments of rehabilitation

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

An Archaeological Impact Assessment (AIA) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in-situ and BNM are taking steps to identify

and avoid all known archaeology. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing stray finds that may arise during rehabilitation works.

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

4.3.3 Restoration scope

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

As part of PCAS, one of the objectives for the rehabilitation of bogs is to promote the development of a naturally functioning peatland system. BnM would envisage benefits to biodiversity on these bogs as a result of rehabilitation. The most intensive peatland re-wetting will be applied to bare peat areas. Where there are diverse habitats already present, less intensive, targeted drain-blocking will be applied. While the overall objective is to make the bog wetter and increase the footprint of wet peatland habitats, there will still be a mosaic of habitats present, including a transition from wet to drier areas of peat, in areas that cannot be re-wetted.

The local environmental conditions of Mostrim Bog are considered such, that deep peat, high bog restoration measures and some additional works measures are the most suitable rehabilitation approach for this site to optimise benefits for climate.

The bog was completely ditched and drained in the 1980's but was not brought into peat production at this point. The bog was re-ditched in 2000 but only the northern area was brought into horticultural peat production during the 2010-2020 time period.

Over much of the bog the vegetated surface was never removed and no industrial peat harvesting ever took place.

Mostrim Bog is predominantly a deep peat bog which was ditched but never brought into peat production. Peat removal from Mostrim Bog is restricted to the northern portion of the bog and some smaller areas of private, domestic turf cutting. The absence of production over much of the bog combined with previous rehabilitation measures has resulted in the retention of many of the bog's natural raised bog features. The most intensive rehabilitation measures are planned for the northern area of the bog that was subject to horticultural peat extraction. The majority of area proposed for rehabilitation is expected to develop as deep peat habitat. A key expected habitat is raised bog habitat on deeper residual peat. Degraded raised bog within the site will improve in overall habitat condition.

4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. It is proposed to monitor the improvement of some biodiversity ecosystem services. The

appearance of key species such as *Sphagnum* moss will be monitored during walk-over surveys and general monitoring visits. It is not proposed to carry out any additional monitoring of biodiversity ecosystem services at this site. Biodiversity monitoring for PCAS planned for a stratified approach with different targeted monitoring at different sites based on the site characteristics.

4.3.5 Flooding, drainage or other impacts on adjacent land.

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

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

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

4.3.6 Future management and amenity

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

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

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

4.3.7 Water quality

It is the expectation of BnM that rehabilitation measures should positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points.

4.3.8 Other issues

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

Where turbary rights exist, these will not be impacted by PCAS activities. Dialogue is ongoing with stakeholders in this regard.

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

4.3.9 Mostrim Bog and Wildlife Act infringement 2019

Up to 2019 there was still ongoing industrial peat extraction at Mostrim Bog. Sod Moss was being extracted from the southern end of the site. An additional small area was developed in spring 2019 for further sod moss extraction and vegetation was removed from this area during the bird-nesting season. A complaint was made to Bord na Móna and to NPWS in relation to this bog development and in particular the removal/disturbance of vegetation during the bird-nesting season as regulated by the Wildlife Act. Bord na Móna then ceased the bog development work and reviewed the issue internally. Bord na Móna then made the decision to cease industrial peat extraction at Mostrim Bog and to begin rehabilitation. Bord na Móna met key stakeholders at the bog in July 2019 to discuss issues and rehabilitation (BnM staff, Birdwatch Ireland, NPWS and IPCC).

A draft rehabilitation plan was then prepared and circulated with stakeholders. Comments were received and the rehabilitation plan updated. A follow-up meeting was held with NPWS staff (in December 2019 where there were further discussions about the rehabilitation of Mostrim Bog. Bog restoration started at Mostrim Bog in autumn 2019. Two excavators were deployed to block drains across the site. This work was paused in 2020 due to changes in staff and machine deployment. At that stage over 50% of the bog had been restored.

In 2023 the rehabilitation plan has now been finalised following further engagement with NPWS and measures will now be completed as part of the Peatlands Climate Action Scheme. Bord na Móna now propose to remove the conifer forestry that was planted on Mostrim Bog (BnM owned) and remove feral conifer trees from the high bog.

4.3.9 Concluding statement

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

5. REHABILITATION GOALS AND OUTCOMES

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

- Meeting conditions of IPC Licence.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in including drain-blocking to encourage raised bog restoration and the development of active raised bog habitat.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich raised bog vegetation communities on areas of bare peat formerly used for sod moss extraction, where possible.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- 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 Mostrim Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- Mostrim contains a relatively intact (undrained) section of high bog in the north of the site which already supports the priority EU Annex I listed habitat 'active raised bogs (7110)' deemed to be of international importance. Re-wetting (and other proposed measures) across the entire bog, as part of the scheme, will further improve the condition of this active raised bog.
- Mostrim Bog has the potential to further develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). However, only a proportion of the bog has potential to develop Annex I active raised bog (approximately 443 ha based on hydrological modelling) in this timeframe. Nevertheless, re-wetting or further measures such as tree removal across the entire bog, as part of the scheme, will improve habitat conditions of the whole bog.
- 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 Mostrim Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and Bord na Móna).
- Bord na Móna have rehabilitated several bogs in the Mountdillon bog group, including Glenlough and are also planning rehabilitation measures in other nearby bogs in 2023. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features. An Archaeological Impact Assessment (AIA) is to be carried out under the PCAS scheme.

6. SCOPE OF REHABILITATION

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

- The area of Mostrim Bog.
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Mostrim bog is part of the Mount Dillon 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 Mostrim 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 Mostrim Bog mean that raised bog restoration and deep peat measures are the most suitable rehabilitation approach for this site. Mostrim Bog has a gravity drainage regime and has residual deep peat.
- 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 Mostrim Bog as **environmental stabilisation**, **optimising residual peat re-wetting, and the development of active raised bog along with the development of embryonic *Sphagnum*-rich raised bog vegetation communities on areas formerly used for sod moss extraction**.
- Consultation and engagement with various stakeholders. Bord na Móna agreed to restore Mostrim Bog in 2018 and have proposed several rehabilitation measures after consultation and engagement with stakeholders.
- Rehabilitation of Mostrim 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.
- Current land-uses. Boundary drains will be maintained to act as a hydrological break between Glenlough Bog and adjoining lands.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites, like Mostrim Bog, where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. At Mostrim Bog, some areas were drained but never harvested. Other areas were used to extract sod moss. The variation in drainage regime across these land use types will create unique hydrological conditions that create differing rehabilitation requirements.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation

management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

- **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 Mostrim Bog. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. There is one known right of way at Mostrim Bog along the western boundary. 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.
- **Turbary.** Some areas of active turbary are excluded as they are currently being used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Mostrim Bog.
- **High Voltage Power Lines.** 10kV, 20kV and 38kV power lines run overhead to the north western entrance to the bog. These power lines should be given due consideration when planning access/egress routes and rehabilitation works. No rehabilitation works are proposed in proximity to the power line which provides an adequate buffer. Other than the area that is constrained, the power lines will have no impact on the proposed rehabilitation measures.

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:

- Active turbary areas are excluded.
- The longer-term development of stable naturally functioning habitats at Mostrim 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 Mostrim Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what 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 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;
- Improvement of the condition of raised bog habitat; and
- Mitigation of key emissions (e.g. potential run-off of suspended solids).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via 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 silt run off and to encourage and accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

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

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

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

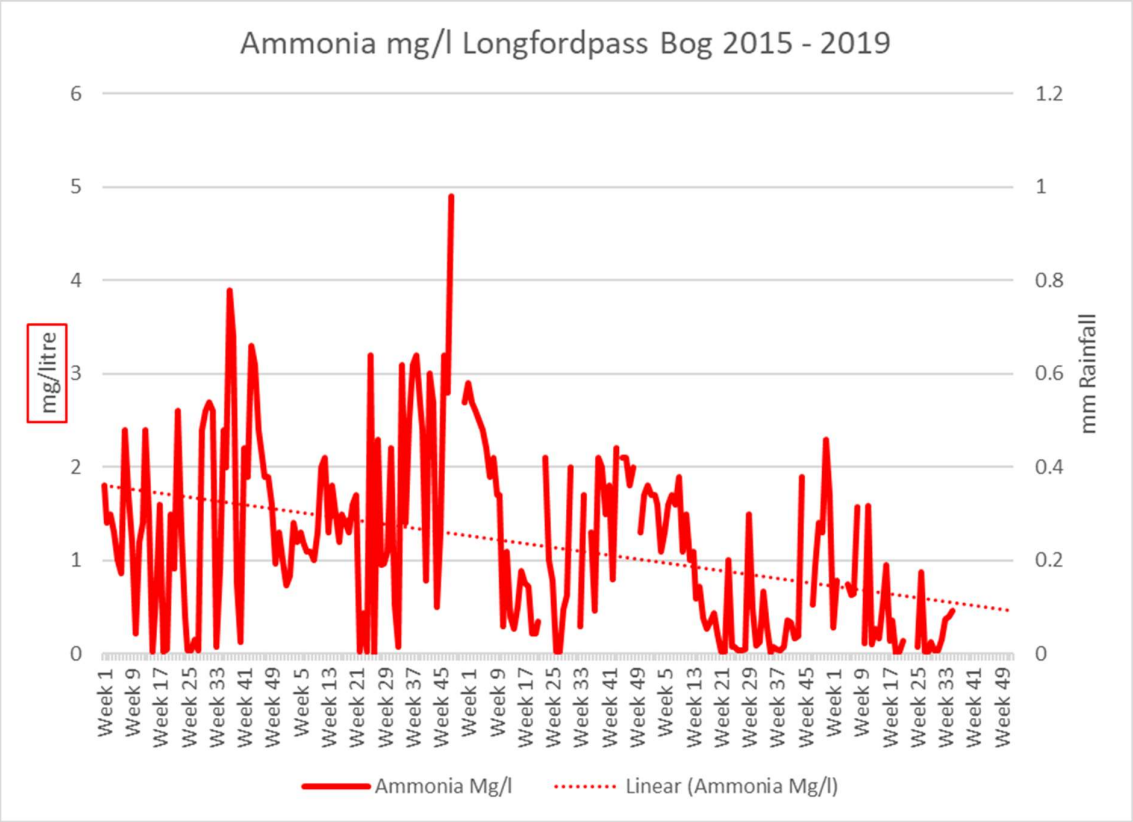

Plate 7-1 Ammonia levels over the period 2015-2019 at Longfordpass.

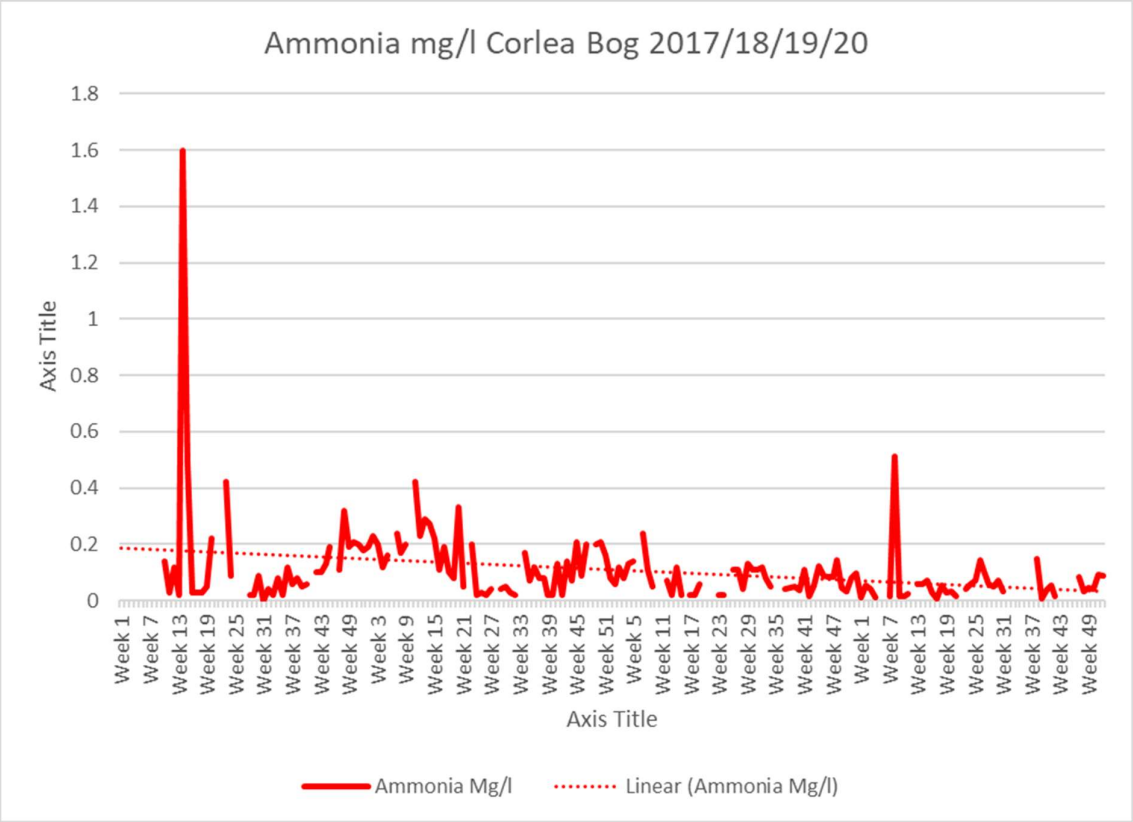

Plate 7-2 Ammonia levels over the period 2017-2020 at Corlea.

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

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

via aerial photography, habitat mapping and cutaway/raised bog habitat condition assessment. Baseline monitoring will be carried out after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.

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	2022-2024
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
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	2023-2025

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

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, LiDar Surface Maps, and Depression Analysis modelling; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-DR-24-17-22 titled **Mostrim Bog: Aerial Imagery 2020**

BNM-DR-24-17-03 titled **Mostrim Bog: LiDAR Map**

BNM-DR-24-17-09 titled **Mostrim Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-24-17-05 Mostrim Bog: Enhanced Rehabilitation Measures** in the accompanying Mapbook (note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the rehabilitation measures.)

These measures for Mostrim will include (see Table 8.1):

- Raised bog restoration measures including intensive drain-blocking (7/100 m);
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Trench drain blocking (max 3/100) (DPT6). Re-use damaged or unsalable sod moss stock to block drains and trenches on the sod moss area – if possible. This measure was initially proposed by Bord na Móna in February 2020.
- Bord na Móna originally proposed (in February 2020) trialling different innovative methods to establish optimum water levels for the establishment of *Sphagnum*-rich peat-forming vegetation in the former trenches of the sod moss area. In some trenches water levels would be brought the surface of the bog. In other trenches water levels will be raised to re-wet the peat surface (< 10 cm of surface water). Some trenches would be infilled and levelled where suitable material is available. Cell bunding could be carried out in these areas. The extent of each approach will to be determined following a baseline survey after peat stock is removed from the overall area, and consideration is given to logistical issues such as ground conditions and stability, and hydrological modelling.
- These innovative measures for the former sod moss area been adapted and implemented at Glenlough Bog in a similar area formerly used for sod moss extraction where BnM have adapted a methodology to block former trench drains created by sod moss extraction (DPT6).
- Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;
- Removal of conifer forestry from the high bog (Forest to Bog restoration). A small part of the high bog was planted with conifer forestry. It is proposed to remove this forestry to support raised bog restoration.

Trees will be felled and removed, conifer stumps will be "flipped", the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. This new innovative approach requires engagement and agreement with the Forest Service. This enhanced bog restoration measure is proposed to be carried out as a trial at Mostrim Bog to learn new techniques and to inform the feasibility and potential to use these new techniques at other sites to remove conifers (See Appendix XIII). This measure is dependent on funding available for this type of rehabilitation.

- Removal of feral self-sown conifer trees from the high bog. Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration. This measure was initially proposed by Bord na Móna in February 2020.
- Monitor excavator disturbance caused by the bog restoration measures across the bog. Reduce long-term impacts by alternating routes across the bog. This measure was initially proposed by Bord na Móna in February 2020.
- 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).

Table 8-1 Types of and areas for rehabilitation measures at Mostrim Bog.

Type*	Rehab Code	Enhanced Rehabilitation Measure	Extent (Ha)
Deep Peat	DPT 2	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows	84.66
Deep Peat	DPT 4	Berms and field re-profiling (45x60m cell), modifying outfalls and managing overflows & drainage channels for excess water	18.56
Deep Peat	DPT6	Trench drain Block (max 3/100)	72.22
Conifer removal	TCT1	Removal of self-seeded feral conifers from high bog. Fell to waste. This area overlaps with areas that have already had previous drain-blocks.	140.61
Forest to bog	FTB1	Forest to Bog. Agreement with the Forest Service, felling of conifers, removal of felled material, where possible, reprofiling the planting area (stump-flipping and surface-smoothing), Drain-blocking.	13.75
Marginal land	MLT1	No work required	41.19
Additional Work	AW1 & AW2	Additional drain blocking	23.93
Silt ponds	Silt pond	Silt ponds	2.84
Constraint	Constraint	Constraint	41.46
Total			**439.39**

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

This section was the subject of targeted raised bog restoration around the southern margins undertaken in 2015. Peat dams were installed in drainage ditches surrounding the unditched section of raised bog to raise water levels in the intact section and to create a buffer.

8.1 Completed

- A small amount of drain-blocking around the intact bog remnant was carried out in 2015 to provide a re-wetted buffer to this area.
- Bord na Móna decided to cease industrial peat extraction at the bog in 2018. Consultation was carried out with various stakeholders in 2018.
- A drone survey was carried out in 2018 of the former sod moss production area.
- An ecological impact assessment was carried out in 2019 to assess potential impacts from bog restoration on species of particular sensitivity using Mostrim Bog (breeding Curlew).
- Bog restoration started in 2019 and carried on until 2021. This took account of the breeding Curlew by not operating in the sensitive area during the breeding season. Restoration of this section was then carried out outside the breeding season. A significant area of the bog has already had drains blocked as per guidelines published by the National Parks and Wildlife Service (Mackin et al., 2017) and in line with methodologies employed by McDonagh (1997). The drain-blocking was completed by an excavator and followed a levelling survey to determine best location of drain blockages relative to surface contours.
- Sod moss has been removed from the former production area prior to completing restoration measures. It was proposed by Bord na Móna that any unused sod moss would be used to block drains and trenches on the sod moss area – if possible.

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

- Seek formal approval of the 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 plan) with the Scheme regulator.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies (The Scheme PCAS) will be applied to Mostrim Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or receptors such as invasive species is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment of the Rehabilitation Plan.

- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of bunding and drain blocking on deep peat, in addition to stump flipping and hydrological 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 run-off of suspended solids 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.

8.4 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 Licence is surrendered.

8.5 Timeframe

- **2022-2023**: Short-term planning actions.
- **2023-2024**: Short-term practical actions.
- **2024-2025**: Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2025**: Decommission silt-ponds, if necessary.

8.6 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, 2022). 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).

Bord na Móna proposes to implement some innovative rehabilitation measures at Mostrim Bog, specifically the removal of conifers and forest to bog rehabilitation. This will be subject to approval from the Forest Service and may require additional funding support.

9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime, but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of

rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.

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

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

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

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

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

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

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

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MOSTRIM DECOMMISSIONING AND REHABILITATION PLAN - ADDENDUM 1

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon 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. Mostrim Bog is located on the Co. Westmeath and Co. Longford border.

This addendum outlines the findings of the Appropriate Assessment reporting carried out in respect of proposed PCAS activities at Mostrim Bog.

Appropriate Assessment Reporting Findings

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

The concluding statement of this report reads as follows:

> *'Following screening it can reasonably be concluded that there is no likelihood of significant effects to the above European Sites because of the proposed project, either alone or in-combination with other plans or projects. Therefore, the potential for significant effects these European Sites has been excluded, the Project has been 'Screened Out' from the Appropriate Assessment process, no Appropriate Assessment is required'.*

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

[4] Delichon Ecology (2023). Article 6 (3) Appropriate Assessment Screening Report. Mostrim Bog, Co. Longford,

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 Mostrim Bog.
- EPA IPC Licence - Ref. P0504-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Mostrim Bog is part of the Mountdillon Bog Group.
- The current condition of Mostrim Bog.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Boundary drains around Mostrim Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Mostrim 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 deep peat raised bog in the former area of industrial peat production and to encourage development of vegetation cover in the sod moss area via natural colonisation, thereby reducing the area of bare exposed peat.
- Setting the high bog on an accelerated trajectory towards developing active raised bog habitat (ARB), where possible, with the re-development of *Sphagnum*-rich vegetation on the high bog and wetter conditions across the high bog in general. The critical success factors are the presence of indicators of re-wetting and establishment of wetter conditions across the bog. Indicators include blocked bog drains with high water levels at the bog surface, shallow surface water in small basins across the high bog and increasing *Sphagnum* cover.
- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia).
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are 'At Risk' from peatlands and peat extraction. The success criteria will be that the 'At Risk' classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

Rehabilitation targets

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

Rehabilitation measures:

- Blocking field drains in drier sections of the former industrial production area using a dozer to create regular peat blockages (three blockages per 100 m) along each field drain.
- Re-alignment of piped drainage; and management of water levels to create/enhance existing wetlands.
- No measures are planned for the majority of 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:

- 2023-2024. 1st phase of rehabilitation. Field drain blocking.

- 2025. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2025-2026. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2025-2026. Decommission silt-ponds, if necessary.

Table AP 1 Rehabilitation measures and target area.

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	378.34
Marginal Land	MLT1	No work required	44.66
Other	Silt Pond	Silt ponds	2.84
Other	Constraint	Rights of Ways and constrained areas/buffers/Archaeology	13.55
Total			439.39

See Drawing number BNM-DR-24-07-20 titled Mostrim **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, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.
- Water quality monitoring will be established.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- 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 Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites (EPA, 2012) when:

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

APPENDIX II: BOG GROUP CONTEXT

The 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 former 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), the BnM power station at Edenderry, or for horticultural peat products.

Industrial peat extraction in the Mount Dillon Bog Group ceased in 2019. Both power stations ceased using peat by the end of 2020. All remaining peat stocks will also be removed by 2023. 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 the majority 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 former 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 Licence 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 Derrycashel 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
Corlea	163	Cutaway Bog Industrial peat production commenced at Corlea Bog in 1960 and ceased in 2018. Long-term peat extraction has reduced peat reserves on this bog. Corlea is considered a shallow peat cutaway bog.	The former production area at Corlea has already extensively colonised. Pioneer wetland and scrub development has occurred over much of the site. Some wetland and rehabilitation management was undertaken between 2016-2018. Part of site leased to local community development group to develop amenity walkway in association with Longford County Council.	2018	To be finalised 2023
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 the proposed Derryadd Windfarm Project (in pre-planning).	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	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	To be finalised 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		the former production area has shallow peat reserves. Some pockets of deep peat remain. Derryadd 2 is considered a shallow peat cutover bog.			
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 the proposed Derryadd Windfarm project (in pre-planning). An amenity walkway through part of Derryarogue is proposed for the Derryadd Windfarm project	2020	To be finalised 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	To be finalised 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

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Erenagh	93	Cutover Bog Development for industrial peat production commenced at Erenagh Bog in 1970's. Erenagh is considered a deep peat cutover bog.	Erenagh Bog formerly supplied a range of commercial functions including; fuel peat for Lough Ree Power. 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.	2020	Draft 2017
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	To be finalised 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	To be finalised 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 proposed Derryadd Windfarm Project (in pre-planning).	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	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	2020	Draft 2017

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		shallow and the peat is considered cutaway. Some deep peat remains on the west of the site. Mount Dillon is considered a shallow peat cutaway bog.	time. These areas have already extensively colonised with pioneer cutaway, wetland and scrub vegetation communities.		

Table Ap-2b: Mount Dillon Bog Group names, area and indicative status (Mostrim sub-group).

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Clonwhelan	212	Development Bog. Clonwhelan Bog was drained in the 1980's but never brought into commercial peat production. Clonwhelan is a deep peat development bog.	Rehabilitation complete Raised bog restoration completed 2019	N/A	Finalised 2018
Clynan	402	Development Bog. Clynan Bog was drained in the 1980's. Sod peat production occurred around the margins and over a portion of the site.	Clynan Bog formerly supplied horticultural peat (sod moss) & fuel turf. Some rehabilitation work has been carried out on Clynan bog East already to buffer an undrained bog remnant. Raised bog restoration potential.	2020	To be finalised 2023
Coolcraff	412	Cutover Bog Industrial peat production commenced at Coolcraff Bog in the 1980's. The site was developed for milled peat production 2015-2018. Deep peat reserves remain over the majority of the former production area.	Coolcraff Bog formerly supplied a range of commercial functions including; horticultural peat. Much of the former production area at Coolcraff is bare peat. One section of high bog to the north of the site was excluded from production and so never developed on the basis of high conservation value raised bog habitat.	2020	Draft 2017
Coolnagun	668	Cutaway Bog Industrial peat production commenced at Coolnagun Bog in 1941. Coolnagun is considered a deep peat cutover bog with areas of shallow cutaway.	Coolnagun Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Much of the former production area at Coolnagun is bare peat. Some small patches of pioneer cutaway vegetation communities are developing. Some bog restoration work was undertaken already along the eastern margin.	2020	Draft 2017
Glenlough	328	Development bog Glenlough Bog was first developed in the 1980's. It was re-ditched in 2003-2005. Only a small part of the bog was fully brought into peat production for sod peat. Deep peat reserves remain over the majority of the former production area. Some of the bog has never been	Glenlough Bog formerly supplied a range of commercial functions including; horticultural pea. Degraded high bog vegetation remains over the majority of the bog. The former production area is a mosaic of vegetation. This site has raised bog restoration potential.	2020	Finalised 2022 Rehabilitation ongoing

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
		subject to commercial peat extraction.			
Milkernagh	627	Cutover Bog Industrial peat production commenced at Milkernagh Bog in 1950. Long-term peat extraction has created shallow cutaway in places. Deep peat reserves remain in parts on the former production area. Milkernagh is considered cutover bog with variable peat depths. Milkernagh has a pumped drainage regime.	Milkernagh Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Much of the former production area at Milkernagh is bare peat. Pioneer cutaway vegetation communities are developing in places.	2020	Draft 2017
Mostrim	442	Development Bog/Cutover Bog The majority of Mostrim was drained but never developed. Industrial peat production commenced in parts of Mostrim Bog in the 1980's. Peat extraction has significantly affected parts of this bog but deep peat reserves remain on the former production area.	Mostrim Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat for Lough Ree Power. Raised bog restoration at Mostrim is ongoing with > 50% completed by Jan 2021.	2020	To be finalised in 2023 Reheb to recommence in 2023.

See Drawing number BNM-DR-23-17-24 titled **Mount Dillon Bog Group**, included in the accompanying Mapbook which illustrates the location of Glenlough 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:	**Mostrim**	**Area (ha):**	449ha
Works Name:	Mostrim	**County:**	Longford
Recorder(s):	MMC, DF & BO'L	**Survey Date(s):**	01/03/2010, 27/01/2011, 24/04/2014, 05/2016, 25/05/2017 & 16/05/2018

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Raised bog (PB1) (Codes refer to Heritage Council habitat classification, (Fossitt 2000), See Appendix II)
- Cutover Bog (PB4)
- Pioneer dry heath (dHeath) (in the active and inactive sod-peat area)
- Scrub (WS1) (on cutover bog)
- Birch woodland (WN7) (on cutover bog)
- Poor fen and flush (PF2) (part of high bog)
- Wet grassland (GS4) (around margins)
- Improved grassland (GA1) (around margins)
- Conifer plantation (WD4) (northern boundary and margins of high bog – Coillte managed)
- Buildings and artificial surfaces (BL3) (roads, tracks and hard surfaces – gun club)

Description of site

Mostrim bog is located just 3km north-east of Edgeworthstown in Co. Longford. The eastern end of the site extends into Co. Westmeath. The site is situated to the east of the N55 National Road between Edgeworthstown and Granard. The R395 regional road bisects the main bog at the south-eastern section of the site. The site is a 'dog-leg' in shape with the western side north-south in orientation. This section is connected to an elongated section to the north, which is orientated North-west-South-east. A small mineral island extends between these two sections. For ease of description, the site is divided into three main sections (west, north and east) according to the local topography.

This bog is part of the Mostrim group of bogs. Similar to other bogs within the Mostrim bog group, the majority of the site was ditched originally in the 1980's. The bog was re-ditched in subsequent years. A significant proportion of the site (14%) was previously zoned for commercial sod-peat production. Ditching and production at this bog has had a significant impact on the quality of the habitat and the majority of the remaining raised bog is now degraded and firm underfoot. There is a small unditched section towards the northern end of the site that contains the best quality raised bog habitat and comprises a developed micro-topography with pools, hollows, hummocks, lawns and flats. This area supports the priority EU Annex I listed habitat 'active raised bogs (7110)' deemed to be of international importance. This area was the subject of targeted restoration work during 2015 whereby peat dams were installed in drainage ditches surrounding the unditched section of raised bog. The main objective of bog restoration is to improve the condition of the raised bog habitats on site and the restoration, where possible, of active raised bog habitat. This is achieved by raising the water table of the high bog through drain blocking measures thereby creating favourable baseline hydrological conditions to encourage the establishment and colonisation of *Sphagnum* mosses, the main peat forming agent of active raised bogs. This is an important component of the rehabilitation process as it serves to stabilise the bog remnant and prevent silt run-off and erosion of peat from the high bog (Condition 10 of the IPC Licence).

Western section

Up until recently, the western section was managed for commercial sod peat production. The former sod moss production areas are mainly found along the western and southern margins. The western part was active up until May 2018 and piles of sod-peat were stacked on the surface, waiting removal. The vegetation within this production area has largely been stripped away and the ground cover is dominated by bare peat. Sod-peat is extracted from along the edges of the drains creating a regular topography with wide shallow trenches and ridges. The trenches are generally 2-3m wide and 1m deep. There is some Heather growing along the edges of these trenches where production may have periodically ceased.

Further south-east the production bog is currently inactive and vegetation is re-colonising on the bog. This pioneer vegetation was classified as pioneer Dry heath (dHeath) and dominated by Heather. Bare peat is still a prominent feature and Purple Moor-grass is spreading in some sections. Common Bog Cotton and Deer-grass and also frequent colonisers of the bare peat between the drains/trenches. Typical raised bog (PB1) features have been stripped from the bog and there is very little *Sphagnum* development.

The remaining high bog is mainly composed of a vegetated acrotelm and corresponds to raised bog (PB1). This section also contains one large flush (Poor fen and flush (PF2)) and several smaller flushes. There was formerly a complex hydrological feature on this bog that connected the smaller flushes to the north with the large main flush to the south. Remnants of flushed features can be seen all throughout the central area of the bog. However, ditching processes have had a significant impact on this feature. This area is dominated by Purple Moor-grass (*Molinia caerulea)* with stands of Ling Heather (*Calluna vulgaris)*. Although the area is an inactive flush, there is a high abundance of *Sphagnum* moss hummocks in localised pockets along the boundary. Other mosses comprise *Pleurozium schreberi* in association with *Empetrum nigrum*. The large flush and several of the smaller flushes are similar in nature. In some instances, Purple Moor-grass has spread to infill some of the drains running through the flushes. Black Bog-rush (*Schoenus nigricans*) was noted in one of the flushes but was infrequent. There are stands of Birch trees scattered over these flushes with patches of scrub containing Bramble, Bracken, Bilberry and Willow spp. Bog Myrtle is also frequent. At some locations, the scrub is more developed and there are small pockets of Birch woodland (WN7). The woodland is poorly developed with most stems < 10 cm in dbh (diameter at breast height). The wooded sections were generally dry and comprised Bilberry, Bracken, Broad-Buckler Fern and extensive cover of mosses including *Hypnum cupressiforme*, *Hylocomium splendens*, *Pseudoscleropodium purum*. Oak was noted in one of the smaller flushes to the north. Cranberry, Crowberry and Bog Rosemary were all frequently found over extensive hummocks in some of the wetter parts of the flush concentrated to the north. Water is pooling around some of the smaller flushes and several drains have been blocked, however, the majority of these flushes are dry underfoot and degraded due to impacts associated with drainage. The main flush has been significantly disturbed by a large old drain orientated north-east-south-west that cuts across the bog.

The high bog is generally dry and firm underfoot with deep functional drainage systems. There is no sign of any natural infilling of drains apart from around some of the flushes. The vegetation of the high bog is typical of this habitat and leggy Heather is dominant in the central zone (somewhat flushed). Towards the eastern margin Heather is dominant but appears to be dying back and there are occasional degraded hummocks of S. *papillosum* and *S. capillifolium*. Marginal ecotope is the dominant raised bog ecotope present on the high bog with <10% *Sphagnum* cover. Vegetation comprises *Calluna vulgaris, Eriophorum vaginatum, E. angustifolium, Erica tetralix, Cladonia portentosa, Narthecium ossifragum*, *Carex panicea* and *Andromeda polifolia*. *Sphagnum* mosses include *Sphagnum capillifolium* and *S. papillosum*. There were scattered trees such as birch and pine recorded at various sections on the high bog, an indicative sign that drainage is having an ongoing negative impact on the high bog.

Occasionally, areas supporting marginal ecotope communities formed mosaics with sub-marginal ecotope complexes and conditions became progressively wetter moving away from marginal areas. In instances where mosaics were recorded, these areas supported a greater diversity of wet bog plant communities including *Sphagnum* mosses such as *Sphagnum magellanicum, S. subnitens, S. austinii, S. capillifolium, S. cuspidatum, S. papillosum* and plants such as *Rhynchospora alba,* and *Drosera rotundifolia*. Conditions ranged from firm to soft underfoot with infilling of bog vegetation and mosses noted in adjoining drainage ditches. *Sphagnum* cover ranges from <10% to 30%.

Old cutover bog adjacent to the southern margin of the production bog is also being used during production. Access tracks have been cut through scrub and Birch woodland and some of the cutover bog has been used for storage of sod-peat and equipment. Old cutover bog is also found adjacent to the high bog along the eastern margin. This has been undisturbed for some time and is developing secondary habitats such as scrub and Birch woodland. Cutover bog with bare peat can be found along the western margin. Up until 2018, domestic peat cutting was quite intensive along this margin and the cutover bog is much more disturbed and dominated by pioneer habitats with bare peat, Rush spp. and Purple Moor-grass prominent.

Northern section

The northern section contains a relatively large intact area of raised bog. The drainage ditches surrounding this section were the subject of targeted raised bog restoration work undertaken in 2015. Peat dams were installed in drainage ditches surrounding the unditched section of raised bog to raise the bog hydrology in this area and prevent further drainage. This area still retains good examples of a developed micro-topography and supports areas of active raised bog. It contains an extensive pool-hummock-hollow complex that was previously at risk of drying out. Much of the northern section of the bog comprises active raised bog supporting sub-central ecotope community complexes. Areas comprising sub-central ecotope often forms mosaics with sub-marginal ecotope communities. The raised bog restoration work is having a positive impact on this area as indicted by the raised water levels within drainage channels when compared to scientific investigations undertaken at the site prior to restoration works. Ground conditions are soft to very soft underfoot. The bog micro-topography comprises pools, hollows, hummocks, lawns and flats. There are several Sphagnum dominated hollows and lawns recorded in this area comprising *Sphagnum cuspidatum, S. papillosum, S. magellanicum* and several hummocks comprising *Sphagnum austinii* (*S. imbricatum*), *S. fuscum* and *S. capillifolium*. The liverwort, *Odontoschisma sphagni* was also present in amongst *Sphagnum* hummocks. Other species present included *Drosera rotundifolia, Aulacomnium palustre, Eriophorum vaginatum, E. angustifolium, Rhynchospora alba, Calluna vulgaris* (occasional) and *Andromeda polifolia*. There are noticeable changes along the boundary of the unditched section whereby blocked drains have resulted in significant changes in bog vegetation such as an increase in Sphagnum cover and *Eriophorum vaginatum* and a decrease in *Calluna vulgaris*. Water levels within drainage features have risen significantly and drainage systems are now deemed to be 'reduced' or 'non-functional' in localised areas.

Some pools appeared to be drying out while others comprised some surface standing water. This is likely attributed to the survey time of year (summer months of 2018) which coincided with high evaporation rates as all pools were inundated with surface water during the previous winter months (winter 2017/18). *Sphagnum* cover was deemed to be high (40-60% cover in places). Extensive lawns of White beak-sedge are associated with pools present. Conditions are characterised as very soft to quaking underfoot. Relic hummocks of *S. imbricatum* are found along some of the edges of pools in the inter-pool areas and *S. fuscum* is also present. Some low hummocks of *Aulacomnium palustre* were also present in wetter sections. The inter-pool areas within the wettest section also have good quality *Sphagnum* cover, mainly *S. capillifolium* and S. *papillosum*. The un-ditched section of high bog extends to the north to a failed conifer plantation, some of which was planted on high bog. Some of the bog around this plantation is quite wet and has relatively high *Sphagnum* cover.

Marginal habitats included cut away bog (PB4), Birch woodland (WN7) and scrub (WS1). All of the cutover areas in this section were old and had developed habitats such as Gorse and Birch scrub and wet grassland dominated by Purple Moor-grass. This section of the site supports a pair of breeding Curlew, a red listed bird species of conservation concern in Ireland (BoCCI).

The habitat onsite conforms to the EU Annex I habitats 'active raised bog (7110)' and is deemed to be of international importance.

Eastern section

The eastern section is cut off from the main site by a regional road (R395). The Longford-Westmeath county boundary crosses the eastern side of this section. The majority of the high bog in this section has been ditched with only a few small areas around the margins left un-ditched (it should be noted that not all of the bog remnant at this location is within the Bord na Móna property boundary). The eastern section of the bog is very dry and comprises degraded raised bog (PB1). The majority of this section supports marginal and facebank ecotope community complex dominated by *Calluna vulgaris* in association with *Narthecium ossifragum*. Other bog plants and lichens present include *Eriophorum vaginatum, Eriophorum angustifolium*, *Trichophorum germanicum*, *Andromeda polifolia*, *Carex panicea*, *Erica tetralix*, *Rhynchospora alba*, *Cladonia portentosa* and *Cladonia floerkeana*. *Sphagnum* cover is <5% and comprises mosses including *Sphagnum capillifolium* (subsp. *rubellum*) (occasional relic hummocks (rare)), *S. papillosum* and *S. tennellum*. *Hypnum jutlandicum* is abundant where it occurs in association with *Calluna vulgaris,* while areas comprising bare peat have colonised with *Campylopus introflexus*. Much of the high bog in the eastern section comprises overgrown stands of *Calluna vulgaris*. Drainage ditches are ca. >1m deep and are characterised by functional drainage systems with little infilling of *Sphagnum* mosses and bog vegetation. Conditions are dry and firm underfoot throughout much of this section of bog. Many of the pools and hollows have completely dried out and disappeared and trees comprising several trees including Lodgepole Pine (*Pinus contorta*) and Birch (*Betula pubescens*) have started to encroach and colonise the high bog.

The section of bog remnant to the east of the R395 comprises similar ecological conditions; however, the bog remnant comprises a number of active hollows in the centre of the bog. These areas comprise *Sphagnum* infilled hollows dominated by lawns of *Sphagnum cuspidatum*, *S. papillosum* and hummocks of *S. capillifolium*. Other species include *Eriophorum angustifolium, Andromeda polifolia, Rhynchospora alba, Calluna vulgaris* and *Narthecium ossifragum.* Conditions are soft to very soft underfoot. This area is surrounded by marginal ecotope and constitutes the majority of the high bog. Conditions are firm underfoot and dominated by *Eriophorum vaginatum* and *Calluna vulgaris* (Complex 9/7). Drainage ditches are functional with some infilling of bog vegetation noted. This section of the bog is

deemed to be of national importance due to the presence of the EU Annex I listed habitat 'degraded raised bogs still capable of natural regeneration (7120)'.

This section is also surrounded by scrub and Birch woodland that have developed on old cutover bog.

Ardgullion Bog

This bog is a separate peatland that is located to the north of Mostrim. This bog is designated as a cSAC. The Mostrim Bord na Móna property includes several plots of land on this bog that have never been developed. The bog remains undeveloped.

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

None on the main Mostrim peatland.

The Mostrim property also includes several plots located on Ardgullion bog to the north of Mostrim bog. Ardgullion bog is and intact raised bog and is designated as a cSAC (NPWS site code 002341) for the presence of 'active' raised bog.

Adjacent habitats and land-use

- Typical marginal peatland habitats including remnant high bog (PB1), cutover bog (PB4), scrub (WS1) and Birch woodland (WN7).
- Commercial conifer forestry on high bog, cutover bog and marginal land around the northern boundaries - managed by Coillte.
- Improved grassland (GA1) and wet grassland (GS4) that are both grazed by cattle. Much of this grassland is grazed during the summer and fodder is also cut.
- Several roads cut through the site or are located adjacent to the site.

Watercourses (major water features on/off site)

- Several streams and drains on the west side of the site drain towards the Camlin River (part of Shannon catchment)
- Streams and drains on the east side of the site drain towards the Inny River, which flows towards Lough Ree (Shannon catchment)

Fauna biodiversity

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

- Curlew (breeding).
- 3 Snipe were noted on the high bog.
- Woodcock (1) on the most easterly section of the bog.
- Red Grouse (droppings recorded in 2018).
- Other more common birds were noted on the site. These included Blackbird (in scrub on cutover bog).

Mammals

- Mammal tracks criss-cross the high bog.
- Signs of Hare were noted on the high bog and adjacent cutover bog.
- Pine Marten scat in the area of Birch woodland along the northern boundary.

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).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[5] will be adhered with throughout all rehabilitation measures and activities.

Rhododendron is present on site and best practice measures will be implemented as part of proposed forest to bog operations to avoid the spread/dispersal of this species.

[5] 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 licence, 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 and EU Climate and Biodiversity Policy

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

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

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

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

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

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

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

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

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

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

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

4 National Peatlands Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6 National Biodiversity Action Plan 2016-2021

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

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

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

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

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

Item	Description	Mostrim 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	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not applicable
7	Decommissioning or Removal of Septic Tanks	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.

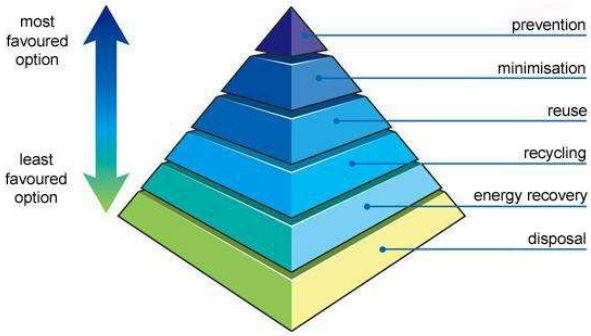
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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

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

APPENDIX VIII. GLOSSARY

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

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

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat, but in a location (i.e. 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 the Scheme, which is proposed to be 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 Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

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

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

Restoration: Ecological restoration 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 located in Co. Longford/Co. Westmeath.

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 in the Mountdillon bog group are serviced by 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:
Edenderry Power Station 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' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

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

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

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is

through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

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

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

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

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

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

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

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

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

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

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

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

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

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

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

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

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

10.2 Cutaway Bog Rehabilitation Plan:

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

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

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

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

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the 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.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

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

APPENDIX XI. CONSULTATION SUMMARIES

Table APX -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Department of Agriculture, Food and the Marine	General Email Contact	15/07/2023	Email		
Mostrim	Head of Ecological Assessment - NPWS	General Email Contact	15/07/2023	Email		
Mostrim	Department of Housing, Local Government and Heritage NPWS	General Email Contact	15/07/2023	Email		
Mostrim	National Museum of Ireland	General Email Contact	15/07/2023	Email		
Mostrim	Dept of Agriculture Food & the Marine	Environmental_Co-ordination@agriculture.gov.ie;	15/07/2023	Email		
Mostrim	Department of Environment, Climate and Communications	General Email Contact	15/07/2023	Email		
Mostrim	Dept of Rural and Community Development	INFO@DRCD.gov.ie;	15/07/2023	Email		
Mostrim	Minister for Environment, Climate and Communications	General Email Contact	15/07/2023	Email		
Mostrim	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Eoghan.murphy@agriculture.gov.ie;	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Oireachtas	General Email Contact	15/07/2023	Email		
Mostrim	An Taisce	heritage@antaisce.org;	15/07/2023	Email		
Mostrim	Environmental Protection Agency	General Email Contact	15/07/2023	Email		
Mostrim	Inland Fisheries Ireland	General Email Contact	15/07/2023	Email		
Mostrim	Local Authority Waters Programme (West and Border Region)	General Email Contact	15/07/2023	Email		
Mostrim	Local Authority Waters Programme	General Email Contact	15/07/2023	Email		
Mostrim	Local Authority Waters Programme (Midlands and Eastern Region)	General Email Contact	15/07/2023	Email		
Mostrim	Teagasc	General Email Contact	15/07/2023	Email		
Mostrim	The Heritage Council	General Email Contact	15/07/2023	Email		
Mostrim	Waterways Ireland	info@waterwaysirELAND.ORG;	15/07/2023	Email		
Mostrim	An Forum Uisce (The Water Forum)	INFO@THEWATERFORUM.IE;	15/07/2023	Email		
Mostrim	Coillte	General Email Contact	15/07/2023	Email		
Mostrim	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	15/07/2023	Email		
Mostrim	Irish Water	General Email Contact	15/07/2023	Email	03/08/2023	Email
Mostrim	Office of Public Works	General Email Contact	15/07/2023	Email	09/08/2023	Email

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	CARO (Climate Action Regional Office) Eastern and Midlands	General Email Contact	15/07/2023	Email		
Mostrim	Bat Conservation Ireland	info@batconservationiRELAND.ORG;	15/07/2023	Email		
Mostrim	Birdwatch Ireland	INFO@BIRDWATCHIRELAND.IE;	15/07/2023	Email		
Mostrim	Butterfly Conservation Ireland	conservation.butterfly@gmail.com;	15/07/2023	Email		
Mostrim	COUNTY LONGFORD SHOOTING & CONSERVATION COUNCIL	General Email Contact	15/07/2023	Email		
Mostrim	Eastern and Midland Regional Assembly	General Email Contact	15/07/2023	Email		
Mostrim	Friends of the Irish Environment	Admin@friendsoftheirishenvironmENT.ORG;	15/07/2023	Email		
Mostrim	ICMSA (Irish Creamery Milk Suppliers Association)	**General Secretary** General Email Contact	15/07/2023	Email		
Mostrim	ICMSA (Irish Creamery Milk Suppliers Association)	**President** General Email Contact	15/07/2023	Email		
Mostrim	ICMSA (Irish Creamery Milk Suppliers Association)	**Chairperson rural affairs committee** General Email Contact	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	ICSA (Irish Cattle and Sheep Farmers Association	**INFO@ICSAIRELAND.COM;**	15/07/2023	Email		
Mostrim	Irish Environmental Network (Agriculture and Land Use Policy and Advocacy Officer)	General Email Contact	15/07/2023	Email		
Mostrim	Irish Farmers Association	**DEPUTY.PRESIDENT@IFA.IE;**	15/07/2023	Email		
Mostrim	Irish Farmers Association	**INFO@IFA.IE;**	15/07/2023	Email		
Mostrim	Irish Farmers Association (Senior Policy Exec)	General Email Contact	15/07/2023	Email		
Mostrim	Irish Farmers Association (Galway/Leitrim/Longford/Rosc/Sligo)	General Email Contact	15/07/2023	Email		
Mostrim	Irish Farmers Association (Leitrim/Longford/Roscommon/Sligo)	General Email Contact	15/07/2023	Email		
Mostrim	Irish Peatlands Conservation Council	bogs@ipcc.ie;	15/07/2023	Email	23/08/2023	Email
Mostrim	Irish Raptor Study Group	**SECRETARY@IRSG.IE;**	15/07/2023	Email		
Mostrim	Irish Rural Link (Community Wetlands Forum)	General Email Contact	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Irish Rural Link	INFO@IRISHRURALLINK.IE;	15/07/2023	Email		
Mostrim	Irish Wildlife Trust	info@iwt.ie;	15/07/2023	Email		
Mostrim	IWAI	General Email Contact	15/07/2023	Email		
Mostrim	Longford Wilderness Park (Clandillon Civil Consulting)	General Email Contact	15/07/2023	Email		
Mostrim	Longford Wilderness Park (Longford County Council)	General Email Contact	15/07/2023	Email		
Mostrim	Longford Wilderness Park	REGENERATION@LONGFORDCOCO.IE;	15/07/2023	Email		
Mostrim	National Association of Regional Game Councils	HEADOFFICECONTACT@NARGC.IE;	15/07/2023	Email		
Mostrim	National Association of Regional Game Councils	CHAIRMAN@NARGC.IE;	15/07/2023	Leaflet		
Mostrim	NPWS Rangers North Midlands (Westmeath Bogs)	General Email Contact	15/07/2023	Email		
Mostrim	NPWS Rangers North Midlands	General Email Contact	15/07/2023	Email		
Mostrim	NUIG Galway	General Email Contact	15/07/2023	Email		
Mostrim	PPN Longford Public Participation Network	ppn@longfordcoco.ie;	15/07/2023	Email		
Mostrim	ORNI	General Email Contact	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Ranger Association Committee	General Email Contact	15/07/2023	Email		
Mostrim	Mid-Shannon Wilderness Park Awareness Group	midshannonwildernesspark@gmail.com;	15/07/2023	Email		
Mostrim	Sustainable Water Action Network (SWAN)	info@swanireland.ie;	15/07/2023	Email		
Mostrim	Trinity College Dublin	General Email Contact	15/07/2023	Email		
Mostrim	Turf Cutters and Contractors Association	General Email Contact	15/07/2023	Email		
Mostrim	UCD / Irish Rural Link	General Email Contact	15/07/2023	Email		
Mostrim	University College Dublin	General Email Contact	15/07/2023	Email		
Mostrim	Waterways Ireland	General Email Contact	15/07/2023	Email		
Mostrim	Woodlands of Ireland	info@woodlandsofireland.com;	15/07/2023	Email		
Mostrim	University of Galway	General Email Contact	15/07/2023	Email		
Mostrim	Longford County Council	General Email Contact	15/07/2023	Email	05/09/2023	Email
Mostrim	Chief Executive Longford County Council	General Email Contact	15/07/2023	Email		
Mostrim	Longford County Council - Heritage Officer	General Email Contact	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Longford County Council - Director of Services for Community and Enterprise	General Email Contact	15/07/2023	Email		
Mostrim	Lonford County Councillors - Granard District	gmurtagh@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Lonford County Councillors - Granard District	tmcgovern@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Lonford County Councillors - Granard District	pbrady@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Lonford County Councillors - Granard District	cdalton@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Lonford County Councillors - Granard District	pjreilly@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	pnolan@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	uadejinmi@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	jbrowne@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	sbutler@longfordcoco.ie;	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Longford County Councillors - Longford	ghagan@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	mmonaghan@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Councillors - Longford	gwarnock@longfordcoco.ie;	15/07/2023	Email		
Mostrim	Longford County Council	communications@longfordcoco.ie;	15/07/2023	Email		
Mostrim	TD/Longford	peter.burke@oireachtas.ie;	15/07/2023	Email		
Mostrim	TD/Longford	sorca.clarke@oireachtas.ie;	15/07/2023	Email		
Mostrim	TD/Longford	joe.flaherty@oireachtas.ie;	15/07/2023	Email		
Mostrim	TD/Longford	robert.troy@oireachtas.ie;	15/07/2023	Email		
Mostrim	PPN Westmeath Public Participation Network	info@westmeathppn.ie;	15/07/2023	Email		
Mostrim	Irish Farmers Association (Laois Offaly and Westmeath Office)	offaly@ifa.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Chief Executive	General Email Contact	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Director of Service	General Email Contact	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Westmeath County Council Executive Directors	info@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Council Heritage Officer	General Email Contact	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	john.shaw@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	emily.wallace@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	andrew.duncan@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	mdollard@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	aoife.davitt@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	denis.leonard@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	kenglynn@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	hazel.smyth@westmeathcoco.ie;	15/07/2023	Email		

Bog Name	Contact Organisation	Contact Name	Date of Issue	Format	Date Response Received	Response Format
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	billy.collentine@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	fmcdermott@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Westmeath County Councillors - Mullingar-Kinnegad	phill@westmeathcoco.ie;	15/07/2023	Email		
Mostrim	Minister of State at the Department of Enterprise, Trade and Employment	robert.troy@oireachtas.ie;	15/07/2023	Email		

Table APX -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Office of Public Works (OPW)	OPW responded via e-mail on 09/08/2023 and advised that Mostrim Bog, does not overlap with any OPW Arterial Drainage Scheme channels. The OPW requested information from BnM on the following points 1) Does BnM envisage any impacts or constraints on OPW carrying out normal Arterial Drainage Maintenance activities on particular OPW Inny scheme channels arising as a result of PCAS activities at Mostrim. 2) A small area at the south-eastern part of Mostrim bog is within the "Benefited Boglands" of the Inny Arterial Drainage Scheme, therefore the OPW is seeking clarification from Bord na Móna with regard to future drainage maintenance liabilities for the OPW on this bogland that will be rewetted during the decommissioning and rehabilitation of this bog. The OPW also expressed support for PCAS in general.	BnM responded on 16/08/2023 with reply to the OPW's main points. BnM advised as follows; 1) BnM don't envisage any impacts or constraints which would restrict OPW from carrying out its ADM activities 2) BnM do not envisage that there will be any requirement for OPW drain maintenance activities to support the hydrological requirements of Bord na Mona's lands at Mostrim Bog.
IPCC	The IPCC made a specific submission on Mostrim Bog as well as on plans for other PCAS bogs throughout the duration of the project. A number of key points regarding climate resilience, biodiversity opportunities and issues, and hydrology have been discussed.	Dialogue is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
Longford County Council	Longford Co. Council responded on the 05/09/2023 to acknowledge receipt of engagement contact.	Dialogue is ongoing.
The Irish Wildlife Trust	The IWT have not made a specific submission on Mostrim bog but have responded to consultation regarding PCAS on other sites. IWT have outlined their support for the principal purpose of PCAS.	Dialogue is ongoing.
Minister of State for Heritage and Electoral Reform, Malcolm Noonan, T.D.	Responded via email on the 16/02/2023 to request a phone call to discuss an upcoming information presentation.	
Uisce Éireann/Irish Water	Uisce Éireann responded to engagement on the 15/07/2023 to acknowledge receipt of engagement and voice support for PCAS.	

Organisation	Summary of Response by Stakeholder	BnM Response
Local Landowner A	A local property owner contacted BnM via email to express concerns regarding the potential for flooding arising from PCAS activities.	BnM community liaison officer met with the landowner to discuss BnM PCAS plans and reassure them that BnM would take every precaution to prevent adverse impacts on neighbouring lands.
Local Landowner B	A local group of people cutting turf in an area of Mostrim Bog have contacted BnM as individuals and as a group to discuss turf cutting and the future of same at Mostrim Bog.	BnM have met with and discussed this issue with the people involved and dialogue is ongoing.
Department of Housing, Local Government and Heritage	The Department of Housing, Local Government and Heritage responded via email to acknowledge receipt of the rehabilitation consultation email.	No response required.
Irish Farmers Association	The IFA have not made a submission on any specific PCAS rehab plan this bog but dialogue is ongoing regarding PCAS and consultation with IFA members in the vicinity of PCAS bogs	Dialogue is ongoing.

Organisation	Summary of Response by Stakeholder	BnM Response
ICMSA (Irish Creamery Milk Suppliers Association)	The ICMSA have not made a submission on this bog but dialogue is ongoing regarding PCAS and consultation with ICMSA members in the vicinity of PCAS bogs	Dialogue is ongoing.

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: 13/10/2020**

1) Purpose

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

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

2) Procedure

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

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

Your Archaeological Liaison Officer is ……

3) Records

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

Archaeological Impact Assessment of Proposed Bog Decommissioning and Rehabilitation at Mostrim Bog, Co. Longford

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation on c.534 hectares at Mostrim 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 Mostrim Bog will include:

- Raised bog restoration measures including intensive drain-blocking (7/100 m);
- Modifying outfalls, and management of water levels with overflow pipes and blocking of internal outfalls;
- Bord na Móna originally proposed (in February 2020) trailing different innovative methods to establish optimum water levels for the establishment of Sphagnum-rich peat-forming vegetation in the former trenches of the sod moss area. In some trenches water levels would be brought the surface of the bog. In other trenches water levels will be raised to re-wet the peat surface (< 10 cm of surface water). Some trenches would be infilled and levelled where suitable material is available. Cell bunding could be carried out in these areas. The extent of each approach was to be determined following a baseline survey after peat stock was removed from the overall area, consideration of logistical issues such as ground conditions and stability, and hydrological modelling.
- These innovative measures for the former sod moss area have since been adapted and implemented at Glenlough Bog in a similar area formerly used for sod moss extraction where BnM have adapted a methodology to block former trench drains created by sod moss extraction (DPT6).
- Re-wetting the deep peat in the cutover areas of the bog using berms and peat dams. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (levels at peat surface +/- 10 cm) water conditions on bare areas and vegetated areas of cutover bog;
- Removal of conifer forestry from the high bog (Forest to Bog restoration). A small part of the high bog was planted with conifer forestry. It is proposed to remove this forestry to support raised bog restoration. Trees will be felled and removed, conifer stumps will be "flipped", the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. This new innovative approach requires engagement and agreement with the Forest Service. This enhanced bog restoration measure is proposed to be carried out as a trial at Mostrim Bog to learn new techniques and to inform the feasibility and potential to use these new techniques at other sites to remove conifers (See Appendix XIII). This measure is dependent on funding available for this type of rehabilitation.
- Removal of feral self-sown conifer trees from the high bog. Conifers from adjacent plantations have colonised the bog. These trees will be felled to waste to support raise bog restoration. This measure was initially proposed by Bord na Móna in February 2020.
- Re-use damaged or unsalable sod moss stock to block drains and trenches on the sod moss area – if possible. This measure was initially proposed by Bord na Móna in February 2020.
- Monitor excavator disturbance caused by the bog restoration measures across the bog. Reduce long-term impacts by alternating routes across the bog. This measure was initially proposed by Bord na Móna in February 2020.

- 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).

Mostrim Bog is located c.2.6km north-east of Edgeworthstown and directly south of the N55 road. The bog rehabilitation area occupies the townlands of Assagh, Clonca, Cloonshannagh or Coolambermanor Demesne, Cranalagh Beg and More, Gortanear, Lissanore, Moatavally and Ringowny, on OS 6-inch sheets Longford No. 15 and Westmeath No. 2.

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

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

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

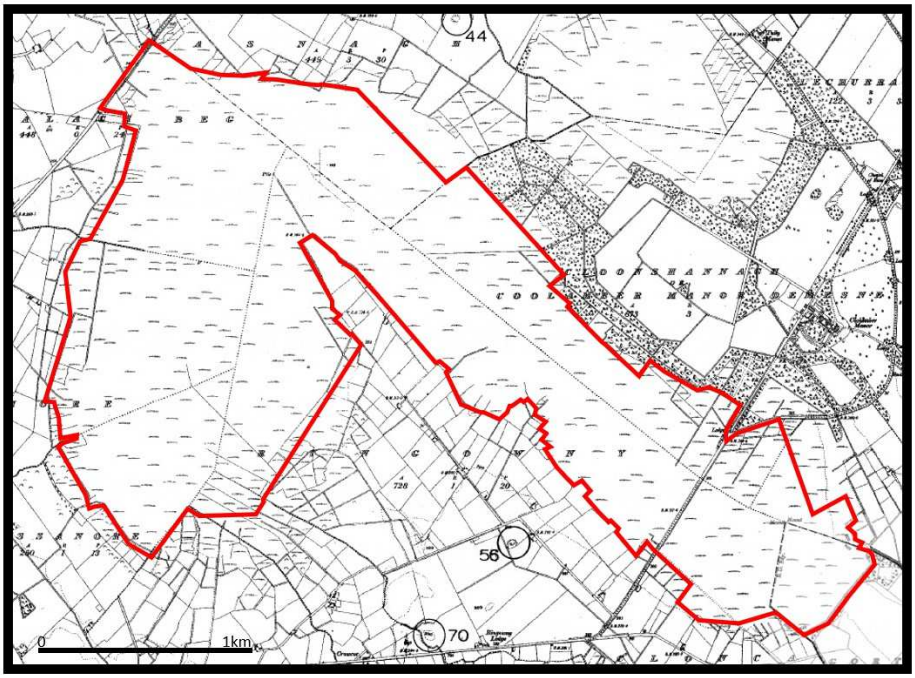


Fig. 1. Mostrim Bog, Co. Longford, detail of the Record of Monuments and Places map sheets Longford No. 15 and Westmeath No. 2. The proposed rehabilitation area is outlined with the red line.

Desktop assessment

Peatland survey

Mostrim Bog has not been the subject of peatland archaeological survey.

Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Longford and Co. Westmeath which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1996 and 1997). These records were published by the Minister in 1996 and 1997 include sites and monuments that were known in Mostrim Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 13th of June 2023. This review established that there are no SMRs located in the proposed rehabilitation area (see Fig. 2).

Archaeological Excavations

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

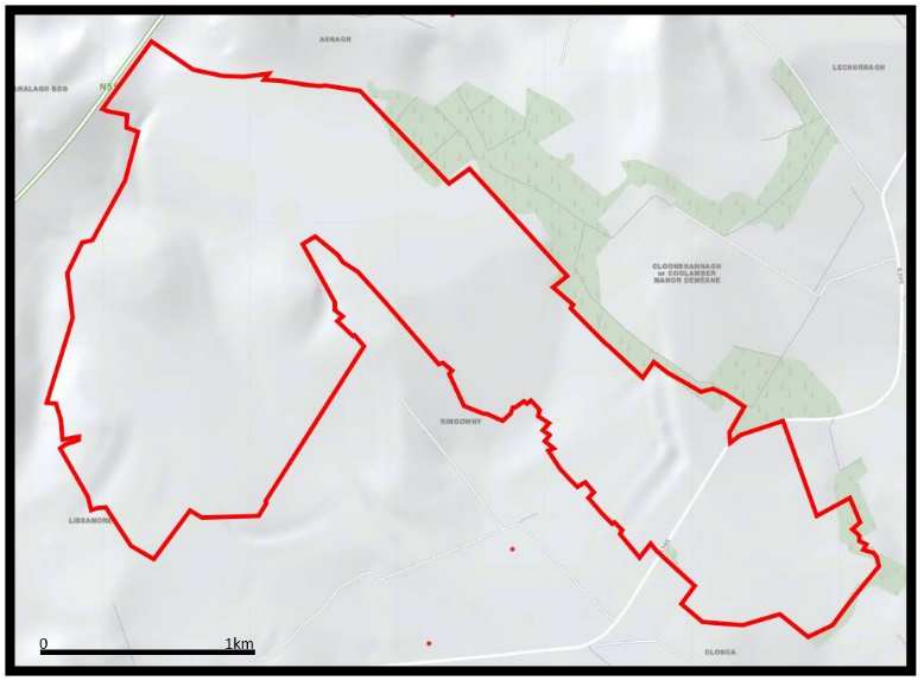


Fig. 2. Mostrim Bog, Co. Longford, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line.

Previous assessments

Mostrim Bog has been the subject of an Environmental Impact Assessment Report (EIAR) carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0504-01. This assessment included a review of the topographical files and finds registers of the National Museum of Ireland intended to identify all archaeological objects from the bog reported to the Museum by that date and these are included below in Table 1 (Pers Comm. Jane Whitaker). The assessment noted that there was a high potential for archaeological heritage to be uncovered during the course of any future development works in Mostrim Bog.

Reported finds

As noted above the EIAR carried out by Irish Archaeological Consultancy LTD in in relation to IPC Licence P0504-01 contains a complete list of known archaeological objects from Mostrim Bog reported to the National Museum of Ireland up to 2018 (see Table 1).

Townland	Museum No./ catalogue No.	Description
Cranalagh More	2011:284-5	Bog butter contained in a wicker vessel
Moatavally	1955:33	Wooden deer trap

Table 1. List of archaeological finds from Mostrim Bog reported to the National Museum of Ireland.

Impact assessment

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

Recommendations

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

Conclusion

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

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

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

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

Dr. Charles Mount
13 June 2023

APPENDIX XIII. FOREST TO BOG RESTORATION.

There have been several case-studies and examples of the removal of planted conifer forestry from raised and blanket bogs to support raised bog restoration in Ireland and Britain. Mackin et al. (2017) provided case studies and guidance for the removal of forestry from raised bogs carried out by Coillte in Ireland. Key issues include

- establishing if a forestry crop is commercially viable;
- ground conditions, the use of a forestry harvester and the use of brash;
- limiting impacts to the bog surface;
- the potential for peat-forming bog vegetation;
- blocking forestry drains;
- timing of forestry operations;
- re-planting obligations;
- re-growth of trees.

Forest to bog restoration is gaining more and more interest in Scotland, Wales and England, particularly when considering the value of peatlands as a carbon store, carbon sink potential and other ecosystem services like biodiversity. Forest to bog restoration is seen as one way to lower carbon emissions from areas of peatlands that were planted with forestry (Hermans et al. 2019, Anderson 2021). It may take 15-20 years after restoration before there is a net positive climate action impact. Forest biomass (the timber) is a sink for carbon and forest to bog restoration is only recommended for conifer stands where there is a low conifer yield class. However, the long-term climate action benefit of continued forestry management on these deep peats is not likely to match the benefits of peatland restoration as forestry management requires drainage, which drives carbon emissions from the peat .

Felled-to-waste restoration (felling trees and allowing them to decompose naturally) has largely been replaced by newer management approaches (whole tree harvest, re-profiling, furrow blocking), which have the potential to accelerate recovery of water table and vegetation (Anderson 2017, Hermans et al. 2019, Anderson 2021). One key issue highlighted by the original trials and research was the regrowth of trees that were colonising the somewhat drier low ridges in the peatland that were originally created when the peatland was drained. New methods to counteract this issue include re-profiling of the drained peatland surface to flatten out this micro-topography. This includes stump-flipping, where conifer stumps are pulled out and pushed back into the bog to remove a slightly drier mound. Surface smoothing is a technique that flattens out the ridges created by drainage. These new techniques, in addition to drain-blocking, create a surface where there are optimised water levels close to the bog surface and this will help reduce new tree colonisation as the bog is recovering.

Bord na Móna worked with NPWS and private contractors to apply these techniques to a small area of Carrenagappaul Bog, Co. Galway as part of the recent Living Bog LIFE Project.

The Forestry Commission in England (Forestry Commission 2022) have recently published a draft decision-making support tool to support decisions about forestry and peat, when to restore peatlands, when to re-plant forestry, when to fell and allow development of a different habitat and when to establish new woodland/forestry on peat soils. The application of this tool to the conifer forestry on the Mostrim site indicates that forest to bog restoration is appropriate as:

- This is a deep peat raised bog site with peat depths of between 3-6 m.

- There is important habitat on site (Annex I active raised bog and degraded raised bog capable of restoration)
- The conifer trees are likely to be having a negative impact of the condition of this habitat.
- This overall site (Mostrim Bog) has been identified as having high restoration potential and is targeted for restoration.
- The yield class for the planted conifers on the bog is less than YC10.

It is proposed to trial forest to bog restoration at Mostrim Bog. The target area (approx. 13.5 ha) is relatively small and suitable to be developed as a trial. Trees will be felled and removed, conifer stumps will be "flipped", the bog surface will be reprofiled (smoothed) and the drains will be blocked to encourage the redevelopment of bog vegetation. Bord na Móna will engage with practitioners of forest to bog restoration in Britain to be able to apply these new techniques at Mostrim Bog. This trial will allow Bord na Móna to learn new forest to bog techniques and will inform the feasibility and potential to use these new techniques at other sites to remove conifers. The first step of this proposed restoration is to engage and reach agreement with the Forest Service.

APPENDIX XIV. INITIAL WATER QUALITY DATA FROM MOSTRIM BOG

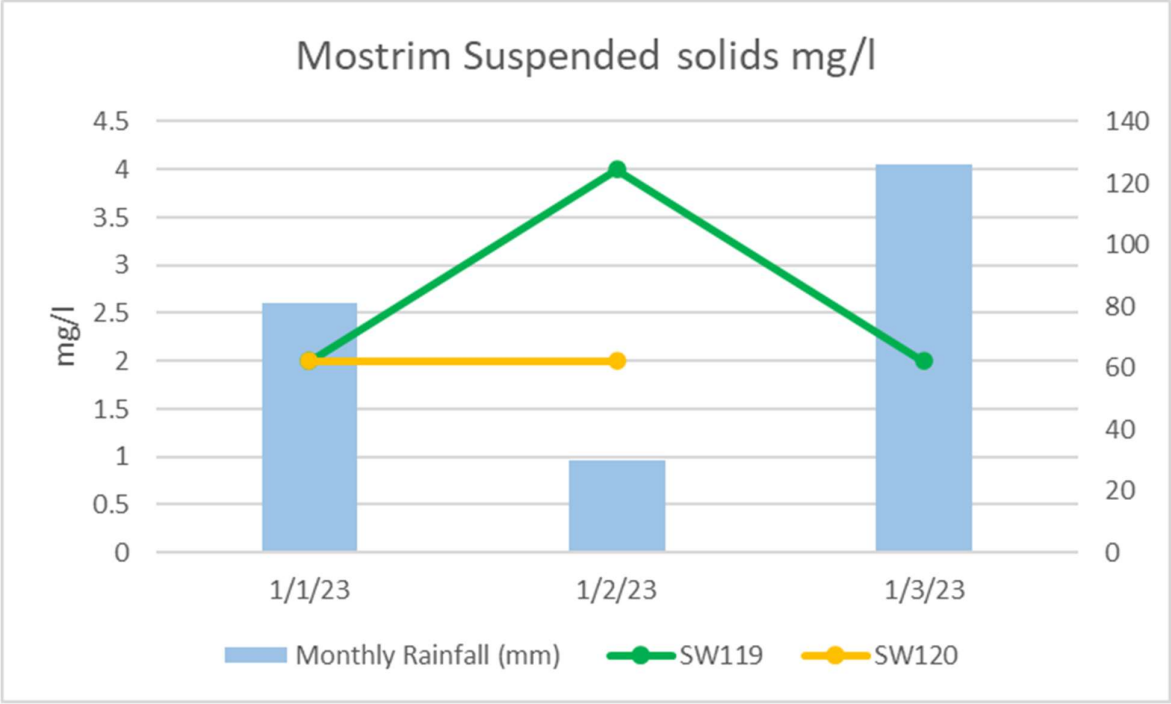


Figure AP13.1. Suspended solids in water sampling at Mostrim bog from different discharge points.35 mg/l is the emission limit value.

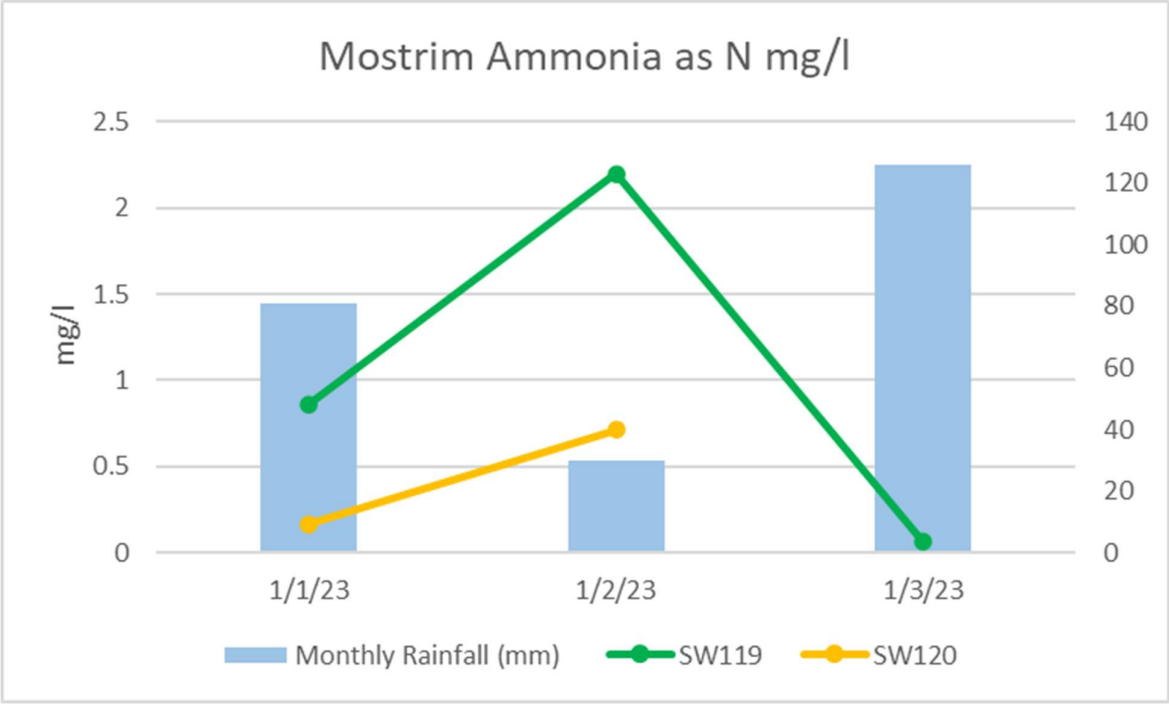


Figure AP13.2. Ammonia concentrations in water sampling from Mostrim bog from different discharge points. The main trigger level for ammonia is 1.42mg/l for reporting to EPA.

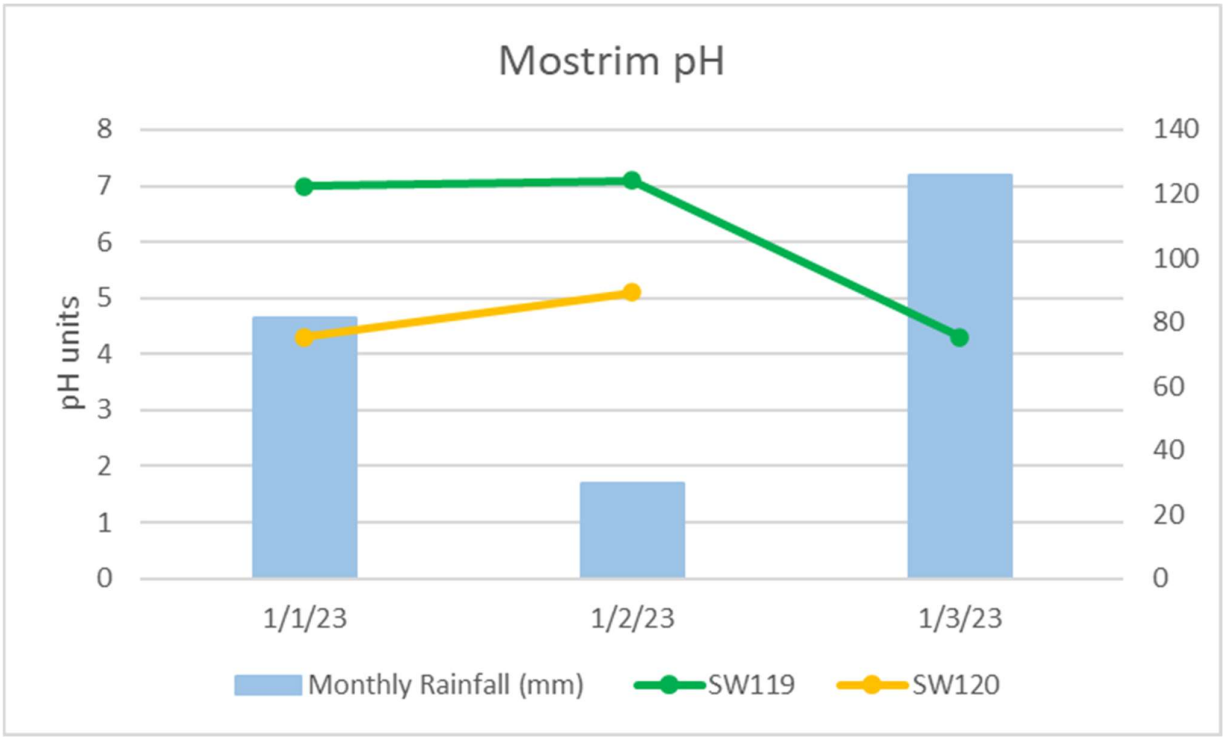


Figure AP13.1. pH in water sampling at Mostrim bog from different discharge points.